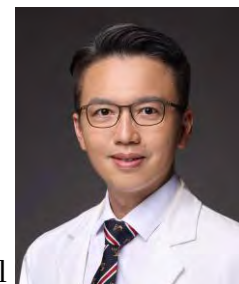


CURRICULUM VITAE



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Education:

1994~2001 MD; Chang Gung University, Taoyuan, Taiwan

Post-Graduate Education:

2006/9~2011/8 PHD; Graduate Institute of Clinical Medical Sciences, Chang Gung University, Taoyuan, Taiwan

Employment Record:

July 2000~June 2001	Internship, Chang Gung Memorial Hospital
Aug 2001~Aug 2004	R1, R2 & R3, Div of General Surgery, Chang Gung Memorial Hospital
Aug 2004~Aug 2006	Fellow, Div of Thoracic & Cardiovascular Surgery, Chang Gung Memorial Hospital
July 15~31, 2006	Fellow, Div of Thoracic Surgery, National Cancer Center, Tokyo, Japan
Aug 2006~	Attending Staff, Div of Thoracic & Cardiovascular Surgery, CGMH
July 2008~June 2011	Lecturer, Div of Thoracic & Cardiovascular Surgery, CGMH
Aug 2009~Aug 2011	Lecturer, Department of medicine, Chang Gung University
July 2011~June 2014	Assistant professor, Div of Thoracic & Cardiovascular Surgery, CGMH
Aug 2012~Sep 2015	Assistant professor, Department of medicine, Chang Gung University
July 2014~June 2019	Associate professor, Div of Thoracic & Cardiovascular Surgery, CGMH
Oct 2015~ July 2020	Associate professor, Department of medicine, Chang Gung University
Jan 2016~ June 2023	Vice-Director, Robotic surgery center, CGMH
July 2017~ June 2023	Chief, Department of thoracic surgery, CGMH
July 2017~ June 2023	Director, International Medical Center, CGMH
July 2019~	Professor, Div of Thoracic & Cardiovascular Surgery, CGMH
July 2020~ June 2026	Chief, Department of Thoracic and Cardiovascular Surgery, CGMH
July 2020~	Vice-Director, Cancer center, CGMH
Aug 2020~	Professor, Department of medicine, Chang Gung University
July 2023~	Director, Robotic surgery center, CGMH
Feb 2024~	Deputy Chief, Department of Surgery, CGMH

Board Certification:

1. Taiwan Surgical Association, No:5333, 2005.
2. Taiwan Association of Thoracic & Cardiovascular Surgery, No: 324, 2006.
3. Taiwan Society of Pulmonary and Critical Care Medicine, No: 0909, 2006.
4. Taiwan Society of Critical Care Medicine, No: 297, 2007.

5. Taiwan Society for Vascular Surgery, No: S00407, 2007.
6. Taiwan Society of Thoracic Surgeon, No: 005, 2018.

Research Project (Principal Investigator):

1. 2007.11~2008.10 以免疫染色法探討食道癌經電化學治療後病理完全反應之機轉及預後因子分析
Evaluating mechanism of pathological complete response after induction CCRT in esophageal cancer and prognostic factor identification (CMRPG361201) 長庚醫院
2. 2009.08~2010.07 以 RT-PCR array 來系統性探討食道癌經電化療後之機轉及預後因子 Systemic evaluation of molecular mechanism and prognostic factors after neoadjuvant CRT in esophageal cancer by RT-PCR array (NMRPG380041) 國科會 98-2314-B-182A-036-
3. 2009.09~2010.08 淋巴結微轉移在電化療後食道癌患者之預後意義 The prognostic significance of lymph node micrometastases after chemoradiotherapy in esophageal cancer patients (CMRPG380961) 長庚醫院
4. 2011.01~2012.12 以高侵襲性細胞子株及腫瘤轉移動物模式來系統性探討食道癌轉移相關機轉 Systemic evaluation of the molecular mechanism in esophageal cancer metastases: From invasion subline to animal model (CMRPG290561) 長庚醫院
5. 2011.08~2012.07 以放射線抗性細胞子株研究模式來尋找與食道癌放化療抗性相關之 microRNA 分子 MicroRNA markers of radioresistance in esophageal cancer: from radioresistant subline to clinical investigation (NMRPG2A0011) 國科會 100-2314-B-182A-018-
6. 2012.08~2014.07 以放射線抗性細胞子株及動物模式來系統性探討 microRNA 在食道癌放療抗性相關機轉 MicroRNA markers of radioresistance in esophageal cancer: from radioresistant subline to animal (NMRPD1B1431/NMRPD1B1432) 國科會 101-2314-B-182-094-MY2
7. 2013.07~2014.12 以順鉑載子治療惡性肋膜積液動物模式 Cisplatin-eluting beads for malignant pleural effusion: In vivo and in vitro studies (CMRPG3C1281) 長庚醫院
8. 2013.08~2014.10 使用可吸收性化療藥物釋放三層複合奈米薄膜預防食道癌切緣復發：體外及動物模式 Prevention of margin recurrence in esophageal cancer using biodegradable sandwich-structured nanofibrous cisplatin-eluting membranes: In vitro and in vivo study (NMRPD1C0651) 國科會 102-2628-B-182-007
9. 2015.01~2016.02 以具抗生素釋放功能引流管治療膿胸：體外及動物實驗 Antibiotics eluting pigtail catheter for pleural space infection : in vivo and in vitro studies (CMRPG3E1091)長庚醫院
10. 2015.02~2016.09 以可吸收性帶化療藥物複合奈米薄膜預防食道癌環狀切緣復發：腫瘤動物模式 Prevention of circumferential margin recurrence in esophageal cancer using biodegradable nanofibrous chemotherapeutic drug-eluting membranes: Animal cancer models (CMRPG3E0721) 長庚醫院
11. 2015.08~2016.07 以順鉑載子治療惡性肋膜積液：體外及腫瘤動物模式 Cisplatin-eluting pellets for malignant pleural effusion: In vivo and animal cancer models (NMRPD1E1191)科技部 104-2314-B-182-048
12. 2016.10~2019.9 比較以術前斷層掃描輔助與術中多軸落地式X光攝影機輔助對微小肺腫瘤定位之優劣:前瞻性臨床研究 Comparison of Preoperative CT Scan Guided and Intraoperative Hybrid DynaCT Scan-Guided Small Lung Tumor Localization: A Randomized Study(CMRPG3F1811)長庚醫院
13. 2017.01~2017.12 利用全民健康保險研究資料庫及台灣癌症登記檔來建立食道癌病患接受放化

療後是否能達到明顯反應之預測模型 Establishing a prediction model for chemoradiotherapy response in esophageal cancer by using National Health Insurance Research Database and Taiwan Cancer Registry(CMRPG3G0291)長庚醫院

14. 2017.08~2018.07 以具磁導與腫瘤特異性膜抗原抗體分子雙重標靶功能之奈米順鉑化療藥物進行肋膜腔內高溫化學治療：體外及腫瘤動物模式 Dual tumor-targeted cisplatin-conjugated magnetic nanoparticles for intrapleural thermochemotherapy : In vitro and animal cancer model(NMRPG3G0651) 科技部 MOST 106-2314-B-182-034
15. 2017.10~2018.09 系統性分析食道鱗狀上皮癌病患接受化療及手術後之預後因子：經同步性放化療後之食道癌的病人接受微創手術或傳統開胸手術治療後之結果比較 Safety and oncological outcome of Thoracoscopic esophagectomy for treatment of esophageal cancer after neoadjuvant chemoradiotherapy: a histological comparison with open esophagectomy using propensity-score matching analysis (CORPG3G0771/ CORPG3G0781)長庚醫院
16. 2018.07~2019.06 食道鱗狀上皮癌接受胸腔鏡手術及達文西機器手臂手術的比較 Robotic-assisted Esophagectomy vs. Video-Assisted Thoracoscopic Esophagectomy(REVATE) : A Multicenter Open-label Randomized Controlled Trial (CMRPG3H0951/ XPRPG3H0091) 長庚醫院
17. 2018.08~2019.07 結合循環腫瘤細胞、分析型態學及臨床資訊建立食道癌放化療後病理完全反應預測平台 An integrated detection platform for pathological complete response after chemoradiotherapy in esophageal cancer based on the combined signatures of circulating tumor cells, analytic morphomics, and clinical informatics MOST (NMRPG3H0491)科技部 107-2314-B-182A-162
18. 2019.08~2020.07 利用整合型正子暨核磁共振掃描評估食道癌病人接受前導性放化療與食道切除術療效的前瞻性研究 Investigating the role of integrated 18FDG-PET/MRI in predicting the treatment outcome of neoadjuvant concurrent chemoradiotherapy followed by esophagectomy for patients with esophageal cancer(NMRPG3J0051)科技部 108-2314-B-182A-021 -
19. 2019.10~2020.09 食道癌病患經放化療後病理反應相關預測及預後因子分析：以 CROSS 配方治療食道鱗狀上皮癌：臨床試驗與現實世界結果比較 Pathological response after chemoradiotherapy in esophageal cancer: predictor and prognosticators: CROSS Regimen for Esophageal squamous cell carcinoma: The Difference Between Clinical Trial and Real World Data (CORPG3J0631/ CORPG3J0611) 長庚醫院
20. 2020.07~2022.06 結合深度切片、循環腫瘤細胞及臨床資訊評估食道癌病患誘導性放化療後個人化治療之可行性 Accuracy of detecting residual disease after neoadjuvant chemoradiotherapy for esophageal squamous cell carcinoma (CMRPG3K0761/ CMRPG3K0762) 長庚醫院
21. 2020.08~2023.07 食道癌外泌體 RNA 作為反應評估及預後追蹤之生物標誌 Circulating Exosomal miRNAs as Potential Prognostic and Response Predictive Biomarkers for Esophageal Cancer(NMRPG3K6181/ NMRPG3K6182/ NMRPG3K6183)科技部 109-2314-B-182A-125 -MY3
22. 2021.10~2022.09 臨床整合型多面向探討食道癌新輔助放化療最佳組合及病理評價方式之總計畫/子計畫一：食道癌切除術前不同輔助治療方案的存活分析 Neoadjuvant chemoradiotherapy for esophageal cancer: a multidimensional analysis / Outcomes of commonly used neoadjuvant chemoradiotherapy regimens for esophageal cancer (CORPG3L0311/CORPG3L0341) 長庚醫院
23. 2022.07~2023.06 整合型達文西機械手臂單孔系統臨床應用之子計畫一：達文西機械手臂單孔系統於前縱膈腔腫瘤切除手術之應用 A Prospective, Single-Center Investigation of the da Vinci SP® Surgical System in Anterior Mediastinal Disease(CIRPG3M0021) 長庚醫院

24. 2022.07~2023.06 整合型達文西機械手臂單孔系統臨床應用之子計畫二：達文西機械手臂單孔系統於解剖性切除手術之應用 Pilot study of single port robotic surgery for anatomical lung resection(CIRPG3M0031) 長庚醫院
25. 2023.08~2026.07 利用胞外囊泡內之非編碼核糖核酸作為亞洲非吸煙女性早期肺腺癌的臨床生物標誌及功能性探討 Extracellular vesicle-encapsulated non-coding RNAs as functional and clinical biomarkers in non-smoker Asian females with early stage lung adenocarcinoma (NMRPG3N6201) 國科會NSTC112-2314-B-182A-116 -MY3
26. 2023.11~2026.10 局部侵犯之食道鱗狀上皮癌接受前導型化學及放射治療併腫瘤切除手術與治癒型化學及放射治療暨必要時進行腫瘤切除手術之比較 Neoadjuvant Chemoradiotherapy and Surgery for Esophageal Squamous Cell Carcinoma versus Definitive Chemoradiotherapy with Salvage Surgery as Needed (CMRPG3N1171)長庚醫院
27. 2023.12~2024.11 臨床整合型微創食道癌手術併發症及教科書結果標桿分析之子計畫一：比較機械手臂輔助與胸腔鏡手術食道癌切除術後的教科書結果達成率及生存率 Benchmark analyses in minimally invasive esophagectomy—with special emphasis on surgical complications and textbook outcome / Textbook Outcome and Survival after Esophagectomy for Cancer: Robotic versus Video-assisted Thoracoscopic Surgery (CORPG3N0521 /CORPG3N0531)長庚醫院

Publication:

(A) Papers:

1. **Chao YK**, Liu YH, Hsieh MJ, et al: Controlling difficult airway by rigid bronchoscope--an old but effective method. Interact Cardiovasc Thorac Surg 2005Jun;4(3):175-9. (IF=1.978; Surgery 136/211)
2. **Chao YK**, Liu YH, Ko PJ, et al: Treatment of esophageal perforation in a referral center in Taiwan. Surg Today 2005Oct;35:828-32 (SCI ; IF=2.077 ; surgery 87/203)
3. **Chao YK**, Changchien CR, Hsieh PS, et al: Brain metastases from colorectal cancer: A retrospective study of 39 patients. J Soc Colon Rectal Surgeon (Taiwan) 2005Dec;16:135-40.
4. **Chao YK**, Hsieh MJ, Liu YH, et al: Extramedullary Hematopoiesis: A Forgotten Cause of Mediastinum Mass. Thorac Med 2006Dec;21(6):529-33.
5. **Chao YK**, Ko PJ, Yeow KM, et al: Video-assisted thoracoscopic surgery for catamenial hemoptysis: the rationale of preoperative computed tomography-guided hook-wire localization. Surg Laparosc Endosc Percutan Tech 2006Dec;16(6):437-8. (SCI ; IF=1.227 ; Surgery 113/203)
6. **Chao YK**, Liu YH, Hsieh MJ, et al: Incorporated home-made long endotracheal tube: a useful option for treating mucus plugging following silicone stenting. Respiriology 2007Sep;12:780-2. (SCI ; IF=4.756 ; Respiratory system 11/63)
7. Hsieh MJ, Liu YH, **Chao YK**, et al: Risk factors in surgical management of thoracic empyema in elderly patients. ANZ J Surg 2008Jun;78(6):445-8. (SCI ; IF=1.605 ; Surgery 121/203)
8. **Chao YK**, Chan SC, Chang HK, et al: Salvage surgery after failed chemoradiotherapy in squamous cell carcinoma of the esophagus. Eur J Surg Oncol 2009Mar;35(3):289-94 (SCI ; IF=3.379 ; Surgery 35/203)
9. **Chao YK**, Chan SC, Liu YH, Chen HW, Wan YL, Chang HK, Fan KH, Liu HP*: Pretreatment T3-4

stage is an adverse prognostic factor in patients with esophageal squamous cell carcinoma who achieve pathological complete response following preoperative chemoradiotherapy. *Ann Surg* 2009Mar;249(3):392-6. (SCI ; IF=13.787 ; Surgery 2/211)

10. Liu YH, **Chao YK**, Wu YC, et al: Bullae ablation in primary spontaneous pneumothorax. *World J Surg* 2009May;33(5):938-42. (SCI ; IF=2.768; Surgery 56/203)
11. Liu YH, Wu YC, Hsieh MJ, **Chao YK**, et al: Extra-long Montgomery T tube in major airway stenosis. *J Laryngol Otol* 2009Jul;123(7):772-7. (SCI; IF=1.261 ; Otorhinolaryngology 33/42)
12. Chuang WY, Yeh CJ, Wu YC, **Chao YK**, et al: Tumor cell expression of podoplanin correlates with nodal metastasis in esophageal squamous cell carcinoma. *Histol Histopathol* 2009Aug;24(8):1021-7 (SCI; IF=1.777; Pathology 47/76)
13. **Chao YK**, Yeh CJ, Chuang WY, et al: Prognostic significance of immunohistochemically detected lymph node micrometastases in pT0N0 esophageal squamous cell carcinoma. *J Surg Oncol* 2009Dec;100(7):559-62 (SCI;IF=3.114;Surgery 42/203)
14. Ko PJ, Liu CY, Wu YC, **Chao YK**, et al: Granulation formation following tracheal stenosis stenting: influence of stent position. *Laryngoscope* 2009Dec;119:2331-6 (SCI; IF=2.343; Otorhinolaryngology 12/42)
15. **Chao YK**, Wu YC, Liu YH, et al: Distant nodal metastases from intrathoracic esophageal squamous cell carcinoma: characteristics of long-term survivors after chemoradiotherapy. *J Surg Oncol* 2010Aug;102(2):158-62 (SCI;IF=3.114;Surgery 42/203)
16. **Chao YK**, Yeh CJ, Chang HK, et al: Impact of circumferential resection margin distance on locoregional recurrence and survival after chemoradiotherapy in esophageal squamous cell carcinoma. *Ann Surg Oncol* 2011Feb;18(2):529-34 (SCI; IF=3.681; Surgery 27/203)
17. Yeh CJ, Chuang WY, **Chao YK**, et al: High expression of phosphorylated 4E-binding protein 1 is an adverse prognostic factor in esophageal squamous cell carcinoma. *Virchows Arch* 2011Feb;458(2):171-8 (SCI; IF=2.868; Pathology: 24/76)
18. Hu HC, Liu YH, Wu YC, Hsieh MJ, **Chao YK**, et al: Granulation tissue formation following Dumon airway stenting: the influence of stent diameter. *Thorac Cardiovasc Surg* 2011Apr;59(3):163-8 (SCI; IF=1.152; surgery 155/203)
19. **Chao YK**[†], Wu YC[†], Yang KJ, et al: Pulmonary perfusion with L-arginine ameliorates post-cardiopulmonary bypass lung injury in a rabbit model. *J Surg Res* 2011May;167(2):e77-83 (SCI; IF=1.872;Surgery 104/203)
20. Chen WH, Ko PJ, Liu CY, Wu YC, Hsieh MJ, Chen TP, **Chao YK**, et al: Dumon Y-stent in the Management of Central Airway Disease Involving the Carina. *Thoracic Medicine* 2011Oct;26(5):252-60.
21. **Chao YK**, Chuang WY, Yeh CJ, et al: Prognostic significance of high podoplanin expression after

- chemoradiotherapy in esophageal squamous cell carcinoma patients. J Surg Oncol 2012**Feb**;105(2):183-8 (SCI; IF=3.114; Surgery 42/203)
22. Chen SW, Tsai FC, Tsai FZ, **Chao YK**, et al: Surgical risk and outcome of repair versus replacement for late tricuspid regurgitation in redo operation. Ann Thorac Surg 2012**Mar**;93(3):770-5.(SCI;IF=5.102;Surgery 28/211)
 23. **Chao YK**, Chuang WY, Yeh CJ, et al: High phosphorylated 4E-binding protein 1 expression after chemoradiotherapy is a predictor for locoregional recurrence and worse survival in esophageal squamous cell carcinoma patients. J Surg Oncol 2012 **Mar**;105(3):288-92 (SCI; IF=3.114; Surgery 42/203)
 24. Chen WH, **Chao YK***, Chang HK, et al: Long-term outcomes following neoadjuvant chemoradiotherapy in patients with clinical T2N0 esophageal squamous cell carcinoma. Dis Esophagus 2012**Apr**;25(3):250-5.(SCI; IF=2.323; Gastroenterology & Hepatology 60/84) (corresponding author)
 25. Ko PJ, Chu Y, Wu YC, Liu CY, Hsieh MJ, Chen TP, **Chao YK**, et al: Feasibility of endoscopic transoral thoracic surgical lung biopsy and pericardial window creation. J Surg Res 2012**Jun**;175(2):207-14 (SCI; IF=1.872;Surgery 104/203)
 26. **Chao YK***, Liu HP, Hsieh MJ, et al: Impact of the number of lymph nodes sampled on outcome in ypT0N0 esophageal squamous cell carcinoma patients. J Surg Oncol 2012**Sep**;106(4):436-40 (SCI; IF=3.114; Surgery 42/203) (corresponding author)
 27. **Chao YK**, Chang HC, Wu YC, et al: Management of lung metastases from colorectal cancer: video-assisted thoracoscopic surgery versus thoracotomy--a case-matched study. Thorac Cardiovasc Surg 2012**Sep**;60(6):398-404 (SCI; IF=1.152; surgery 155/203)
 28. **Chao YK***, Liu HP, Hsieh MJ, et al: Lymph node dissection after chemoradiation in esophageal cancer: a subgroup analysis of patients with and without pathological response. Ann Surg Oncol 2012**Oct**;19(11):3500-5 (SCI; IF=3.681; Surgery 27/203)
 29. Liu CY, Chu Y, Wu YC, Hsieh MJ, Chen TP, **Chao YK**, et al: Comparison of hemodynamic and inflammatory changes between transoral and transthoracic thoracoscopic surgery. PLoS One 8:e50338, 2013**Jan**;8(1):e50338 (SCI; IF=2.776; Multidisciplinary Sciences 24/69)
 30. Chen YJ, Lee LY, **Chao YK**, et al: DSG3 facilitates cancer cell growth and invasion through the DSG3-plakoglobin-TCF/LEF-Myc/cyclin D1/MMP signaling pathway. PLoS One 2013**May**;8(5):e64088 (SCI; IF=2.776; Multidisciplinary Sciences 24/69)
 31. Wang CW, Teng YH, Huang CC, Wu YC, **Chao YK**, et al: Intrapulmonary lymph nodes: computed tomography findings with histopathologic correlations. Clin Imaging 2013**May**;37(3):487-92, (SCI; IF=1.136; Radiology, Nuclear Medicine & Mesical Imaging 109/129)
 32. **Chao YK**[†], Liu KS[†], Wang YC, Huang YL, Liu SJ: Biodegradable cisplatin-eluting Tracheal Stent

for malignant airway obstruction: In vivo and in vitro studies. Chest 2013**Jul**;144(1):193-9 (SCI; IF=9.657; Respiratory system 5/63)

33. **Chao YK**, Tseng CK, Wen YW, et al: Using Pretreatment Tumor Depth and Length to Select Esophageal Squamous Cell Carcinoma Patients for Nonoperative Treatment After Neoadjuvant Chemoradiotherapy. Ann Surg Oncol 2013**Sep**;20(9):3000-8 (SCI; IF=3.681; Surgery 27/203)
34. Yang PS, Yeh CS, **Chao YK***. Boerhaave's syndrome secondary to migration of gastrostomy tube. Hong Kong Journal of Emergency Medicine 2013**Nov**;20(6):400-1 (SCI; IF=0.170; EMERGENCY MEDICINE 28/29) (corresponding author)
35. Chen SH, Chan SC, **Chao YK**, Yen TC. Detection of Synchronous Cancers by Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography during Primary Staging Workup for Esophageal Squamous Cell Carcinoma in Taiwan. PLoS One 2013**Nov**; 8: e82812. (SCI; IF=2.776; Multidisciplinary Sciences 24/69)
36. Chiu CH, **Chao YK***, Chang HK, et al: Interval Between Neoadjuvant Chemoradiotherapy and Surgery for Esophageal Squamous Cell Carcinoma: Does Delayed Surgery Impact Outcome? Ann Surg Oncol 2013**Dec**;20(13):4245-51 (SCI; IF=3.681; Surgery 27/203) (corresponding author)
37. Wu YC, Yen-Chu, Yeh CJ, Hsieh MJ, Chen TP, **Chao YK**, Wu CY, Yuan HC, Ko PJ, Liu YH*, Liu HP. Feasibility of transumbilical surgical lung biopsy and pericardial window creation. Surg Innov. 2014**Feb**;21(1):15-21 (SCI; IF=1.472; Surgery 131/203)
38. Huang RW, **Chao YK***, Wen YW, et al: Predictors of pathological complete response to neoadjuvant chemoradiotherapy for esophageal squamous cell carcinoma. World J Surgical Oncol 2014**May**;12:170 (SCI; IF=1.966; Surgery 91/203) (corresponding author)
39. Yin SY, **Chao YK***, Tseng CK, et al: Bronchoscopic finding determined outcome after chemoradiotherapy in esophageal cancer patients with airway invasion. J Surg Oncol 2014**Jun**;109(8):808-11 (SCI; IF=3.114; Surgery 42/203) (corresponding author)
40. Chuang WY, Yeh CJ, **Chao YK**, et al: Concordant podoplanin expression in cancer-associated fibroblasts and tumor cells is an adverse prognostic factor in esophageal squamous cell carcinoma. Int J Clin Exp Patho 7(8):4847-56, 2014.(SCI; IF=0.205; Pathology 76/76)
41. **Chao YK**, Kawada K, Kumagai Y, Takubo K, Wang HH: On endocytoscopy and posttherapy pathologic staging in esophageal cancers, and on evidence-based methodology. Ann N Y Acad Sci 1325(1):1-7, 2014.(SCI; IF=4.8; Multidisciplinary Science)
42. Chen WH, Huang YL, **Chao YK***, et al: Prognostic significance of lymphovascular invasion in patients with esophageal squamous cell carcinoma treated with neoadjuvant chemoradiotherapy. Ann Surg Oncol 2015 **Jan**;22(1):338-43 (SCI; IF=3.681; Surgery 27/203) (corresponding author)

43. **Chao YK**, Wen YW, Liu KS, Wang YC, Wang CW, Liu SJ: Biodegradable drug-eluting pellets provide steady and sustainable cisplatin release in the intrapleural cavity: In vivo and in vitro studies. *Int J Pharm* 2015**Feb**19;484(1-2):38-43 (SCI; IF=4.213; Pharmacology & Pharmacy 44/267)
44. **Chao YK***, Yeh CJ, Lee MH, Wen YW, Chang HK, Tseng CK, Liu YH: Factors associated with false-negative endoscopic biopsy results after neoadjuvant chemoradiotherapy in patients with esophageal squamous cell carcinoma. *Medicine* 2015**Feb**;94(8):e588 (SCI; IF=1.870; Medicine, General & Internal 69/160) (corresponding author)
45. **Chao YK**, Liu YH, Hsieh MJ, Wu YC, Chen TP, Lu MS, Lu HI, Liu HP* : Long-Term Outcomes After Thoracoscopic Resection of Stage I and II Thymoma: A Propensity-Matched Study. *Ann Surg Oncol* 2015**Apr**;22(4):1371-6 (SCI; IF=3.681; Surgery 27/203)
46. Lu HY, Chu Y, Wu YC, Liu CY, Hsieh MJ, **Chao YK**, Wu CY, Yuan HC, Ko PJ, Liu YH*, Liu HP. Hemodynamic and inflammatory responses following transumbilical and transthoracic lung wedge resection in a live canine model. *Int J Surg* 2015 Apr;16(Pt A):116-22 (SCI; IF=3.158; Surgery 40/203)
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201. Chen LWY, **Chao YK**, Wong AWJ, Chen PH, Lee CP, Chang KH, Illias A, Cheng C, Pang ST, Chen DY, Sung CWH, Huang JJ, Lu JCY, Chuang DCC, Chang TNJ. The history and development of sympathetic trunk reconstruction: a 40-year journey from open surgery to robotic-assisted microsurgery. *J Robotic Surg* 2025 **Jun** 30;19:337. (SCI; IF= 3; Surgery 48/312)
202. Yang TY, Wu CY, Hsieh MJ, **Chao YK**, Wu CF. Association of Wearable Activity Monitors and Digital Drainage Device With Daily Ambulation and Length of Stay Among Pulmonary Resection Patients: A Prospective, Randomized Controlled Study. *Thoracic Cancer*. 2025 **Jul** 23;16(14):e70132. (SCIE; IF= 2.3; Respiratory system 51/108, Oncology 208/328)
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 208. Tseng SK, Chou PL, Chen WH, Liu KS, Fang HY, Hu HC, Hsieh MJ, Cheng CH, **Chao YK**, Liu YH. Safety and early outcomes of nighttime lung transplantation with a surgical multidisciplinary team in a low-volume center. Journal of Thoracic Disease. 2025 **Oct** 31;17(10):8279-89 (SCIE; IF=1.9; Respiratory System 70/108)
 209. Rajendran R, Ong ECW, **Chao YK***. A novel intercostal approach for single-port robotic right upper lobectomy: Surgical technique. JTCVS Techniques. 2025 **Dec** 2;35:102168. (ESCI; IF=1.9; Cardiac & Cardiovascular Systems 61/210)
 210. Fang HY, Cheng C, Chou PL, **Chao YK***. Feasibility and Efficacy of Mobile Three-Dimensional c-Arm Systems for Single-Stage Localization and Resection of Small Pulmonary Nodules: A Pilot Clinical Trial. Interdiscip Cardiovasc Thorac Surg. 2025 **Dec** 22;41(1). (SCIE; IF= 1.3; Cardiac & Cardiovascular Systems 167/231, Respiratory System 81/108, Surgery 190/314)
 211. Shyu S, Cheong DCF, Chen CF, **Chao YK**, Huang JJ. Microsurgical Chest Wall Reconstruction with Abdominal Flaps for Large Full-Thickness Oncologic Defects. Seminars in Plastic Surgery. 2026 **Jan** 29;40(01):89-96. (SCIE; IF= 1.2; Surgery 205/314)
 212. Chen LWY, Sung CWH, **Chao YK**, Cheng C, Pang ST, Chang TNJ. Evolution of Robotic-Assisted Sympathetic Trunk Reconstruction: Technical Innovation and Clinical Experience. Seminars in Plastic Surgery. 2026 **Jan** 30;40(01):50-4. (SCIE; IF= 1.2; Surgery 205/314)
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 214. Huang CY, Lin CY, Lui KW, **Chao YK**, Lee LY, Huang YL, Hsieh CH, Fan HC, Lin AC, Chang KP. SSTR2-targeting therapy in EBV-positive and EBV-negative metastatic nasopharyngeal carcinoma. Am J Cancer Res. 2026 **Feb** 28;16(2):496. (SCIE; IF= 2.9; Oncology 153/328)
 215. Cheng C, Wen YW, Chien MS, **Chao YK***. Chronic Neuralgia After Single-Port Versus Multiport Trans-Subxiphoid Robotic Mediastinal Surgery: A Prospective Single-Arm Pilot Study With Historical Controls. The International Journal of Medical Robotics and Computer Assisted Surgery. 2026 **Apr** 2;22(2):e70158. doi: [10.1245/s10434-024-15460-0](https://doi.org/10.1245/s10434-024-15460-0) (SCIE; IF= 2.1; Surgery 102/314) (corresponding author)

216. Chiu CH, Lin J, Zhang P, Chang AC, Derstine BA, Ross BE, Enchakalody B, Shah NV, Liu YH, Wang SC, **Chao YK***. The effects of neoadjuvant chemoradiotherapy-related frailty by analytic morphomics in esophageal cancer. *J Cardiothorac Surg*. 2026 **Apr** 12. <https://doi.org/10.1186/s13019-026-03959-4>(SCIE; IF= 1.5; Cardiac & Cardiovascular Systems 149/231, Surgery 175/314) (corresponding author)
217. Suzuki Y, Sarkaria IS, Kim S, Awais O, Van Hillegersberg R, Ruurda J, **Chao YK**, Grimminger P, Li Z, Li C, Yuan C, Hölzen JP, Juratli MA, Pascher A, Fuchs HF, Bruns CJ, Bellaio L, Lozanovski V, Fujita T, Van Det MJ, Kouwenhoven EA, Haveman JW, Van Etten B, Gisbertz SS, Van Berge Henegouwen MI, Van Boxel GI, Straatman J, Nilsson M, Rouvelas I, Mala T, Førland DT, Benedix F, Lorenz E, Rouanet P, Mourregot A, Immanuel A, Giacobuzzi S, Preston SR, Daiko H, Müller BP, Babic B, Beyer K, Semaan A, Jarosciakova S, Li H, Strignano P, Piessen G, Chiu PW, Milone M, Egberts JH, Sallum RAA, Ferrari G, Luketich JD, Alicuben ET. Regional characteristics of esophageal cancer and robot-assisted minimally invasive esophagectomy (RAMIE): an analysis of the international UGIRA registry. *Dis Esophagus*. 2026 **Apr** 30;39(2). (SCIE; IF= 2.3; Gastroenterology & Hepatology 80/148)
218. Huang TC, Liang CW, Li YI, Guo JC, Lin CC, **Chao YK**, Shen WC, Cheng AL, Hsu CH. Tertiary lymphoid structures predict outcomes of neoadjuvant chemoradiotherapy in patients with locally advanced esophageal squamous cell carcinoma. *BMC Cancer*. 2026 **May** 8. (SCIE; IF= 3.4; Oncology 118/328)
219. Ong ECW, Lee JH, **Chao YK***. Ivor Lewis uniportal robot-assisted minimally invasive esophagectomy via an intercostal approach using the da Vinci® SP system: A technical note with a video vignette. *Asian Journal of Surgery*. 2026 **May** 27. (SCIE; IF= 3.8; Surgery 30/314) (corresponding author)
220. Leow OQY, Chou PL, Wang YC, Huang SC, Chen WH, Wu CF, Fang HY, Wu CY, Liu YH, **Chao YK**, Chiu CH. The impact of modified esophageal stenting on oral intake in delayed spontaneous esophageal perforation. *J Cardiothorac Surg*. 2026 **May** 31. (SCIE; IF= 1.5; Cardiac & Cardiovascular Systems 149/231, Surgery 175/314)
221. De León Ayala IA, Hou MM, Cheng YT, Chang FC, Chen CY, Chu PH, Liu KS, Yeh CH, **Chao YK**, Chen SW. Positron emission tomography-guided planning is associated with improved outcomes after thoracic endovascular aortic repair in T4b esophageal cancer. *J Vasc Surg*. 2026 **Jul** 20;84(2):555-6. (SCIE; IF= 3.9; Peripheral Vascular Disease 24/100, Surgery 34/321)
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(B) Book:

1. **Yin-Kai Chao**. (2020). *Robotic Esophagectomy Procedure Guide*. Taoyuan, TW: Chang Gung Memorial Hospital.

2. Hsin-Yueh Fang, Chuan Cheng, **Yin-Kai Chao**.(2023) Image-guided VATS Guidebook (ARTIS Pheno). Taoyuan, Taiwan: Chang Gung Memorial Hospital.
3. Charlène J. van der Zijden, Xing Gao, Bianca Mostert, Manon C.W. Spaander, Michail Doukas, Sjoerd Lagarde, Chi-Ju Yeh, Wen-Yu Chuang, Shao-Hsuan Lee, I-Chen Wu, Yung-Kuan Tsou, Ta-Chen Huang, Chen-Kan Tseng, **Yin-Kai Chao** & Bas P.L. Wijnhoven.(2024) Esophageal Squamous Cell Carcinoma. Hoboken, NJ John: Wiley & Sons Inc.
4. **Yin-Kai Chao**. (2023). Robotic reversal of thoracic sympathectomy (Chapter 22). In Ali Zamir Khan, Shyam Kolvekar(Eds.), Operative Manual of Robotic Thoracic Surgery (pp. 205–214). Singapore: Springer.
5. **Yin-Kai Chao**. (2025). Contributor. Atlas of Robotic Reconstructive Procedures in Plastic Surgery(Chapter 16). New York, NY: Springer.

Honor/Award:

1. 2006 Taiwan Surgical Association Best Surgical Video Award (2006 台灣外科醫學會最佳手術錄影帶獎)
2. 2008 Taiwan Association of Thoracic and Cardiovascular Surgery 5th young investigator award (2008 台灣胸心外學會新秀論文獎)
3. 2009 17th Annual Meeting of the Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS). Young Investigator's Award (2009 亞洲胸心外學會新秀論文獎)
4. 2009 Taiwan Association of Thoracic and Cardiovascular Surgery 6th young investigator award (2009 台灣胸心外學會新秀論文獎)
5. 2010 Outstanding Research Award; Division of Surgery; Chang Gung Memorial Hospital (2010 長庚醫院外科部年度傑出研究獎)
6. 2010 Taiwan Association of Thoracic and Cardiovascular Surgery 7th president award (2010 台灣胸心外學會理事長論文獎)
7. 2011 International College of Surgeons-Taiwan Section; Excellent Paper Competition Distinction Award (2011 國際外科學會中華民國總會優秀論文競賽特優獎)
8. 2012 Taiwan Association of Thoracic and Cardiovascular Surgery 9th president award (2012 台灣胸心外學會理事長論文獎)
9. 2013 Taiwan Association of Thoracic and Cardiovascular Surgery 10th president award (2013 台灣胸心外學會理事長論文獎)
10. 2013 Taiwan society of pulmonary and critical care medicine, Young Investigator award (2013 台灣胸重加護醫學會優秀論文獎)
11. 2014 Taiwan Association of Thoracic and Cardiovascular Surgery 11th president award (2014 台灣胸心外學會理事長論文獎)
12. 2015 American College of Surgeon International Scholarship (2015 美國外科醫學會國際研究學者獎勵)
13. 2015 Taiwan Association of Thoracic and Cardiovascular Surgery 12th president award (2015 台灣胸心

外學會理事長論文獎)

14. 2016 Taiwan Association of Thoracic and Cardiovascular Surgery 13th president award (2016 台灣胸心外學會理事長論文獎)
15. 2016 European Society for Medical Oncology Asia Congress Travel Grant for Young Oncologist (2016 歐洲腫瘤醫學會年輕學者研究獎勵)
16. 2017 Taiwan Association of Thoracic and Cardiovascular Surgery 14th president award (2017 台灣胸心外學會理事長論文獎)
17. 2018 European Society of Thoracic Surgeons 26th Medtronic Prize (2018 歐洲胸腔外科年會最佳口頭報告獎)
18. 2018 Taiwan Association of Thoracic and Cardiovascular Surgery 15th president award (2018 台灣胸心外學會理事長論文獎)
19. 2018 Clinical Group: Young Investigator award; Chang Gung Memorial Hospital (2018 長庚醫學研究臨床組青年獎)
20. 2019 Taiwan Society of Thoracic Surgeons 1st president award (2019 台灣胸腔外科學會理事長論文獎)
21. 2019 Chang Gung University Distinguished Alumni (2019 長庚大學傑出校友)
22. 2022 Huang Oulin Honorary Speaker Professor National Specialist Center for da Vinci Robotic Esophageal Surgery Shanghai Chest Hospital (2022 上海胸科醫院達文西手術機器人中國食管外科臨床手術示範中心黃偶麟特聘教授)
23. 2024 Yeoh Ghim Seng Visiting Professor Department of Surgery National University of Singapore (2024 新加坡國立大學外科部客座教授)
24. 2025 The Phi Tau Phi Scholastic Honor Society of the Republic of China Membership(斐陶斐榮譽學會會員)
25. 2025 The American Association for Thoracic Surgery(AATS) Membership (美國胸腔外科醫學會 正式會員)
26. 2025-2028 Biomedical Journal Editorial Committee(長庚醫誌 編輯委員)

List of invited talks

International conferences and workshops

1. 2024/8/28: Asia Pacific Thoracic Masters' Series Think Again-The Power of Knowing What You Don't Know About Segmentectomy, Taiwan "*Left Upper Lobe Segmentectomy: How I do it*"
2. 2024/8/23: SEATS, Manila, Philippines "(1)*Long-Term Outcome of Patients with Peripheral Ground Glass Opacity-Dominant Lung Cancer After Sublobar Resections*, (2)*Percutaneous Lung tumor localization: How I do it*"
3. 2024/8/4: IRCAD, Taiwan "(1)*Minimally invasive esophagectomy: current evidence*. (2)*Management of RLN palsy after esophagectomy*"
4. 2024/7/26: The Penang Surgical Symposium with MUGIS Conference, Malaysia "(1) *Evolution of Oesophagectomy: From Human Hands to Laparoscopic Instruments to Endo-Robotic Arms*, (2) *Robotic-Assisted Minimally Invasive Esophagectomy (RAMIE)*"
5. 2024/7/10: 10th APGCC & 15th SGCC ASM, Singapore "*Debate: RAMIE should replace MIE for Esophageal Cancer*"
6. 2024/7/12: Robotic Surgery Society of Singapore, Singapore "*Recent Advances in Robotic Surgery*"
7. 2024/7/4: 2024 Annual meeting of the Japan Esophageal Society (JES), Tokyo, Japan "*Robot-Assisted Minimally Invasive Esophagectomy versus Thoracoscopic Approach: A Multi-institutional Study from Taiwan*"
8. 2024/6/24: Upper GI Course of Robotic Surgery in Grosseto, Italy "*Esophagectomy for cancer Open, Laparo-thoracoscopic or Robotic?*"
9. 2024/6/22: Society of Robotic Surgery SRS Annual Meeting, Orlando, USA "(1) *The Best Approach to Recurrent Laryngeal Nerve Lymph Node Dissection*, (2) *Robotic Thymectomy: Subxyphoid Approach*"
10. 2024/6/21: Fujian Cross-Straits Medicine Exchange Association, Fujian, China "*Robotic Sympathetic Trunk Reconstruction for Compensatory Sweating After Thoracic Sympathectomy*"
11. 2024/4/27: American Association for Thoracic Surgery (AATS) Annual Meeting, Toronto, Canada "*Subcostal Uniportal Robotic Lung Resection A Pilot Trial (NCT05535712)*"
12. 2023/12/9: 2nd Lee Yung Kyoon Memorial Symposium, Seoul, Korea "*Learning curve in RAMIE and MIE. How I teach it*"
13. 2023/11/9: IRCAD, Strasbourg, France "*Standard and extended mediastinal lymphadenectomy*"
14. 2023/10/19: 76th Annual Scientific Meeting of the Japanese Association for Thoracic Surgery (JATS), Sendai, Japan "*MIE and RAMIE: Lessons learned from REVATE trial*"
15. 2023/9/21: 2nd SEATS Meeting, Bangkok, Thailand "(1) *Right Side Segmentectomy How I do it?* (2) *Esophagectomy Step by Step How I do it?*"
16. 2023/9/14: 2023 KATSO Autumn Conference, Gyeongju, Korea "*General thoracic surgery in Taiwan: Research hot spots and ongoing surgical trials*"
17. 2023/8/23: SRS Congress, Brazil "*Robotic McKeown Esophagectomy*"
18. 2023/7/24: SRS Annual Meeting, Melbourne, Australia "(1) *Uniportal Lobectomy*, (2) *Recurrent Laryngeal Nerve Lymph Node Dissection*"
19. 2023/7/15: Ningbo Thoracic Tumor Forum, Zhejiang, China "*Single port Robotic Lung Surgery: Results from CGMH trial*"

20. 2023/6/29: Intuitive webinar, Taiwan *“How to we take advantage of the da Vinci technology for Thoracic surgery”*
21. 2023/6/9: 1st UGIRA Congress in conjunction with the 6th Annual Meeting of the Taiwan Society of Thoracic Surgeons Robotic Esophagectomy, Taipei, Taiwan *“Lessons learned from REVATE trial”*
22. 2023/6/2: Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS), Busan, Korea *“Recent clinical Trials in Esophageal surgery”*
23. 2023/5/23: Upper GI Course of Robotic Surgery in Grosseto, Italy *“Esophagectomy for cancer: open, laparo-thoracoscopic or robotic?”*
24. 2023/5/6: AATS, Los Angeles, California, USA *“Robotic Sympathetic Trunk Reconstruction for Compensatory Sweating After Thoracic Sympathectomy”*
25. 2022/12/17: 14th ISSS Symposium, Beijing, China *“Robotic Sympathetic Nerve Reconstruction Using Sural Nerve Graft”*
26. 2022/12/17: Cross-Straits Medicine Exchange Association, China *“From VATS to iVATS: The Evolving Role of Thoracic Surgeon”*
27. 2022/12/9: XIII CRSA Worldwide Congress on Robotic Surgery, Rome, Italy *“Esophagectomy for cancer: open, laparo-thoracoscopic or robotic?”*
28. 2022/11/19: 2022 Fujian Province CME Seminar of Advances in Thoracic Cancer Treatment, Xiamen, China *“Minimally Invasive Approach Thoracic Outlet Syndrome”*
29. 2022/11/10: KALC Breakthrough and Excellence in Lung Cancer, Seoul, Korea *“Indocyanine Green Technique for Preoperative Tumor Localization in Lung Cancer”*
30. 2022/11/5: Masterclass in Foregut Surgery 2022, Hong Kong, China *“Management of Esophageal Cancer. Screening and Surveillance for Esophageal Cancer in Asia”*
31. 2022/10/14: IRCAD, Strasburg, France *“Standard and extended mediastinal lymphadenectomy”*
32. 2022/9/29: SEATS, Hue, Vietnam *“Optimization of Access Route and Markers In Hybrid OR”*
33. 2022/9/30: 18th ISDE, Virtual *“(1) Screening Programs in High-incidence Regions, ALDH2 in Asia, (2) Robotic Recurrent Laryngeal Nerve Lymphadenectomy”*
34. 2022/9/15: DASA International Robotic Surgery Symposium, Brazil *“Robotic lymphadenectomy in esophageal cancer”*
35. 2022/6/25: The 7th Southeast Thoracic Surgery Forum, Fuzhou, China *“RLN palsy after esophagectomy”*
36. 2022/5/28: International Summit of Esophageal Surgery Shanghai Chest Hospital Esophageal Surgery Academic Week, Shanghai, China *“Recurrent laryngeal nerve injury after esophageal cancer surgery -quantity? quality?”*
37. 2022/5/20: Cross-Straits Medicine Exchange Association, Xiamen, China *“Thoracic Surgery in 2030 : Evolving Role of Thoracic Surgeon”*
38. 2022/5/14: 13th Zhongshan International Forum on Minimally Invasive Thoracic Surgery, Shanghai, China *“Organ Preservation after nCRT Myth or Reality?”*
39. 2022/3/24: ASCVTS, Nara, Japan *“Minimally Invasive Esophagectomy RAMIE or MIE?”*
40. 2021/12/16: 27th Spanish Congress for Upper GI Surgery, Spain *“ROBOTIC ESOPHAGECTOMY & 3F LYMPHADENECTOMY”*
41. 2021/11/24: IFSES 17th World Congress of Endoscopic Surgery (WCES), Barcelona, Spain *“(1) How to*

- perform endoscopic oesophagectomy, (2) Robotic oesophageal resection*”
42. 2021/11/22: 32nd World Congress of International Association of Surgeons, Gastroenterologists and Oncologists (IASGO), Taipei, Taiwan *“The Ugly Truth of Minimal Invasive Esophagectomy”*
 43. 2021/11/20: 15th Asia-Pacific congress of Endoscopic and Laparoscopic Surgeons of Asia (ELSA), Hong Kong, China *“Robotic esophagectomy”*
 44. 2021/10/27: Esophageal Cancer Forum, Taiwan *“How far should we go? Selecting the right patient”*
 45. 2021/10/26: The 2nd SEA Hematology and Oncology Webinar Series, Taiwan *“IO in Resectable NSCLC in the realm of immunotherapy”*
 46. 2021/10/17: 6th Rujin International Thoracic Symposium, Shanghai, China *“Mid-term Outcome after Robot-assisted Sympathetic Nerve Reconstruction”*
 47. 2021/10/16: Cross-Straits Medicine Exchange Association, China *“From VATS to iVATS: The Evolving Role of Thoracic Surgeon”*
 48. 2021/10/15: IRCAD Upper-GI Robotic Surgery Advanced Course, Strasbourg, France *“Standard and extended mediastinal lymphadenectomy”*
 49. 2021/10/1: 7th Northern Laparoscopic and Robotic GI Video Symposium, Middlesbrough, UK *“Minimal invasive surgical strategies for lymph node dissection in oesophageal cancer”*
 50. 2021/9/4: IRCAD, Taiwan *“How to Become a Key Opinion Leader”*
 51. 2019/7/27: 1st international Thoracic Surgery Fluorescence Consensus Meeting, Hong Kong, China *“Fluorescence-guided Pulmonary Nodule Detection and Localization Techniques in Hybrid Operating Theatre”*
 52. 2019/7/20: 4th Rujin International Thoracic Symposium, Shanghai, China *“Transition from Thoracoscopic to Robotic Subxiphoid Surgery Lesson Learned”*
 53. 2021/7/9: Philippine Association of Minimally Invasive Thoracic Surgeons (PAMITS), Philippine *“Evolution of Esophageal Surgery Minimally Invasive Esophagectomy From MIE to RAMIE”*
 54. 2019/7/4: Asia Thoracic Cancer Care Summit (ATCCS), Hong Kong, China *“Personalized Approach to Small Lung Tumor Localization and Surgery”*
 55. 2019/6/22: Cross-Straits Medicine Exchange Association, Xiamen, China *“ Personalized Approach to Small Lung Tumor Localization and Surgery ”*
 56. 2021/6/21: Society of Thoracic Surgeons Online Course in Robotic Thoracic Surgery (STS) *“Robotic Esophagectomy: Data Overview”*
 57. 2021/6/19: 21 ISMICS REIMAGINED Meeting, Poland *“Mobile 3D C-arm for iVATS vats. The OR of The Future”*
 58. 2021/6/4: ASCVTS 2021 On-line Conference *“Neoadjuvant therapy for locally advanced esophageal cancer”*
 59. 2019/5/30: The 4th Southeast Thoracic Surgery Forum, Fuzhou, China *“Esophagectomy after chemoradiotherapy”*
 60. 2021/5/28: East Asia cancer meeting, China *“Enhancement of EC Surgical Outcome: from Robotic Clinical Trials to Daily Practice”*
 61. 2021/4/24: 1st TUGS Far East Symposium, Beijing, China *“Lymph node dissection in oesophageal cancer surgery The optimal approach”*
 62. 2021/3/12: ATEP ISTSTCON, Shanghai, China *“Robotic reversal of sympathectomy”*

63. 2021/1/21: IRCAD Masterclass: UPPER GI ROBOTIC SURGERY, Strasbourg, France *“Robotic extended mediastinal lymphadenectomy”*
64. 2020/6/24: 28th International congress of the European Association for Endoscopic Surgery (EAES), Poland *“How to perform endoscopic oesophagectomy”*
65. 2020/1/16: IRCAD Upper-GI Robotic Surgery, Strasbourg, France *“Advanced Course Paratracheal lymphadenectomy”*
66. 2019/12/11: UPMC Minimally Invasive Approaches to the Management of Esophageal Cancer, Pittsburgh, Pennsylvania, USA *“Perspective on MIE from Taiwan and Prospective Clinical Trial”*
67. 2019/11/28: IRCAD Advanced Course Minimal Invasive Surgery for Upper GI Tract, Taiwan *“Postoperative care after esophagectomy and evaluation of complications”*
68. 2019/10/3: 33rd EACTS Annual Meeting, Lisbon, Portugal *“Real-world cost-effectiveness of thoracoscopic versus open esophagectomy for esophageal cancer: a nationwide population-based study”*
69. 2019/10/30: ATCSA, Taipei Taiwan *“Surgical procedure for mediastinal lymph node dissection in esophageal cancer (Robotic approach)”*
70. 2019/9/11: Advances in Thoracic Surgery, Oncology and Pulmonology (ATSOP), Singapore *“(1) iVATS in steps: Training as hybrid OR Technician, (2) Optimization of access route and markers in hybrid OR, (3) Hybrid OR and Radiation protection, (4) Difficult Case, Trouble shooting, Collision avoidance in hybrid OR”*
71. 2019/7/4: ATCCS 2019, Hong Kong, China *“Personalized Approach to Small Lung Tumor Localization and Surgery”*
72. 2019/6/6: The 73rd Annual Meeting of the Japan Esophageal Society (JES), Fukuoka, Japan *“Role of Esophageal Surgeon in the Era of Chemoradiotherapy”*
73. 2019/5/24: 7th Asian single port VATS symposium (ASPVS), Nagoya, Japan *“Transition from subxiphoid single port to robotic surgery: lesson learned”*
74. 2019/5/9: 10th Zhongshan International Forum on Minimally Invasive Thoracic Surgery, Shanghai, China *“Organ Preservation after nCRT Myth or Reality?”*
75. 2019/5/4: American Association for Thoracic Surgery 99th Annual Meeting (AATS), Toronto, Canada *“Stepwise approach for robot-assisted thoracoscopic left recurrent laryngeal nerve lymph node dissection”*
76. 2019/3/28: International Summit of Esophageal Surgery Shanghai Chest Hospital Esophageal Surgery Academic Week, Shanghai, China *“Young doctor clinical research report meeting Comment on guests : J.J.B. van Lanschot”*
77. 2019/3/8: INNOVATIONS IN THORACIC SURGERY 2019 (IITS), Seoul, Korea *“Developing a Personalized Approach for Small Lung Tumor Localization and Surgery”*
78. 2019/1/10: Hong Kong Surgical Forum (HKSF), Hong Kong, China *“The Use of Hybrid Orin Minimal Invasive Lung Surgery”*
79. 2018/11/29: 23rd Congress of the Asian Pacific Society of Respirology (APSR), Taipei, Taiwan *“Hybrid Operating Room Dyna-CT-guided Small Lung Tumor Localization: Experience of a Thoracic Surgeon”*
80. 2018/11/22: IRCAD Advanced Course Minimal Invasive Surgery for Upper GI Tract, Taiwan *“Postoperative care after esophagectomy: pain, feeding, drains”*

81. 2018/11/16: 4th Asian Congress of Robotic and Laparoscopic Surgery (ACRLS), Shanghai, China
“Image-Guided Video-Assisted Thoracoscopic Surgery (iVATS)”
82. 2018/10/27: IRCAD Minimally Invasive Esophago-Gastric Surgery, Strasbourg, France
“Esophagectomy: laparoscopic or robotic?”
83. 2018/10/18: ASIAN SUMMIT ON ROBOTICS SURGERY (ASRS), Singapore *“(1) Robotic esophagectomy – Boon or Bane? (2) Technique of robotic esophagectomy: How I do it?”*
84. 2018/10/24: Annual Congress of The Association of Thoracic and Cardiovascular Surgeons of Asia (ATCSA), Yogyakarta, Indonesia *“Image-Guided Video-Assisted Thoracoscopic Surgery (iVATS)”*
85. 2018/9/30: 2018 Taiwan Digestive Disease Week (TDDW), Taipei, Taiwan *“Robotic Surgery for ECJ cancer-Experience from a Thoracic Surgeon”*
86. 2018/9/16: ISDE, Vienna, Austria *“Learning Curve of Robotic and Video-assisted Thoracoscopic Esophagectomy-A Multidimensional Analysis”*
87. 2018/9/15: The 1st Asia Esophageal Cancer Forum, Taichung, Taiwan *“Robotic esophagectomy for esophageal cancer”*
88. 2018/6/24: 1st Global Image Guided Therapy Summit, Macao, China *“Image-guide VATS Learning curve of a Thoracic Surgeon”*
89. 2018/5/27: 26th ESTS Meeting, Ljubljana, Slovenia *“Comparison of Learning Curves Between Robotic and Video-assisted Thoracoscopic Esophagectomy with a Special Focus on RLN nodal dissection”*
90. 2018/4/13: Asia Thoracic Cancer Care Summit (ATCCS), Hong Kong, China *“(1) iVATS, (2) Subxiphoid Approach for Thoracic Surgery”*
91. 2018/3/23: International Summit of Esophageal Surgery Shanghai Chest Hospital Esophageal Surgery Academic Week, Shanghai, China *“Long Term Survivor of Esophageal Cancer Lessons learned from Taiwan Healthcare Database”*
92. 2018/3/8: IRCAD Master Class in Uniportal VATS Advanced Course, Taiwan *“(1) Robotic lung surgery, (2) Image-Guided VATS (iVATS)”*
93. 2017/11/23: IRCAD Advanced Course Minimal Invasive Surgery for Upper GI Tract, Taiwan
“Postoperative care after esophagectomy: pain, feeding, drains”
94. 2017/11/25: 3rd Asian Congress of Robotic and Endoscopic Surgery (ACRES), Taipei, Taiwan
“Protection of Recurrent Laryngeal Nerve During Robotic-Assisted Esophagectomy”
95. 2017/9/13: Advances in Thoracic Surgery, Oncology and Pulmonology (ATSOP), Singapore
“Image-Guided VATS (iVATS) for Early Stage Lung Cancer”
96. 2017/5/12: 8th Zhongshan International Forum on Minimally Invasive Thoracic Surgery, Shanghai, China
“Cost-Effectiveness of Minimal Invasive Esophagectomy: A population-based study”
97. 2017/3/23: Annual meeting of Asian Society of Cardiovascular and thoracic surgery (ASCVTS), Seoul, Korea
“Standardized evaluation of postoperative complication”
98. 2017/3/18: International Summit of Esophageal Surgery Shanghai Chest Hospital Esophageal Surgery Academic Week, Shanghai, China *“Robotic Esophagectomy: VATS vs. RATS-Si vs. RATS-Xi”*
99. 2017/1/22: 2017 annual meeting of Society of Thoracic Surgeon (STS), Houston, USA *“Induction therapy before surgery improves survival in patients with clinical T3N0 esophageal cancer: A nationwide study in Taiwan”*
100. 2016/12/1: 2016 annual meeting of the European Society for Disease of the Esophagus (ESDE),

- Munich, Germany “(1) Incidence of Residual Disease Undetectable on Panendoscopy in Patients with Esophageal Squamous Cell Carcinoma Who Achieve Clinical Complete Response, (2) Bilateral recurrent laryngeal lymph node dissection after neoadjuvant chemoradiotherapy: safety and oncological efficacy in patients with esophageal squamous cell carcinoma”
101. 2016/9/19: 15th ISDE, Singapore “(1) Prognosis of patients with ypT0N0 esophageal cancer: A Nationwide Study, (2) Transition from VATS to RATS for esophagectomy: Are there outcome advantage?”
 102. 2016/7/4: 2016 Annual meeting of the Japan Esophageal Society (JES), Japan “(1) Transition from VATS to RATS for esophagectomy: Are there outcome advantage? (2) Prognosis of patients with ypT0N+ esophageal cancer: A Nationwide Study”
 103. 2016/4/10: Annual meeting of Asian Society of Cardiovascular and thoracic surgery (ASCVTS), Taipei, Taiwan “TRANSITIONING FROM THORACOSCOPIC TO ROBOTIC ESOPHAGECTOMY FOR ESOPHAGEAL CANCER: ARE THERE OUTCOME ADVANTAGES?”
 104. 2015/10/31: 10th Anniversary International Robotic Surgery LIVE, Korea “McKeown Esophagectomy-The Eastern Surgeon's View”
 105. 2015/10/4: 2015 annual meeting of American College of Surgeon (ACS), Chicago, USA “Establishing a Nomogram for the prediction of pathological CR in ESCC”
 106. 2014/4/16: 18th WCBIP/WCBE Congress, Kyoto, Japan “The evolving role of esophagectomy in the era of neoadjuvant chemoradiotherapy”
 107. 2013/4/6: ASCVS, Kobe, Japan “Nonoperative management after neoadjuvant chemoradiotherapy in Esophageal cancer”
 108. 2013/8/30: OESO, Paris, France “The clinical significance of post-therapy pathological stage in patients with esophageal SCC after neoadjuvant CRT”

National conference and workshops(>100 times in the past five years, not listed here)

國內演講

1. 2024/8/13: 台美病患醫療創新論壇科技引領新醫療時代，台北“機械手臂輔助微創手術-在胸腔外科的革新”
2. 2024/8/3: 肺癌聯合討論會 Perioperative Management for Resectable NSCLC，台北“台灣肺癌外科臨床試驗的契機”
3. 2024/06/13: 北榮胸腔科胸腔外科的微創手術達文西手術之最新進展，台北“Robotic Thoracic Surgery bone or bane”
4. 2024/5/4: 長庚體系胸腔及心臟血管外科聯合學術研討會& 住院醫師研究報告競賽，高雄“Neoadjuvant Approach with ICI Setting in Stage II-III NSCLC”
5. 2024/3/6: 台中榮總外科部專題演講，台中“Robotic Thoracic Surgery bone or bane”
6. 2024/3/5: 高雄市立小港醫院專題演講，高雄“Hybrid OR in Thoracic Surgery”
7. 2024/3/5: 台中榮總胸腔外科專題演講，台中“Robotic Lung Surgery my skills and outcome”
8. 2024/1/25: 羅東博愛醫院專題演講，宜蘭“Robotic Lung Surgery my skills and outcome”
9. 2024/1/20: TLCS 台灣肺癌學會北區研討會，桃園“Deep-dive into The Role of Surgery in Advanced EGFR M+ NSCLC”

10. 2023/11/25: TATCS 期肺癌研討會，新北 *“Evolving Treatment Paradigms for Stage III NSCLC”*
11. 2023/10/28: 台灣胸腔及心臟血管外科學會第十九屆第一次會員大會暨學術研討會，台中 *“Robotic versus Thoracoscopic surgery for anterior mediastinal mass and esophageal cancer : A multi-center analysis”*
12. 2023/10/21: Summit Symposium of Treatment for Esophageal Disease，台北 *“Lymph node dissection along the bilateral recurrent laryngeal nerve: How to avoid complication”*
13. 2023/9/7: 大千醫院專題演講，苗栗 *“如何建立高效運轉達文西團隊”*
14. 2023/8/24: 成大外科醫學研究創新週，台南 *“Hybrid OR Application in Thoracic Surgery”*
15. 2023/5/26: 中國醫藥大學演講，台中 *“Robot in Thoracic Surgery: Boon or Bane?”*
16. 2023/2/18: 晚期肺癌局部治療研討會，台北 *“Management of Residual primary tumor affter systemic tx in stage IV NSCLC: when resection is beneficial?”*
17. 2023/2/16: 童綜合醫院全院演講，台中 *“Innovation in Thoracic Surgery From Research to Daily practice”*
18. 2022/12/21: 肺癌研究學會 Overcome the challenge of EGFR M+NSCLC Patients，台北 *“Updates on TKI combinations with surgery for EGFR m+NSCLC: How to implement into our clinical practice?”*
19. 2022/11/26: 長庚中榮研討會，台北 *“Multidisciplinary approach for stage III NSCLC: CGMH EXPERIENCE”*
20. 2022/11/12: 社團法人中華民國放射線醫學會肺癌早期偵測計畫資格審查及品質監測計畫教育訓練課程，台北 *“肺結節的後續處置建議：外科觀點”*
21. 2022/10/30: 臺中榮民總醫院國際醫學研討會-(胸腔外科)，台中 *“Hybrid OR in thoracic surgery: from clinical trial to daily practice”*
22. 2022/10/22: Immunotherapy in Esophageal Cancer: Holistic Approach from Adjuvant to Metastatic，台北 *“Current treatment landscape and unmet needs in locally advanced EC”*
23. 2022/10/22: 長庚醫學週-第 14 屆紀念王創辦人永慶先生研討會醫學新進展，桃園 *“複合式手術室 胸腔外科新進展桃園 Hybrid Operation Room for Chest surgery”*
24. 2022/10/22: Locally advanced lung cancer workshop *“Expert’s point of view-Thoracic Surgery”*
25. 2022/10/8: 台灣多汗症論壇，台北 *“The management of compensatory sweating after thoracic sympathectomy by robotic surgical approach”*
26. 2022/10/4: A New Era of Early Stage Lung Cancer Treatment，台北 *“The Adjuvant Therapy in Early Stage Lung Cancer”*
27. 2022/10/1: 食道癌論壇Taiwan Esophageal Cancer Forum-Live Longer, Live Better，台北 *“Laparo-Gastrosopic Esophagectomy”*
28. 2022/9/26: 長庚肺癌團隊演講，桃園 *“Total Solution for Early Lung Cancer Treatment”*
29. 2022/ 08/25: 台中中國醫藥學院專題演講，台中 *“Curative Lung Resection after TKI in stage IV NSCLC Myth or Reality”*
30. 2022/8/24: 2022 年人體研究暨受試者保護教育訓練臨床試驗之設計與執行(進階)，桃園 *“成功建立高效率臨床試驗團隊的策略”*
31. 2022/8/20: The Treatment Journey from Early Stage to Advanced Lung Cancer，新竹 *“The Adjuvant Therapy in Early-Stage Lung Cancer”*
32. 2022/8/6: 長庚體系胸腔內科研討會，桃園 *“Stage IV Lung Cancer in the Era of TKI How Can We do Better?”*

33. 2022/7/23: 食道疾病之內視鏡診斷與治療研討會，台北 *“Surgery for early esophageal cancer”*
34. 2022/7/13: Lung cancer Treatment，新北 *“Curative Lung Resection after TKI in stage IV NSCLC Myth or Reality”*
35. 2022/7/2: 2022 台灣肺癌學會 Lung Cancer Summer Summit，台北 *“Image-guided percutaneous ablation for lung cancer”*
36. 2022/6/10: 台灣醫學中心協會第十屆第一次會員代表大會暨專題演講，台北 *“林口長庚紀念醫院精準定位打造個人化醫療-領先全球影像導引胸腔鏡手術中心”*
37. 2022/5/25: TLCS Lung cancer symposium *“Shift in Treatment Paradigm for Resectable NSCLC with IO as Neoadjuvant or Adjuvant Therapy”*
38. 2022/5/14: Lung Cancer – Overview and More，台南 *“Adjuvant therapy in early-stage NSCLC”*
39. 2022/4/30: TJCC *“Multiple Ground-glass Opacities of Lungs: Genetic diversity, Natural course and Current management”*
40. 2022/4/24: 2022 年台灣食道癌研究會議，新北淡水 *“目前食道癌研究與治療之爭議”*
41. 2022/3/20: Lung cancer summit，台中 *“Deep-dive into The Role of Surgery in Advanced EGFR M+ NSCLC”*
42. 2022/3/13: Lung Cancer Summit，台北 *“Deep-Dive into the Role of Surgery in Advanced EGFR(+) NSCLC”*
43. 2022-02-19: 肺癌治療新趨勢-病友社團活動 *“晚期肺癌標靶治療合併手術時機與成效”*
44. 2022/1/15: 亞洲食道癌高峰會 *“Minimally Invasive Esophagectomy From MIE to RAMIE”*
45. 2021/12/26: T4b 食道癌的治療共識研討會 Treatment of T4b Esophageal Cancer Seminar，台北 *“Recent Advance for treatment of cT4b esophageal cancer :a literature review”*
46. 2021/12/18: TATCS EC Forum，台北 *“Moving forward! IO development toward earlier treatment in locally advanced EC”*
47. 2021/12/1: 雙和醫院專題演講，台北 *“如何累積第一桶金:小人物學術發展策略”*
48. 2021/11/27: ALEX Forum，台北 *“The Changing Landscape for Resectable NSCLC in Neoadjuvant Setting”*
49. 2021/11/7: Core Curriculum of Lung Cancer Management，台灣肺癌學會線上會議 *“Management of stage III non-small cell lung cancer: the perspective of the surgeon”*
50. 2021/10/16: 台灣胸腔外科醫學會學術討論會線上會議 *“The Changing Landscape for Resectable NSCLC in Neoadjuvant Setting: Crucial Role of Immunotherapy”*
51. 2021/10/2: Taiwan Association for Veterinary Endoscopic Surgery 台灣獸醫內視鏡微創醫學會成立大會暨會員學術研討會，台北 *“Innovation in thoracic surgery”*
52. 2021/9/26: Lung cancer precision medicine forum 台灣心胸外學會線上會議 *“應勢而起的亞肺葉切除手術-從 JCOG0802 談起”*
53. 2021/8/28: ALEX Forum，台北 *“Early stage/ adjuvant treatment”*
54. 2021/8/21: The 2021 Annual Meeting of the Taiwan Society of Thoracic Surgeons Lung Surgery for Metastatic Disease & Mediastinal Tumor Surgery，台北 *“Deep-dive into The Role of Surgery in Advanced EGFR M+NSCLC”*
55. 2021/8/14: 台灣食道癌論壇 2021 Taiwan Esophageal Cancer Forum Into the Unknowns of Esophageal Cancer，台北 *“Minimally invasive esophagectomy: pushing the boundaries to improve surgical*

outcomes”

56. 2021/7/13: 台灣胸腔外科醫學會線上討論會 “三代 EGFR-TKI 於肺癌術後治療研究”
57. 2021/7/10: ADVANCE IN ESOPHAGEAL CANCER “*Optimal Combination of Neoadjuvant Therapy for Esophageal Cancer*”
58. 2021/3/27: 2021 Hybrid OR Meeting Thoracic Surgery, 基隆“複合手術是生存之道”
59. 2021/3/20: Lung Cancer Summit 肺癌治療新紀元, 高雄“*Deep-dive into The Role of Surgery in Advanced EGFR M+ NSCLC*”
60. 2021/3/20: 食道癌多專科高峰論壇, 台中“*Enhancement of EC Surgical Outcome From Clinical Trials to Daily Practice*”
61. 2021/3/14: GI workshop, 台北“*Current treatment options and considerations for locally advanced EC patients*”
62. 2021/3/4: 三軍總醫院專題演講, 台北“*Innovation in Thoracic Surgery From Research to Daily practice*”
63. 2021/1/16: 長庚體系四院區胸腔外科研討會, 桃園“以小搏大: 小人物學術發展策略”
64. 2020/12/19: 第九屆李元麒教授紀念講座暨胸腔外科國際研討會 The 9th Commemorative Lecture of Professor Yung-Chie Lee and International Conference of Thoracic Surgery, 台北“*Innovation in thoracic surgery*”
65. 2020/12/18: 高雄醫學大學附設中和紀念醫院外科部專題演講, 高雄 “*Innovation in Thoracic Surgery From Research to Daily practice*”
66. 2020/12/6: 2020 年第 2 次早期消化道癌症暨創新內視鏡研討會(視訊課程)Management and long-term outcome of superficial long-segment/ circumferential esophageal squamous cell carcinoma “*Minimally-invasive surgery: Advantages and recent advances*”
67. 2020/11/2: 台灣癌症登記學會癌症登記申報規則與醫療專家面對面肺癌多顆腫瘤分期治療與登錄疑義座談, 台北“*肺癌多顆腫瘤國際文獻建議做法及實際案例*”
68. 2020/11/26: 衛福部雙和醫院專題演講, 台北“*Robotic Thoracic Surgery*”
69. 2020/11/17: 嘉義基督教醫院專題演講, 嘉義“*Innovation in Thoracic Surgery From Research to Daily practice*”
70. 2020/11/1: EC advisory board meeting, 台北“*Current Treatment Option and Considerations for Locally Advanced EC Patients Treatment option for esophageal cancer Surgery Definitive CRT Neoadjuvant CRT+S*”
71. 2020/10/24: 長庚肺癌四院區研討會, 桃園“*長庚肺癌趨勢*”
72. 2020/10/23: 花蓮慈濟醫院外科部專題演講, 花蓮“*Innovation in Thoracic Surgery From Research to Daily practice*”
73. 2020/9/21: 高雄長庚醫院外科部專題演講, 高雄“*How to Become a Key Opinion Leader 小人物發展策略*”
74. 2020/9/19: 胸外醫學會年會 The 2020 Annual Meeting of the Taiwan Society of Thoracic Surgeons “*The Application of ICG in Thoracic Surgery*”

75. 2020/7/4: 心胸外麻醉年會 “*Innovation in thoracic surgery*”
76. 2020/6/6: Hybrid OR user meeting “*複合式手術室生存之道*”
77. 2019/12/21: Taiwan intraoperative fluorescence forum (TIFF) 2019 Better surgical treatments with fluorescence imaging “*Fluorescence Imaging in Lung: Small Nodule Localization*”
78. 2019/12/18: 長庚醫院整形外科專題演講 “*An Interdisciplinary Perspective of Image-guided Robotic Surgery*”
79. 2019/9/19: 嘉義長庚醫院全院專題演講 “*Robotic Thoracic Surgery Present and Future*”
80. 2019/6/23: 馬偕醫院專題演講 Navigated Bronchoscopy in Thoracic surgery Main Course or Side Dish , 台北 “*Total Solution for Small Lung Nodule Localization Percutaneous or Endobronchial?*”
81. 2019/6/15: 台灣胸腔外科醫學會年會, 台北 “*CROSS regimen for ESCC Clinical trial vs. Real world data*”
82. 2019/6/14: 新光醫院全院專題演講, 台北 “*Innovation in Thoracic Surgery: From Research to Daily practice*”
83. 2019/4/17: 花蓮慈濟醫院專題演講, 花蓮 “*Minimal Invasive Esophagectomy*”
84. 2019/3/11: 國泰醫院全院專題演講, 台北 “*Innovation in Thoracic Surgery: From Research to Daily practice*”
85. 2019/01/09: 台大醫院胸腔外科演講, 台北 “*Innovation in Thoracic Surgery: From Research to Daily practice*”
86. 2019/01/05: 中國醫藥大學醫院專題演講, 台中 “*Image-Guided Surgery in Thoracic and Upper GI Surgery*”
87. 2018/12/23: VGH Taichung Robotic Symposium , 台中 “*Robotic Thoracic Surgery Past, Present and Future*”
88. 2018/11/19: upper GI SCRUM “*Overview of Esophageal Cancer CGMH-LK experience*”
89. 2018/10/11: 嘉義長庚醫院全院演講, 嘉義 “*Robotics, Technology, and the Future of Thoracic Surgery*”
90. 2018/9/26: 亞東醫院全院演講, 新北 “*Robotics, Technology, and the Future of Thoracic Surgery*”
91. 2018/8/18: 肺小腫瘤定位策略最佳化：成本效益分析, 台北 “*Total Solution for Small Lung Tumor Localization*”
92. 2018/07/28: 免疫腫瘤醫學會 “*Management of Subcentimeter Lung Cancer*”
93. 2017/12/16: 李元麒論壇, 台北 “*The Evolving Role of Esophageal Surgeon in the Era of ChemoRadioTherapy*”
94. 2017/11/25: 長庚醫院 RTO 月會, 桃園 “*Organ Preservation after CRT Myth or Reality?*”
95. 2017/06/24: 北區胸腔鏡論壇 “*雷射導引式胸腔鏡手術-胸腔外科醫師觀點*”
96. 2017/1/7: 頭頸癌四院區研討會, 桃園 “*Management of Lung nodule in H&N SCC patients CGMH-LK Experiences*”

97. 2016/08/27: 長庚達文西演講，桃園“胸腔外科達文西手術:林口長庚經驗分享”
98. 2016/4/23: 達文西機械手臂手術研討會，基隆“達文西手術發展經驗-個人心得分享”
99. 2015/5/23: 北區胸腔鏡論壇“Minimal Invasive Esophagectomy :Chang Gung Experience”
100. 2015/06: 墾丁醫材會議，屏東“*IntraPleural chemotherapy with biodegradable beads In vivo and in vitro results*”
101. 2014/09/28: 心胸外醫學會研討會“The Circumferential Margin in MIE: How far is enough”
102. 2013/12: 胸腔重症醫學會研討會“*Biodegradable cisplatin-eluting Tracheal Stent for malignant airway obstruction: In vivo and in vitro studies*”
103. 2012/11/17: 胸心外醫學會研討會，台南“*Biodegradable cisplatin-eluting Tracheal Stent for malignant airway obstruction: In vivo and in vitro studies*”
104. 2011/3/19: 外科醫學會研討會 The 1st MIE symposium “*Pretreatment T3-4 stage is an adverse prognostic factor in patients with esophageal squamous cell carcinoma who achieve pathological complete response following preoperative chemoradiotherapy*”
105. 2010/5/19: 外科月會“The impact of circumferential resection margin distance on locoregional recurrence and survival after chemoradiotherapy in esophageal squamous cell carcinoma”
106. 2010/10: 胸心外醫學會研討會“*Management of lung metastases from colorectal cancer: VATS versus Thoracotomy: A case-matched study*”
107. 2009/8/15: 秀傳醫院專題演講，彰化“*Circumferential margin distance in pT3 cancer Impact of neoadjuvant CCRT*”
108. 2009/12: 胸腔重症醫學會研討會 “*VATS lobectomy after induction therapy for lung cancer: Chang Gung Experience*”

Feasibility and Early Outcomes of Robotic-assisted Thoracic Surgery using Single Port System through Intercostal Approach

Objective:

Since its introduction into robotic-assisted thoracic surgery, the single-port robotic system has been applied almost exclusively through the outside-the-cage approach, as the 2.5-cm cannula diameter exceeds the typical width of the intercostal space. However, while the outside-the-cage approach provides broad access to the thoracic cavity from its most caudal aspect, it presents two potential limitations. First, for apical pathologies, the instrument length may be insufficient to comfortably reach the target area. Second, and more critically, in the event of major pulmonary vessel bleeding, the outside-the-cage incision trajectory may hinder timely proximal vascular control due to its longer and more tangential path to the hilum. Building upon these considerations, we explored the feasibility of an intercostal single-port robotic approach for thoracic procedures.

Methods:

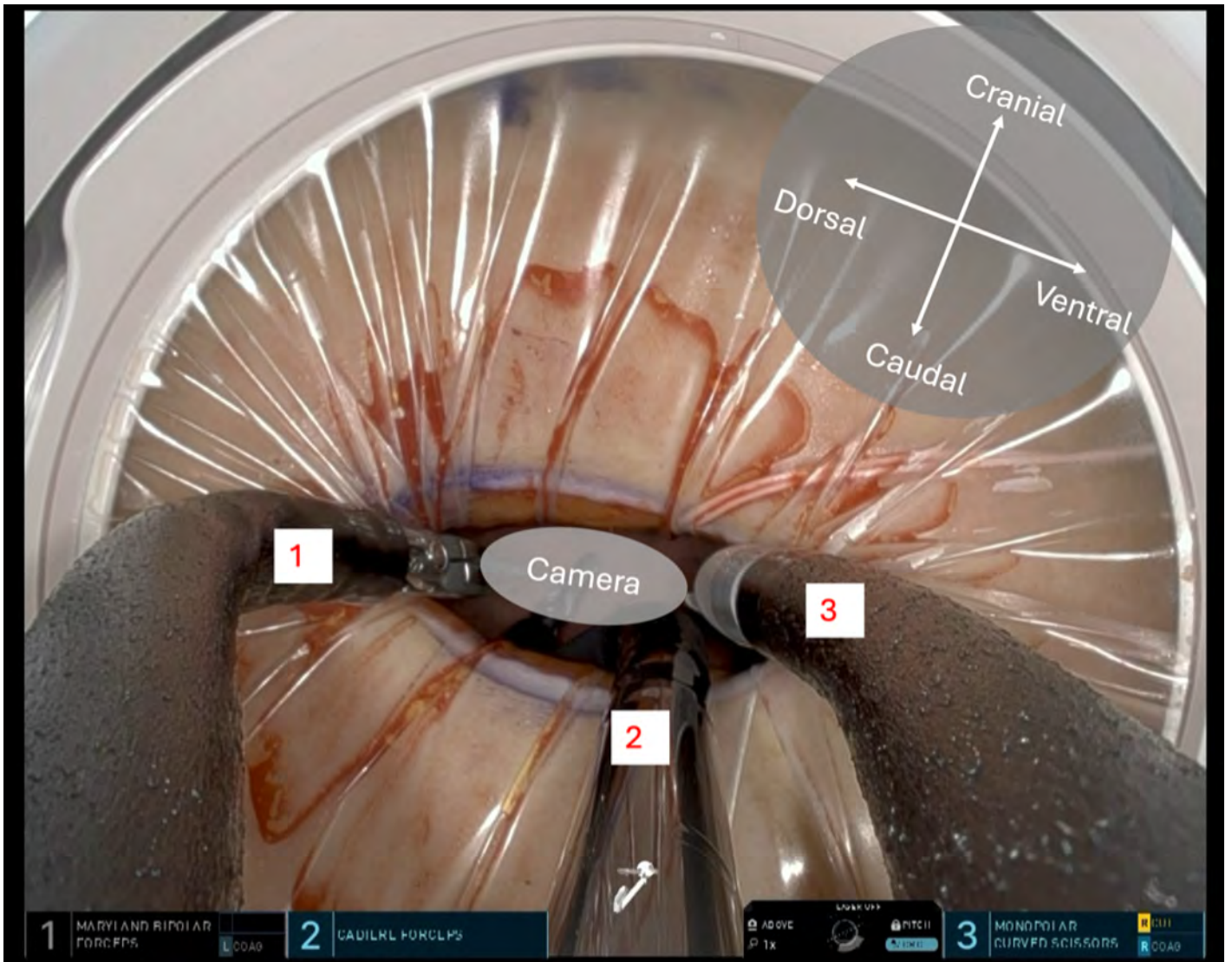
Between 2025/6 and 2025/9, a total of 33 patients underwent robotic-assisted thoracic surgery using the single port robotic system and 12 patients were through intercostal approach. Clinical data of these patients were retrospectively reviewed to assess procedural feasibility and perioperative safety.

Results:

Using the float docking technique, the three instrument arms were fully deployed before entry and then positioned at the extreme right, left, and inferior margins of the intercostal site (Figure 1). This configuration provided sufficient clearance for insertion of the 1.6-cm camera while minimizing instrument crowding at the chest wall and reducing torque at the access site. Procedures included lung resection (lobectomy or segmentectomy) in four patients, esophagectomy in three, posterior mediastinal disease in five. All operations were successfully completed without conversion to thoracotomy or the addition of ports. Two patients experienced postoperative complications of Clavien–Dindo grade ? II. There was no operative mortality, and the median length of postoperative stay was 4 days.

Conclusions:

Robotic-assisted thoracic surgery using single port system through an intercostal approach is feasible and safe across a spectrum of thoracic procedures. Strategic instrument alignment achieved through the float docking technique allows atraumatic insertion of the robotic arms and camera through the intercostal space while maintaining adequate intrathoracic working volume.





Michael Zhen-Yu Tong, MD ★ 4.8 • 131 ratings, 4 reviews

Cardiac Surgery

Locations

1 Cleveland Clinic Main Campus

9500 Euclid Avenue, Cleveland, OH 44195

Phone: Fax:

Need help scheduling? Call [\(888\) 351-2709](tel:(888)351-2709)

Highlights

Age Groups Seen

Adult

Languages

French Chinese English

Gender

Male

About Michael Zhen-Yu Tong

Biography

Michael Zhen-Yu Tong, MD, MBA, FRCSC, is Director of Cardiac Transplantation and Mechanical Circulatory Support and a staff cardiac surgeon in the Department of Thoracic and Cardiovascular Surgery in the Sydell and Arnold Miller Family Heart, Vascular & Thoracic Institute.

Specialty interests: Complex cardiac disease, Ventricular assist devices, Heart transplantation, Aortic surgery, Aortic root and valve sparing root operations, Complex valvular disease, Coronary artery disease including total arterial revascularization, Surgical cardiomyopathy, Complex redo operations, Minimally invasive cardiac operations, Chronic thromboembolic pulmonary hypertension (CTEPH), Pulmonary embolism, Pericardial disease and Cardiac tumors.

Number of Procedures Performed: Cleveland Clinic performs more than 4,000 heart surgeries each year. Dr. Tong performs around 350 cardiac cases annually including over 25 heart transplants, 30 ventricular assist devices, 60 aortic operations, 30 pulmonary endarterectomies and over 100 redo operations

Success rates: As one of the nation's highest-volume cardiac surgical centers, Cleveland Clinic treats highly complex and critically ill patients, performing procedures that only a handful of surgeons across the country can do. You can view success rates for specific procedures at <http://my.clevelandclinic.org/heart/about-heart-vascular-institute/treatment-outcomes.aspx>

Education and Training: Dr. Tong received his doctorate in medicine from McGill University, Montreal, Quebec, Canada. He served his residency in cardiac surgery at the University of Western Ontario, London, Ontario, Canada, and was Chief Resident in his final year of training. During his

Education & Board Certifications

Education

- Residency: University of Western Ontario Hospital, 2012
- Graduate School: University of Western Ontario, 2009
- Medical Education: McGill University Faculty of Medicine, 2006
- Undergraduate: McGill University, 2002

Board Certifications

- Cardiac Surgery: Royal College of Physicians and Surgeons of Canada, 2012

Awards

Fellow, Royal College of Physicians and Surgeons of Canada
Teacher of the Year Award
International Physician of the Year Award from Cleveland Clinic
Top Doctor Award, selected by peers in Cleveland Magazine

Professional Memberships

Society of Thoracic Surgeons; Canadian Cardiovascular Society; Canadian Society of Cardiac Surgeons; Sigma Xi Scientific Research Society

Innovations & Patents

[See publications for this provider.](#)

Research & Publications

[See publications for this provider.](#) (Disclaimer: This search is powered by PubMed, a service of the U.S. National Library of Medicine. PubMed is a third-party website with no affiliation with Cleveland Clinic.)

Industry Relationships

Cleveland Clinic physicians and scientists collaborate with industry to advance medical breakthroughs. These partnerships help commercialize discoveries for public benefit while maintaining scientific integrity. To ensure transparency and minimize potential bias, Cleveland Clinic reviews these relationships and publicly discloses when physicians/scientists receive significant compensation for consulting, serve in fiduciary roles, receive royalties, or hold equity interests related to their work. We manage potential conflicts through approval processes, annual reporting, and targeted management plans.

As of 2024-03-19, Dr. Tong has reported the financial relationships with the companies listed below.

Consulting and/or Speaking. Dr. Tong receives fees of \$5,000 or more per year (or, in rare cases, equity or stock options) as a paid consultant, speaker or as a member of an advisory committee for the following companies:

- ABIOMED, Inc.
- Abbott Laboratories
- LifeNet Health

Public Health Service-Reportable Financial Conflicts of Interest. Cleveland Clinic scientists and physicians engage in basic, translational and clinical research activities, working to solve health problems, enhance patient care and improve quality of life for patients. Interactions with industry are essential to bringing the researchers' discoveries to the public, but can present the potential for conflicts of interest related to their research activities. [Click here](#) to view a listing of instances where Cleveland Clinic has identified a Public Health Service (PHS)-Reportable Financial Conflict of

Interest and has put measures in place to ensure that, to the extent possible, the design, conduct and reporting of the research is free from bias.

** Cleveland Clinic physicians and scientists subscribe to the guidance presented in the PhRMA Code on Interactions with Healthcare Professionals and the AdvaMed Code of Ethics on Interactions with Health Care Professionals. As such, gifts of substantial value are generally prohibited.*

Insurances Accepted

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Ratings & Reviews

★★★★★ 4.8 out of 5 131 ratings, 4 reviews

The Patient Satisfaction Rating is an average of all responses to the care provider related questions shown below from our survey. Patients that are treated in outpatient or hospital environments may receive different surveys, and the volume of responses will vary by question.

Listens	★★★★★ 4.7
Explains	★★★★★ 4.8
Courtesy Respect & Concern	★★★★★ 4.9
Patient Rating of Doctor	★★★★★ 5

★★★★★ 5 out of 5 Reviewed on 9/16/2025

Dr. Tong inspired a lot of confidence.

★★★★★ 5 out of 5 Reviewed on 8/19/2025

I will always recommend Dr. Tong's practice. Always.

★★★★★ 5 out of 5 Reviewed on 8/19/2025

If there was a box labeled the best in his field anywhere, I would have checked it. Dr. Tong is

MCS in older patients, pushing the boundaries of what is possible

Abstract

The application of mechanical circulatory support (MCS) in older patients continues to expand as device technology and perioperative management advance. Contemporary data suggest that carefully selected elderly patients can achieve acceptable survival with durable mechanical support. Optimal outcomes depend on individualized patient selection, timely initiation, and alignment of therapy with clinical and patient's personal goals."

Last name D'JOURNO Xavier Benoit (date of birth 14/03/1976)	Fist Name	POSITION TITLE MD, PhD, Full Professor
--	-----------	--

EDUCATION/TRAINING

Aix-Marseille University Medical School (1994-1999)
General Surgery Residency - Aix-Marseille University (2000-2005)
Research and Clinical Fellow - Catholic University of Leuven (Belgium) (2005)
Thoracic Surgery Residency - Aix-Marseille University (2006-2007)
Research and Clinical Fellow - University of Montreal, QC (Canada) (2007-2008)
European Board Certified Thoracic Surgeon (FECTS) (2009)
French Board Certified Thoracic Surgeon (2010)



INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
Aix-Marseille University	Master Science (M.Sc)	2000	Medicine
Aix-Marseille University	Medical Doctor (M.D)	2005	Medicine
Aix-Marseille University	Physician Doctor (Ph.D)	2010	Medicine
Aix-Marseille University	Assistant Professor	2010	Thoracic Surgery
Aix-Marseille University	Full Professor	2013	Thoracic Surgery

Professional address:

Department of Thoracic Surgery, Aix-Marseille University, Hôpital Nord, Chemin des Bourrely, 13915 Marseille, France.
Tel: +33 491 966 001, Fax: +33 491 966 004, GSM: +33612442626, Mail address: xavier.djourno@ap-hm.fr
Research Unit: Aix-Marseille University, CNRS, INSERM, Cancer Research Center of Marseille (CRCM)

Interest: Thoracic oncology, Esophageal surgery, Minimally invasive surgery, Lung transplantations, Robotic Surgery

Positions

- Director of the accreditation system of the French Society of Thoracic and Cardiovascular Surgery (2020-2022)
- President of the French Thoracic and Cardiovascular surgery (FSCTCV) (2022-2025)
- Head of the Department of Thoracic surgery, North Hospital, Aix-Marseille University (2023-)
- Head of the Thorax Division, North Hospital, Aix-Marseille University (2023-)
- Director of Education of the European Society of Thoracic Surgery (ESTS) (2026-)

Membership and Honors

- ESTS Greek Pioneers Prize (2007), ESTS Brompton Prize (2009), , Member of the European Society of Thoracic Surgeons (ESTS), Member of the French Society of Thoracic and Cardiovascular Surgery (FSCTCV), Member of the International Society of Disease of the Esophagus (ISDE)

Scientific expertise

Associate Editor of Journal of Diseases of the Esophagus, **Assistant Editor** of European Journal of Thoracic and Cardiovascular Surgery. **Reviewer for** : Revue des Maladies Respiratoires; Chest Journal; The/ Journal of Diseases of Esophagus; European Journal of Cardio-Thoracic Surgery; Annals Thoracic/ Surgery; Plosone; British J Surg; J Thor Cardio-vasc; Ann Surg

- **184 peer-reviewed publications and 3995 Time citations;**
- **SIGAPS (2022-2025): 332**
- **H-index : 40**
- **Nb of oral communicational and posters in national and international meeting : 90, 25 book Chapters including**
- **ORCID number: 0000-0001-6747-4583 ; Web of science reaseach ID: AAJ-4457-2021; ICH Good Clinical Practice E6 (R2) 30/10/2023**

23/04/2026

Pr D'Journo Xavier Benoit

N°ordre 20843; RPPS : 10004081377, n°adeli 131208431

Current management of adenocarcinoma of esophagus and gastro-esophageal junction

The incidence of adenocarcinoma of the esophagus and gastroesophageal junction has increased nearly sevenfold over the past two decades in most Western countries. For early-stage disease, endoscopic resection is the preferred treatment for superficial tumors, offering excellent oncologic outcomes with organ preservation, while surgery remains the standard for lesions with submucosal invasion or unfavorable histologic features. Despite advances in multimodal therapies, locally advanced disease continues to carry a high risk of recurrence. Perioperative chemotherapy combined with immunotherapy has recently emerged as a preferred strategy based on the results of contemporary clinical trials. Surgery remains a cornerstone of treatment, guided by key oncologic principles including complete (R0) resection, adequate lymphadenectomy, and optimal timing following neoadjuvant therapy. Minimally invasive and robotic approaches are increasingly utilized to reduce postoperative morbidity without compromising oncologic efficacy. Ongoing efforts focus on refining patient selection and personalizing treatment through the identification of predictive biomarkers to guide immunotherapy. In parallel, organ-preserving strategies are being explored in selected complete responders, with the aim of avoiding unnecessary surgery while maintaining long-term disease control and improving quality of life.

RESUME

Personal Profile

Name/ Degrees	James, Mei-Lin Chan, MD. PHD.	Gender	Male	
Date of Birth	04, 02, 1978	Nationality	Taiwan	

Contact Information

Email Address	mlchan127@gmail.com
Phone	(office) (+886) 02-25433535 (mobile) (+886) 922283366
Mailing Address	
Street	No. 92, Sec. 2, Zhongshan N. Rd.
Post/Zip Code, town, country	Taipei City 10449 (Mackay Memorial Hospital)
Country	Taiwan

Education/ Training Background

Higher Education(University or other degree-awarding institute)					
From (year)	To (year)	Degree(bachelor /master/PhD)	University/ Institute	Country	Subject
1997	2004	Bachelor	Kaohsiung Medical University/ Medicine	Taiwan	School of Medicine
2018	2025	Ph.D	National Yang Ming Chiao Tung University	Taiwan	Institute of Traditional Medicine, School of Medicine

Licenses and Certificates (Medical/Educational/ Other Specialties)

License:-present Physician License (醫師執照)
Taiwan Surgical Association (number: 2-5529)
Taiwan Association of Thoracic and Cardiovascular Surgery (number:432)
Taiwan Society of Thoracic Surgeon (number:00207)
Taiwan Society of Pulmonary and Critical Care Medicine (number: 1165)
Taiwan Society of Critical Care Medicine (number:02614)

Employment History

From (year)	To (year)	Department	Position/ professional status
Jun. 2003	Jul. 2004	National Taiwan University Hospital, Taipei, Taiwan	Interns
Aug. 2004	Jul. 2006	Puli Branch, Taichung Veterans General Hospital, Nantou, Taiwan	Resident /Surgery
Aug. 2006	Sep. 2011	Taipei Veterans General Hospital, Taipei, Taiwan	1. Resident / Surgery 2. Chief Resident / Division Thoracic Surgery 3. Visiting Staff / Division of Thoracic Surgery
2016.08	2019.09	Latner Thoracic Surgery Laboratories, Toronto General Hospital Research Institute, University Health Network, Toronto, Canada	Research Fellow
2012. 07	present	Mackay Memorial Hospital, New Taipei, Taiwan	Senior Visiting Staff / Division of Thoracic Surgery
2025. 04	present	Mackay Medical University, New Taipei City, Taiwan	Assistant Professor

Grants (International/Governmental/Institutional/Industrial/Philanthropic)

1. Resolving the role of lipidomics associated with G1TR/G1TRL axis in protecting human non-small cell lung cancer from chemotherapy; MOST 110-2314-B-195-028, 2021/08/01~2022/07/31 (Principal Investigator)
2.
3.
4.
5.
6.
7.
8.
9.

Publications

1. **James Mei-Lin Chan**, Yuan-Ching Chang, Hua-Chen Chan, Hsiu-Chuan Chan, Wei-Chin Chang, Liu-Fang Wang, Tung-Hu Tsai, Yu-Jen Chen and Wen-Chien Huang. FK228 suppress the growth of human malignant pleural mesothelioma tumor independent to epithelioid or non-epithelioid histology. *Molecular Medicine* (2024) 30:73
2. Tung-Yu Tiong , **Mei-Lin Chan** , Chun-Hua Wang , Vijesh Kumar Yadav , Narpati Wesa Pikatan , Iat-Hang Fong , Chi-Tai Yeh , Kuang-Tai Kuo, Wen-Chien Huang. Exosomal miR-21 determines lung-to-brain metastasis specificity through the DGKB/ERK axis within the tumor microenvironment. *Life Sci.* 2023 Sep 15;329:121945.
3. Licun Wu, Mikihiro Kohno, Junichi Murakami, Amin Ziaa,c , Jonathan Allena, Hana Yuna, **Meilin Chan**, Cristina Baciua , Mingyao Liua, Veronique Serre-Beinierd , Michele De Palmae, Emanuela Felley-Boscog , Jonathan Yeunga, Trevor J. Pughb, and Marc de Perrot Defining and targeting tumor-associated macrophages in malignant mesothelioma. *PNAS* 2023 Vol. 120 No. 9 e2210836120
4. Nai-Wen Su, Lai-Man Mok, **Mei-Lin Chan**, Hung-Chang Liu, Wei-Chin Chang, Chun-Ho Yun, Tze-Yu Shieh, Ming-Che Wu, Huan-Chau Lin, Wen-Chien Huang and Yu-Jen Chen. Impact of Perineural Invasion and Preexisting Type 2 Diabetes on Patients with Esophageal Squamous Cell Carcinoma Receiving Neoadjuvant Chemoradiotherapy. *Cancers* 2023, 15, 1122
5. Kun-Yao Dai, Yu-Chao Yu, Yi-Shing Leu, Chih-Wen Chi, **Mei-Lin Chan**, Chung-Hsin Tsai, Huan-Chau Lin, Wen-Chien Huang, and Yu-Jen Chen. Neoadjuvant Chemoradiotherapy and Larynx-Preserving Surgery for Cervical Esophageal Cancer. *J. Clin. Med.* 2020, 9, 387; doi:10.3390/jcm9020387
6. **Mei-Lin Chan**, Licun Wu, Zhihong Yun, Trevor D. McKee, Michael Cabanero, Yidan Zhao, Mikihiro Kohno, Junichi Murakami & Marc de Perrot. Blocking the GATR-GITRL pathway to overcome resistance to therapy in sarcomatoid malignant pleural mesothelioma. *Communications biology*, 2021; 26;4(1):914. (SCI, 8/93 in Biology)
7. Junichi Murakami, Licun Wu, Mikihiro Kohno, **Mei-Lin Chan**, Yidan Zhao, Zhihong Yun, B C John Cho, Marc de Perrot. Triple-modality therapy maximizes antitumor immune responses in a mouse model of mesothelioma. *Sci Transl Med.* 2021; 13(589):eabd9882. (SCI, 12/195 in Cell Biology)
8. Mikihiro Kohno, Junichi Murakami, Licun Wu, **Mei-Lin Chan**, Zhihong Yun, B C John Cho, Marc de Perrot. Foxp3 + Regulatory T Cell Depletion after Nonablative Oligofractionated Irradiation Boosts the Abscopal Effects in Murine Malignant Mesothelioma. *J Immunol.* 2020; 205(9):2519-2531. (SCI, 45/159 in Immunology)
9. Marc de Perrot, Licun Wu, Michael Cabanero, J Yannis Perentes, Trevor D McKee, Laura Donahoe, Penelope Bradbury, Mikihiro Kohno, **Mei-Lin Chan**, Junichi Murakami, Shaf

- Keshavjee, Ming-Sound Tsao, B C John Cho. Prognostic influence of tumor microenvironment after hypofractionated radiation and surgery for mesothelioma. *J Thorac Cardiovasc Surg.* 2020; 159(5):2082-2091. (SCI, 18/210 in Surgery).
10. Kun-Yao Dai, Yu-Chao Yu, Yi-Shing Leu, Chih-Wen Chi, **Mei-Lin Chan**, Chung-Hsin Tsai, Huan-Chau Lin, Wen-Chien Huang, Yu-Jen Chen. Neoadjuvant Chemoradiotherapy and Larynx-Preserving Surgery for Cervical Esophageal Cancer. *J Clin Med.* 2020; 9(2):387. (SCI, 36/165 in Medicine, General & Internal).
 11. Licun Wu, Irene Dell'Anno, Moshe Lapidot, Yoshitaka Sekido, **Mei-Lin Chan**, Mikihiro Kohno, Veronique Serre-Beinier, Emanuela Felley-Bosco, Marc de Perrot (2019, Jun). Progress of malignant mesothelioma research in basic science: A review of the 14th international conference of the international mesothelioma interest group (iMig2018). *Lung Cancer.* 2019; 127:138-145. (SCI, 12/63 in Respiratory System).
 12. Shi-Hui Law†, **Mei-Lin Chan†(共同第一作者)**, Gopal K Marathe, Farzana Parveen, Chu-Huang Chen, Liang-Yin Ke. An Updated Review of Lysophosphatidylcholine Metabolism in Human Diseases. *Int J Mol Sci.* 2019; 20(5):1149. (SCI, 46/172 in Chemistry, Multidisciplinary).
 13. Zhen-Chian Chen, Wen-Chien Huang, **Mei-Lin Chan**, Hemostatic Sealant Used in Managing. Delayed Extravascular Migration of a Totally Implantable Venous Access Device. *Thorac Med* 2018; 33: 111-116
 14. Licun Wu, Walter Blum, Chang-Qi Zhu, Zhihong Yun, Laszlo Pecze, Mikihiro Kohno, **Mei-Lin Chan**, Yidan Zhao, Emanuela Felley-Bosco, Beat Schwaller, Marc de Perrot. Putative cancer stem cells may be the key target to inhibit cancer cell repopulation between the intervals of chemoradiation in murine mesothelioma. *BMC Cancer.* 2018; 18(1):471. (SCI, 107/223 in Oncology).
 15. Chih-Cheng Hsieh, Yung-Han Sun, Shih-Wei Lin, Yi-Chen Yeh, **Mei-Lin Chan**. Surgical outcomes of pulmonary mucoepidermoid carcinoma: A review of 41 cases. *PLoS One.* 2017; 12(5):e0176918. (SCI, 15/64 in Multidisciplinary Science).
 16. Wen-Chien Huang, **Mei-Lin Chan**, Ming-Jen Chen, Tung-Hu Tsai, Yu-Jen Chen. Modulation of macrophage polarization and lung cancer cell stemness by MUC1 and development of a related small-molecule inhibitor pterostilbene. *Oncotarget.* 2016; 7(26):39363-39375. (SCI, 36/213 in Oncology).
 17. Po-Kuei Hsu, Wei-Cheng Lin, Yin-Chun Chang, **Mei-Lin Chan**, Bing-Yen Wang, Chao-Yu Liu, Wen-Chien Huang, Chih-Hsun Shih, Chia-Chuan Liu. Multiinstitutional analysis of single-port video-assisted thoracoscopic anatomical resection for primary lung cancer. *Ann Thorac Surg.* 2015; 99(5):1739-44. (SCI, 16/198 in Surgery).

廖啓耀 醫師

現職

- * 仁愛長庚合作聯盟醫院 胸腔暨心臟血管外科主任
- * 林口長庚紀念醫院 胸腔暨心臟血管外科 主治醫師

學經歷

- * 華沙醫學大學 醫學士
- * 林口長庚紀念醫院 外科住院醫師
- * 林口長庚紀念醫院 胸腔暨心臟血管外科總醫師

專長

- * LungVision® 支氣管導航切片及肺小結節定位
- * 複合式手術房電腦斷層導引切片及定位
- * 達文西機器人胸腔手術（RATS）
- * 胸腔鏡微創手術（VATS）
- * 食道疾病、縱膈腫瘤及胸壁重建手術

個人簡介

廖啓耀醫師專長於肺癌早期診斷、肺小結節精準治療及微創胸腔手術，長期投入複合式手術房定位手術與機器人胸腔手術的臨床應用。近年積極推動LungVision® 支氣管導航系統 應用於肺周邊病灶切片、肺小結節定位及微創肺切除，結合複合式手術房與達文西機器人手術，建立肺癌精準診療流程，致力提升診斷效率、定位精準度及病人治療品質。

10/17 胸外場/ 40 分鐘

Lunch Symposium (上鉅贊助)

一 ,

Moderator : Po-Kuei Hsu, M.D., PhD.

Speaker : Osbert Qi-Yao Leow, MD.,

Title : Real-world Experience with LungVision™ in Peripheral Lung Lesion Biopsy

Abstract :

With the increasing use of low-dose computed tomography (LDCT) for lung cancer screening, small, peripheral, and ground-glass pulmonary nodules are being detected more frequently. However, bronchoscopic diagnosis and localization of these lesions remain challenging because of their small size and peripheral location. LungVision is a navigation bronchoscopy platform integrating real-time fluoroscopic imaging with augmented navigation to facilitate access to peripheral pulmonary lesions. This report describes the initial experience with LungVision at Jen-Ai Hospital and focuses on the feasibility of its use for bronchoscopic biopsy and preoperative localization of peripheral pulmonary lesions.

二 ,

Moderator: Wen-Chien Huang, M.D., PhD.

Speaker : Mei-Lin Chan, M.D., PhD.

Title : Maximizing the Clinical Value of LungVision™: Insights, Techniques and Best Practices

Abstract :

Peripheral pulmonary nodules remain a significant clinical challenge, requiring

accurate diagnosis and, increasingly, minimally invasive therapeutic interventions. AI-assisted navigation platforms such as LungVision™ have the potential to enhance procedural planning, real-time image registration and correction, facilitate tool-in-lesion confirmation, and support a wide range of bronchoscopic interventions, including tissue diagnosis and image-guided bronchoscopic microwave ablation. These capabilities may also reduce fluoroscopy time, thereby minimizing radiation exposure for both patients and healthcare professionals.

This presentation will explore practical strategies for integrating LungVision™ into clinical practice, focusing on patient selection, workflow optimization, navigation techniques, real-time image registration, and procedural decision-making to improve tool-in-lesion success and procedural efficiency. Practical considerations for adopting AI-guided navigation, overcoming procedural challenges, and optimizing both procedural performance and clinical outcomes will also be discussed.

Drawing upon current evidence, practical experience, and best practices, this presentation aims to provide practical insights into optimizing the use of LungVision™ and supporting the integration of AI-guided navigation into routine clinical practice for both diagnostic and therapeutic bronchoscopic interventions.

15 分鐘 lecture ， 5 分鐘 discussion

CURRICULUM VITAE

Masayuki NAKAO, MD, PhD

Department of Thoracic Surgical Oncology
Cancer Institute Hospital, Japanese Foundation for Cancer Research
3-10-6 Ariake, Koto-ku, Tokyo 135-8550, Japan
TEL: +81-3-3520-0111; FAX: +81-3-3570-0343
E-MAIL: masayuki.nakao@jfcr.or.jp

PERSONAL DATA:

Gender: Male Date of Birth: 15 April, 1978 Nationality: Japanese

WORK EXPERIENCE:

2022-Present

Deputy director

Department of Thoracic Surgical Oncology
Cancer Institute Hospital, Japanese Foundation for Cancer Research, Tokyo, Japan

2013-2021

Attending surgeon

Department of Thoracic Surgical Oncology
Cancer Institute Hospital, Japanese Foundation for Cancer Research, Tokyo, Japan

2012-2013

Clinical fellow

Department of Thoracic Surgical Oncology
Cancer Institute Hospital, Japanese Foundation for Cancer Research, Tokyo, Japan

2010-2011

Senior Resident

Division of Thoracic Surgery, National Cancer Center Hospital East, Chiba, Japan

2007-2009

Resident

Division of Thoracic Surgery, National Cancer Center Hospital East, Chiba, Japan

2003-2006

Resident

Division of General Surgery, Mitsui Memorial Hospital, Tokyo, Japan

EDUCATION:

2003 Awarded the degree of M.D. at the School of Medicine,
University of Tsukuba, Ibaraki, Japan.

2021 Awarded the degree of Ph.D. at Graduate School of Medical Science,
Kitasato University, Kanagawa, Japan.

QUALIFICATION:

Japanese Medical Licence (2003.05.08) No.434383

Board Certified Surgeon of The Japan Surgical Society (2009)

Board Certified Surgeon of The Japanese Association for Chest Surgery (2012)

Board Certified Surgical Instructor of The Japan Surgical Society (2021)

MEMBERSHIPS:

The Japan Surgical Society, The International Association for the Study of Lung Cancer,
The Japanese Association for Chest Surgery, The Japan Lung Cancer Society,
The Japanese Association for Thoracic Surgery, The Japan Society of Respiratory Endoscopy

Current Frontiers in Segmentectomy: Where Should We Go?

Masayuki Nakao, MD.

Department of Thoracic Surgical Oncology, Cancer Institute Hospital, The Japanese Foundation for Cancer Research, Tokyo, Japan

Following the results of the JCOG0802 trial, segmentectomy has been established in Japan as a standard surgical procedure for small peripheral lung cancer, and its impact is spreading worldwide. Recent technological innovations, including preoperative three-dimensional CT simulation and intraoperative navigation using indocyanine green (ICG) fluorescence imaging, have enabled safe and precise anatomical segmentectomy, even in minimally invasive approaches such as VATS and RATS. Currently, several clinical trials aiming to expand the indications for segmentectomy are ongoing in Japan. On the other hand, the recently reported 10-year follow-up results of the JCOG0802 trial have generated considerable discussion and controversy.

Can segmentectomy truly replace lobectomy as the standard procedure for early-stage lung cancer? How should we balance the trade-off between the risk of local recurrence and preservation of pulmonary function? In addition, technical challenges remain, including securing adequate surgical margins and determining the optimal extent of lymph node dissection. Furthermore, with advances in imaging technology, identifying patients who are truly suitable candidates for sublobar resection will become increasingly important.

In this lecture, I will review the latest evidence, including the JCOG0802 trial, and discuss the current controversies surrounding segmentectomy. I will also demonstrate our preoperative planning and surgical techniques for anatomical segmentectomy in daily clinical practice.

Curriculum Vitae

Name: Tsai-Wang Huang



Current position

Professor, National Defense Medical University (2021-)

Director, Department of Surgery (2025.10-)

Education

1995-2002 M.D. School of Medicine, National Defense Medical University

2010-2017 Ph.D. Institute of Medical Science, National Defense Medical University

Professional Training and Employment

2004-2009 Residency train, Tri-Service General Hospital

2009- Attending surgeon, Division of Thoracic surgery, Tri-Service General Hospital

2013-2024 Chief of Thoracic Division, Tri-Service General Hospital

2022-2023 Temple University Hospital, Heart & Lung Transplantation Center

2023-2025 Director, Department of Medical Planning and Management

Academic promotion

2004- 2008 Assistant Professor, National Defense Medical University

2008- 2021 Associate Professor, National Defense Medical University

2021- Professor of Surgery, National Defense Medical University

Honor and Award

2008 Outstanding Young investigator research paper of Taiwan association of Thoracic and Cardiovascular Surgery

2008 Outstanding Young investigator research paper of National Defense Medical Center

2017 National innovation award, Taiwan

2018 Outstanding Research paper of Taiwan association of Thoracic and Cardiovascular Surgery

2023 Kyorin Award of Taipei Medical Association

2025 National Healthcare Quality Award Platinum Award

2025 SNQ Award

Specialist

Robotic Assisted Thoracic Surgery 、 Navigation bronchoscopy 、 Tumor ablation

Research: Clinical studies of lung cancer, TIL of lung cancer 、 3D image simulation 、

Outcome of Cryotherapy for Lung

Tsai-Wang Huang

Division of Thoracic Surgery, Department of Surgery, Tri-Service General Hospital,
National Defense Medical Center, Taiwan

To evaluate the safety, local tumor control, and mid-term oncologic outcomes of percutaneous cryoablation for primary and metastatic lung lesions. 115 cryoablation sessions treating 131 tumors in 93 consecutive patients. The mean tumor size was 18.8 ± 15.7 mm, with 32.8% of lesions exceeding 2 cm. The estimated 1-year local control rate was 78.6%, stabilizing at 64.9% at both 3 and 5 years. For lesions <2 cm, the 1-year local control rate reached 87.5%. Multivariable analysis revealed that metastatic tumor origin was an independent predictor of local recurrence (HR = 0.396 for primary vs. metastatic, $p < 0.05$). The overall survival(OS) rates at 1, 2, and 3 years were 88.2%, 82.8%, and 79.6%, respectively. Tumor size > 2 cm was identified as a powerful independent predictor of mortality (HR = 6.326, $p < 0.01$). Pneumothorax occurred in 35.7% of sessions, with 80.5% requiring chest tube insertion, primarily driven by positive pressure ventilation and multiple pleural punctures; all cases were successfully managed. Percutaneous cryoablation is a safe and effective therapeutic option for primary and metastatic lung tumors. While metastatic lesions carry a higher risk of progression and tumors > 2 cm independently predict worse overall survival, cryoablation achieves excellent local control for tumors <2 cm.

Percutaneous radiofrequency ablation is a therapeutic option for lung tumors. However, percutaneous approaches have limited access to central lung regions and a relatively high complication rate. Some clinical trials revealed feasibility and safety of transbronchial ablation for NSCLC. Navigation bronchoscopy with intervention procedure may be the change the practice in the further.

Curriculum Vitae



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Education

1993-2000 Department of Medicine, National Cheng-Kung University, Medical College, Tainan, Taiwan.

2017 PhD Degree, Institute of Clinical Medicine, National Cheng-Kung University, Tainan, Taiwan.

Post-doctoral training and experience

2001-2003 Residency in Surgery, National Cheng-Kung University Hospital, Tainan, Taiwan.

2003-2005 Chief Residency in General Thoracic Surgery, National

	Cheng-Kung University Hospital, Tainan, Taiwan.
2005-2007	Visiting Staff in Division of Thoracic Surgery, Department of Surgery, National Cheng-Kung University Medical Center Hospital, Dou-Liou Branch, Yun-Lin, Taiwan.
2007/03-06	Clinical fellowship in National Cancer Center, Tokyo, Japan.
2007	Instructor, National Cheng-Kung University Medical College, Tainan, Taiwan.
2007-2009	Visiting Staff in Division of Thoracic Surgery, Department of Surgery, National Cheng-Kung University Hospital, Tainan, Taiwan.
2009/8	Chief of staff, Division of Thoracic Surgery, Chia-Yi Christian Hospital, Chia-Yi, Taiwan.
2016	Assistant Professor, Institute of Medical Sciences, Chang Jung Christian University
2016	Editor board member of "Journal of Respiratory Research"
2024/11	Chief of staff, Department of Surgery, Chia-Yi Christian Hospital, Chia-Yi, Taiwan.

Board Certifications

2000	National Board of Medical Examiners Diplomat, Taiwan
2005	National Board in Surgery, Taiwan
2006	National Board in Cardiothoracic Surgery, Taiwan
2007	National Board in Thoracic Medicine and Critical Care Medicine, Taiwan

Publications

1. Lin CW, Wu YF, Kam KH, Wu YL, Yang YC, Lin ZC*, Chang JM*. Inferior

- Pulmonary Ligament Dissection After Thoracoscopic Bullectomy for Primary Pneumothorax Prevents Recurrence. *J Thoracic Disease*. 2025 Oct 31;17(10):8224-8233. doi: 10.21037/jtd-2025-1022. Epub 2025 Oct 22.
2. Chen LY, Wang CT, Chang JM, Shiau AL, Shieh GS, Tseng YL, Yen YT, Huang TH, Cheng LH, Wu YC, Wu CL, Su BH, Wu P. Aberrant expression of nuclear prothymosin α contributes to epithelial-mesenchymal transition in lung cancer. *Mol Oncol*. 2025 Sep;19(9):2730-2749. doi: 10.1002/1878-0261.70035. Epub 2025 Apr 21.
 3. Chen SY, Wang CT, Huang TH, Tsai JL, Wang HT, Yen YT, Tseng YL, Wu CL, Chang JM*, Shiau AL*. Advancing Lung Cancer Treatment with Combined c-Met Promoter-Driven Oncolytic Adenovirus and Rapamycin. *Cells*. 2024, Sep 23;13(18):1597. doi: 10.3390/cells13181597.
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 5. Chang JM, Kam KH, Liu YJ, Devi N, Tsai TY, Chen KT, Lin PC. Fatigue analyses and life predictions of copper laser-welded lap-shear samples. *Engineering Fracture Mechanics* 2023, 289.
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 11. Chang JM, Kam KH, Chao WY, Zhao PW, Chen SH, Chung HC, Li YZ, Jin-Yi Wu JY, Lee YR. Berberine Derivatives Suppress Cellular Proliferation and Tumorigenesis In Vitro in Human Non-Small-Cell Lung Cancer Cells. *Int. J. Mol. Sci.* 2020, 21(12), 4218.
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15. Tseng YL, Chang CC, Chen YY, Liu YS, Cheng L, Chang JM, Wu MH, Yen YT. From one incision to one port: The surgical technique and the evolution of segmentectomy in patients with pulmonary tuberculosis. *PLoS One*. 2018 May 15;13(5):e0197283.
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 17. Chang JM, Kam KH, Yen YT, Huang WL, MD, Chen W, Tseng YL, Wu MH, Lai WW, Rivas DG. From Biportal to Uniportal Video-Assisted Thoracoscopic Anatomical Lung Resection – A Single Institute Experience. *Medicine (Baltimore)*. 2016 Oct;95(40):e5097.
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 19. Tseng YL, Chang JM, Liu YS, Cheng L, Chen YY, Wu MH, Lu CL, Yen YT. The Role of Video-Assisted Thoracoscopic Therapeutic Resection for Medically Failed Pulmonary Tuberculosis. *Medicine (Baltimore)*. 2016 May;95(18):e3511. doi: 10.1097.
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- Behind and Beyond the Masaoka Staging: A 25-Year Follow-up Study of Tumor Recurrence in Completely Resected Thymic Epithelial Tumors in a Single Institution. *Medicine (Baltimore)*. 2015 Dec;94(52):e2278.
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43. Tsai YF, Wu MH, Lai WW, Tseng YL, Lin MY, Chang JM. Clinical Presentation, Radiological Features, and Surgical Treatment of Bronchogenic Cysts. Thoracic Medicine. 2003;18(3):214-221.

Awards

2004 Best Chief Resident in Teaching, National Cheng-Kung University

Hospital, Tainan, Taiwan.

2005 Best Chief Resident in Teaching, National Cheng-Kung University
Hospital, Tainan, Taiwan.

2009 Best Teaching Instructor in National Cheng-Kung University
Hospital, Tainan, Taiwan.

2015-2016 Certified Symbol of National Quality by Institute of for Biotechnology
and Medicine Industry, Taiwan – New Era for Thoracic Surgery:
Single-Port Thoracoscopic Lobectomy of Ditmanson Medical
Foundation Chia-Yi Christian Hospital.

As the treatment landscape of lung cancer continues to evolve, multidisciplinary collaboration has become increasingly important in optimizing patient outcomes. Thoracic surgeons play a pivotal role throughout the lung cancer treatment continuum, from early diagnosis and biomarker testing advocacy to treatment planning, patient counseling, and long-term disease management.

This session will explore the evolving role of thoracic surgeons within multidisciplinary care, highlighting challenges and opportunities in molecular testing, treatment decision-making, and personalized patient management. Through clinical insights and case-based discussions, participants will gain practical perspectives on how collaborative care can support more individualized treatment strategies and improve outcomes for patients with lung cancer.



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Job Title: Director of Department
Organization: Department of Surgery, National Taiwan University Hospital
Education: MD: School of Medicine/ National Taiwan University
License: Cardiovascular Surgeon license certified in Taiwan
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National Taiwan university hospital	Attending Physician
Cardiovascular surgery	
National Taiwan University	Associate Professor
College of Medicine	
Taiwan Association of Thoracic & Cardiovascular Surgery	Chief Executive Officer
Taiwanese Society of Phlebology	Secretary General
24th ASCVTS	Secretary General
Taiwanese Society of Phlebology	Member of Council
Taiwan Association of Thoracic & Cardiovascular Surgery	Secretary General
Taiwanese Society of Phlebology	President
Association of Thoracic and Cardiovascular Surgeons of Asia	Secretary General

Training:

1998-2000	National Taiwan University Hospital	Resident, general surgery training
2000-2003	National Taiwan University Hospital	Resident, Chief Resident in Thoracic & Cardiovascular Surgery
2004	National Taiwan University Hospital	Fellow in Thoracic & Cardiovascular Surgery

Honors & Awards:

2004	Taiwan Walton Lillehei young investigator award
2006	Asia Walton Lillehei young investigator award (Japan Osaka)
2012	Taiwan Association of Thoracic & Cardiovascular Surgery Distinguished paper award
2012	Taiwanese Society for Phlebology Distinguished paper award

2015	Best Video Presentation of Robotic Surgery (Taiwan Surgical Association)
2016	ASCVTS 2016 Furuse Award (Best Cardiac Paper)
2018	Taiwanese Society for Phlebology (BEST PAPER AWARD)
2020	National Taiwan University Hospital (Recipient of the Outstanding Research Award for Excellence in Innovation of Medical Technology)

Scientific publications:

1. HSUN-YI FU, Wang, Ting-Chuan, CHIH-HSIEN WANG, NAI-KUAN CHOU, I-HUI WU, RON-BIN HSU, SHU-CHIEN HUANG, HSI-YU YU, YIH-SHARNG CHEN, **NAI-HSIN CHI**. Long-term outcomes of aortic valve replacement in dialysis patients - a nationwide retrospective cohort study. 1-Nov-2023. ISSN: 1743-9159
2. NAI-KUAN CHOU , YI-CHIA WANG , CHI-HSIANG HUANG , **NAI-HSIN CHI** Robotic mitral valve repair in National Taiwan University Hospital: 10-year results. Nov-2022. ISSN: 2225-319X
3. **Chi NH**, Fu HY, Yu HY, Wu IH, Wang CH, Chou NK. Comparison of robotic and conventional sternotomy in redo mitral valve surgery. J Formos Med Assoc. 2021 Jun 10;S0929-6646(21)00238-2.
4. Okano R, Liou YJ, Yu HY, Wu IH, Chou NK, Chen YS, **Chi NH**. Coronary Artery Bypass in Young Patients-On or Off-Pump? J Clin Med. 2019 Jan 22;8(2):128.
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6. Huang KC, Wu IH, Chou NK, Yang YY, Lin LC, Yu HY, **Chi NH**. Late outcomes of off-pump versus on-pump coronary bypass in patients with diabetes: A nationwide study from Taiwan. J Thorac Cardiovasc Surg. 2019 Mar;157(3):960-969.e2.
7. Chen JJ, Lin LY, Yang YH, Hwang JJ, Chen PC, Lin JL, **Chi NH**. On pump versus off pump coronary artery bypass grafting in patients with end-stage renal disease and coronary artery disease - A nation-wide, propensity score matched database analyses. Int J Cardiol. 2017 Jan 15;227:529-534.
8. **Chi NH**, Chou NK, Yu YH, Yu HY, Wu IH, Chen YS, Huang SC, Ko WJ, Wang SS. Heart transplantation in endstage rheumatic heart disease-experience of an endemic area. Circ J. 2014;78(8):1900-7.
9. **Chi NH**, Huang CH, Huang SC, Yu HY, Chen YS, Wang SS, Wu IH. Robotic mitral valve repair in infective endocarditis. J Thorac Dis. 2014 Jan;6(1):56-60.
10. Luo CM, Chan CY, Chen YS, Wang SS, **Chi NH**, Wu IH. Long-term Outcome of Endovascular Treatment for Mycotic Aortic Aneurysm. Eur J Vasc Endovasc Surg. 2017 Oct;54(4):464-471.
European Journal Of Vascular And Endovascular Surgery 2017 ; OCT54:464-471
11. Clinical Experience Of Infective Endocarditis Complicated By Acute Cerebrovascular

Accidents. Hsu Chan-Yang, **Chi Nai-Hsin**, Wang Shoei-Shen, Chen Yih-Sharng, Yu Hsi-Yuasian

JOURNAL OF SURGERY 2017 ; MAR40:100-105

12. The Outcome Of Patients Requiring Multiple Extracorporeal Membrane Oxygenation: How Many Runs Of ECMO Is Reasonable? Chou Heng-Wen, Chang Te-I, Wang Chih-Hsien, Chou Nai-Kuan, **Chi Nai-Hsin**, Huang Shu-Chien, Wu I-Hui, Chan Chih-Yang, Ponge Lee-Mei, Wang Ya-Chen, Chen Yih-Sharnginternational
Journal Of Artificial Organs 2016 ; Jun39:288-293
13. Malignancy After Heart Transplantation Under Everolimus Versus Mycophenolate Mofetil Immunosuppression. Yu-Jen Wang . , **Chi Nai-Hsin** , Chou Nai-Kuan , Huang Shu-Chien , Wang Chih-Hsien , Wu I-Hui , Yu Hsi-Yu , Chen Yih-Sharng , Tsao Chuan-I , Shun Chia-Tung , Jo-Ting Tsai . , Wang Shoei-Shen
Transplantation Proceedings 2016 ; Apr48:969-973
14. Low Incidence Of Malignancy After Heart Transplantation In Taiwan. Yu-Jen Wang . , **Chi Nai-Hsin** , Chou Nai-Kuan , Huang Shu-Chien , Wang Chih-Hsien , Wu I-Hui , Yu Hsi-Yu , Chen Yih-Sharng , Tsao Chuan-I . , Shun Chia-Tung . , Jo-Ting Tsai . , Wang Shoei-Shen
Transplantation Proceedings 2016 ; Apr48:974-977
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Journal Of Cardio-Thoracic Surgery 2016 ; Mar49:1006-1007
16. Extracorporeal Membrane Oxygenation For Bridge To Heart Transplantation. Wang Shoei-Shen , **Chi Nai-Hsin** , Wang Chih-Hsien , Huang Shu-Chien , Chou Nai-Kuan , Yu Hsi-Yu , Wu I-Hui , Chen Yih-Sharng , Ko Wen-Je
Journal Of Heart And Lung Transplantation 2015 ; Apr34:S311-S311
17. Improved Outcome Of Extracorporeal Cardiopulmonary Resuscitation For Out-Of-Hospital Cardiac Arrest - A Comparison With That For Extracorporeal Rescue For In-Hospital Cardiac Arrest. Wang Chih-Hsien , Chou Nai-Kuan , Becker Lance B. , Lin Jou-Wei , Yu Hsi-Yu , **Chi Nai-Hsin** , Hunag Shu-Chien , Ko Wen-Je , Wang Shoei-Shen , Tseng Li-Jung , Lin Ming-Hsien , Wu I-Hui , Ma Matthew Huei-Ming , Chen Yih-Sharng resuscitation 2014 ; SEP85:1219-1224
18. Cardiac Repair Using Chitosan-Hyaluronan/Silk Fibroin Patches In A Rat Heart Model With Myocardial Infarction. **Chi Nai-Hsin.**, Yang, M.C., Chung, T.W., Chou, N.K., And Wang, S.S.
Carbohydr Polym 2013 Jan; 92:591-597.
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Biomaterials. 2012 Aug;33(22):5541-51. Epub 2012 May 8.
20. Endomyocardial Biopsy In Heart Transplantation: Schedule Or Event? **Chi Nai-Hsin**,

- Chou NK, Tsao CI, Huang SC, Wu IH, Yu HY, Chen YS, Wang SS.
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21. Isolated Cardiac Sarcoidosis In Heart Transplantation. Chang TI, **Chi Nai-Hsin**, Chou NK, Tsao CI, Yu HY, Chen YS, Wang SS.
Transplant Proc. 2012 May;44(4):903-6.
 22. Extracorporeal Membranous Oxygenation Support For Acute Fulminant Myocarditis: Analysis Of A Single Center's Experience. Hsu KH, **Chi Nai-Hsin**, Yu HY, Wang CH, Huang SC, Wang SS, Ko WJ, Chen YS.
Eur J Cardiothorac Surg. 2011 Sep;40(3):682-8. Epub 2011 Feb 21.
 23. Fungal Infection In Heart Transplant Recipients With Severe Sepsis: Single-Center Experience. Chou NK, **Chi Nai-Hsin**, Wu IW, Huang SC, Chen YS, Yu HY, Tsao CI, Ko WJ, Sun HY, Chang SC, Chu SH, Wang SS.
Transplant Proc. 2010 Apr;42(3):952-4.
 24. Extracorporeal Membrane Oxygenation To Rescue Cardiopulmonary Failure After Heart Transplantation: A Single-Center Experience. Chou NK, **Chi Nai-Hsin**, Wu IW, Huang SC, Chen YS, Yu HY, Tsao CI, Ko WJ, Chu SH, Wang SS.
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Artif Organs. 2009 Nov;33(11):1032-7.
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Biomaterials. 2009 Aug;30(22):3757-65. Epub 2009 May 1.
 30. The Influence Of Rat Mesenchymal Stem Cell CD44 Surface Markers On Cell Growth, Fibronectin Expression, And Cardiomyogenic Differentiation On Silk Fibroin -

Hyaluronic Acid Cardiac Patches. Yang MC, **Chi Nai-Hsin**, Chou NK, Huang YY, Chung TW, Chang YL, Liu HC, Shieh MJ, Wang SS.

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31. Cardiopulmonary Resuscitation With Assisted Extracorporeal Life-Support Versus Conventional Cardiopulmonary Resuscitation In Adults With In-Hospital Cardiac Arrest: An Observational Study And Propensity Analysis. Chen YS, Lin JW, Yu HY, Ko WJ, Jerng JS, Chang WT, Chen WJ, Huang SC, **Chi Nai-Hsin**, Wang CH, Chen LC, Tsai PR, Wang SS, Hwang JJ, Lin FY.
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33. Outcome For Pediatric Cardiac Transplantation With And Without Bridge Methods. **Chi Nai-Hsin**, Huang SC, Chen YS, Yu HY, Chou NK, Hsu RB, Chiu IS, Ko WJ, Chu SH, Chang CI, Wang JK, Wu MH, Wang SS, Lin FY. ASAIO J. 2007 Mar-Apr;53(2):241-5
34. A New Method Of Testing Aortic Valve Competence By Venting Subaortic Chamber. **CHI NAI-HSIN** , S-C HUANG , C-S WU , I-S CHIU. CHIRURGIA 2006;19:31-2
35. Incorporating A Pediatric Concept Into Tricuspid Valve Endocarditis: One And A Half Ventricle Repair. Huang SC, **Chi Nai-Hsin**, Wu IH, Yu HY, Wu ET, Wang SS, Lin FY, Chen YS. J Thorac Cardiovasc Surg. 2006 Jan;131(1):228-9
36. Clinical Experience Of Congenital Left Ventricular Aneurysm. **CHI NAI-HSIN**, H-Y Yu, C-I Chang, F-Y Lin, S-S Wang Thorac Cardiovasc Surg 2004; 52 : 110-116
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41. Extracorporeal Membrane Oxygenation For Perioperative Cardiac Allograft Failure. Chou NK, **Chi Nai-Hsin**, Ko WJ, Yu HY, Huang SC, Wang SS, Lin FY, Chu SH, Chen YS. ASAIO J. 2006 Jan-Feb;52(1):100-3.

Abstract

Mitris™ Resilia Valve: Clinical Experience and Insights from Taiwan

The Mitris™ Resilia valve represents a new generation of surgical bioprostheses specifically designed for the mitral position, combining advanced RESILIA tissue technology with a valve design optimized for mitral valve replacement.

In this symposium, Dr. Nai-Hsin Chi will share his clinical experience with the Mitris™ valve, including patient selection, surgical techniques, and early clinical outcomes from Taiwan. Through real-world cases, the session will highlight the valve's design advantages, implantation considerations, and practical tips for achieving optimal surgical results. Participants will also gain insights into how Mitris™ supports durable valve performance and expands treatment options for patients requiring mitral valve replacement.



Da-Yu Chang

Sr Dist Engr
Surgical

Sr. District Engineer, SURG, Edwards Lifesciences

在愛德華公司擔任工程師 20 年，帶領研發的產品包括 Physio 2, Physio tricuspid, INSPIRS , MITRIS 等，在愛德華公司心臟外科瓣膜產品具有豐富的經驗

從實驗室到手術室：愛德華 RESILIA 瓣膜的研發歷程

Abstract

RESILIA tissue technology was developed to address one of the key challenges in bioprosthetic heart valves—tissue calcification—through innovative tissue preservation and material engineering. Its development involved years of multidisciplinary research, extensive laboratory testing, and rigorous preclinical evaluation before being translated into clinical practice.

In this symposium, Da-Yu Chang, R&D Engineer from Edwards Lifesciences, will present the scientific foundation and engineering journey behind RESILIA technology. The session will explore the rationale for its development, key design considerations, and the research process from concept to commercialization. Attendees will gain insights into how engineering innovation, material science, and collaborative development have contributed to advancing surgical valve technology and supporting the long-term performance of bioprosthetic heart valves.

下川 智樹

しもかわ ともき

Shimokawa Tomoki



職位

主任教授

專業領域

後天性心臟血管外科疾病（缺血性心臟病手術、瓣膜疾病手術、心律不整手術、主動脈手術）、微創手術（MICS、達文西機器人手術）

所屬學會與資格

- 日本微創心臟手術學會 副理事長
- 日本微創心臟手術學會 微創心臟手術指導醫師
- 日本外科學會 專科醫師、指導醫師
- 日本胸部外科學會 指導醫師
- 三學會組成心臟血管外科專科醫師認定機構 心臟血管外科專科醫師
- 三學會組成心臟血管外科專科醫師認定機構 訓練指導醫師
- 日本循環器學會認證心臟專科醫師
- 機器人心臟手術相關學會協議會 認證指導醫師（Proctor）
- 日本機器人外科學會會員
- 日本冠狀動脈疾病學會會員
- 日本冠狀動脈外科學會會員
- 日本血管外科學會會員

- 日本心臟病學會會員
- 日本心臟復健學會會員
- 日本人工臟器學會會員
- 日本經導管心臟瓣膜學會會員
- 美國胸腔外科學會（AATS）
- 美國胸腔外科醫師學會（STS）
- 歐洲心胸外科學會（EACTS）
- 亞洲心血管暨胸腔外科學會（ASCVTS）

經歷

1992 年

佐賀醫科大學畢業

1995 年

榊原紀念醫院 專修醫師

1998 年

佐賀醫科大學胸部外科 醫師

2002 年

榊原紀念醫院 醫長

2009 年

帝京大學醫學部 心臟血管外科學講座 主任教授

2019 年

榊原紀念醫院 主任部長（兼任至 2023 年）

摘要（中文版）

The Evolution Continues: Introducing the Next Generation Aavalus Ultra

隨著微創心臟手術（MICS）與機器人輔助手術的快速發展，外科主動脈瓣膜置換術（SAVR）對人工瓣膜的設計需求也持續演進。本演講將介紹 Aavalus 至新一代 Aavalus Ultra 的設計演進，探討其如何透過提升手術可視性、優化植入操作體驗，以及兼顧未來治療策略規劃，回應現代心臟外科的臨床需求。此外，亦將分享新一代瓣膜在血流動力學表現、耐久性期待，以及支援微創與機器人手術發展上的潛在價值，並進一步探討 SAVR 在未來心臟外科治療中的角色與發展方向。

講師個人簡歷

一、基本資料

(此資料僅作講師資料建檔、聯繫與演講費申請之用，不另作他途)

中文姓名	林佩樺	身分證字號	A224645522
聯絡地址	台北市中正區金門街 34 巷 21 號 1 樓		
聯絡電話	0912268103		
傳真號碼		E-MAIL	Momylin021528@gmail.com
證書字號(務必填寫) 如：麻專醫字第 XXXXXX 號 護理字第 XXXXXX 號	護理字第 075911 號		

二、學歷(因部份學會相當要求年資，煩請務必填寫)

學校名稱	科/系/所	學位	畢業年月
康寧護校	護理科	高職	86/07
中台醫專	護理科	二專	88/06
台北醫學大學	護理系	大學	103/06

三、教育部審定講師資格

☐ 教授	☐ 副教授	☐ 助理教授	☐ 講師
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四、現職及與專長相關之經歷(因部份學會相當要求年資，煩請務必填寫)

單位名稱		職稱	起迄年月
現職	1. 台大醫院 外科部 體外循環小組	外科部護理師	103/07 – 迄今
	2.		
	3.		
	4.		
	5.		
經歷	1. 財團法人中心診所醫院 內外科 健保病房	護理師	88/12 – 90/05
	2. 台北市立萬芳醫院 SICU	護理師	90/05 – 92/05
	3. 台北市立萬芳醫院 SICU	護理師	95/09 – 103/06
	4.		

五、專長

1. 成人體外循環操作	2. 小兒體外循環操作	3. 機器人微創體外循環操作	4. 外科急重症照護
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六、課程摘要(約 150-200-字左右即可)

手術中的血液淨化術常見於移植手術中操作血漿置換術，將病人全身抗原抗體去除，大幅減緩器官排斥反應。此課程為介紹新的術中血液淨化術，血液吸附器 CytoSorb。

CytoSorb 是一種無熱原性、無菌、一次性，基於樹脂微粒的吸附系統，使用於移除下列物質。CytoSorb 可移除下列物質：**P2Y₁₂ 抑制物**-Ticagrelor；**Factor Xa 抑制物**-Rivaroxaban；**發炎介質**-細胞激素(Cytokines)；**其他吸附物**-膽紅素(Bilirubin)、肌紅蛋白(Myoglobin)。

其濾膜面積高達 45,000 平方米。可串聯使用不同療程，例如血液灌流(Hemoperfusion)、間歇性血液透析(Intermittent hemodialysis)、聯續性腎臟替代療法(CRRT)、體外循環(Cardiopulmonary bypass)、葉克膜氧合(ECMO)。用於全身性發炎、嚴重敗血症、敗血性休克、急性肝衰竭、燒燙傷與治療橫紋肌溶解症(例如外傷)和去除肌紅蛋白。用於開心手術中抗凝血藥物的移除，能降低大出血的風險。國外已有 15 年已上運用經驗，CytoSorb 具有良好生物相容性、安全、有效專門用於吸附並清除人體血液中過多的細胞激素及特定毒素。

台灣胸腔及心臟血管外科學會

講師個人簡歷

一、基本資料

(此資料僅作講師資料建檔、聯繫與演講費申請之用，不另作他途)

中文姓名	曾麗蓉	身分證字號	S221810157
聯絡地址	(為俾利後續稅務行政，敬請填寫戶籍地址) 台東縣長濱鄉長濱村25鄰148-2 號		
聯絡電話	0972651177		
傳真號碼		E-MAIL	ntuhtlj@gmail.com

二、學歷(因部份學會相當要求年資，煩請務必填寫)

學校名稱	科/系/所	學位	畢業年月
國立陽明大學	急重症醫學研究所	碩士	107/12
輔英護專	護理助產科		80/06

三、教育部審定講師資格

☐ 教授	☐ 副教授	☐ 助理教授	☐ 講師
-----------------------------	------------------------------	-------------------------------	-----------------------------

四、現職及與專長相關之經歷(因部份學會相當要求年資，煩請務必填寫)

單位名稱		職稱	起迄年月
職 現	台大醫院	外科部/護理師	92.12~~迄今
經 歷	台大醫院	小兒心臟外科加護病房/護理師	85.03~92.11
	高雄榮總	新生兒加護病房/護理師	82.12-85.03
	國泰醫院	產房/護理師	80.12~82.02

五、專長

1. ECMO	2. AKI	3. RRT	4.Hemopurificaion
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六、課程摘要(約 150-200 字)

加護病房血液淨化治療

以臨床實用的方式講解血液淨化的方式、原理、臨床應用及機器與 ECMO 機器如何順利的並聯使用，讓心肺衰竭使用 ECMO 的病人在合併急性肝腎衰竭擊敗血症休克時，得以有最合適的治療協助。

個人資料表

基本資料				
中文姓名	溫義輝	英文姓名	Uen Yih-Huei	
身分證號碼	J100561678	出生日期	43 年 1 月 1 日	
性別	男	傳真號碼	06-2828928	
E-Mail	invincible2091136@gmail.com			
聯絡電話	(公):06-2091136 手機:0919-632502			
聯絡地址	704 台南市北區北安路一段 201 號			
主要學歷、部定資格、教職				
學校名稱	主修系所	學位	起訖年月(西元年/月)	
國防醫學院	醫學系	醫學士	自 1973/09 至 1980/07	
成功大學	EMBA	碩士	自 2007/09 至 2009/06	
教育部審定資格等級	教授	證書字號	教字第 019912 號	
教 職	國防醫學院外科兼任教授			
現職及相關之經歷				
服務機構	服務部門／系所	職稱	起訖年月(西元年/月)	
現職：溫義輝外科診所	診所	院長	自 2026/03 起至 迄今	
經歷：中國醫藥學院附設安南醫院及亞大醫院	院長室	副院長	自 2017/07 至 2026/02	
佳里奇美醫院	院長室	院長	自 2011/07 起 至 2017/06	
奇美醫學中心	外科部	主任	自 2008/06 至 2011/06	
奇美醫學中心	一般外科	主任	自 1999/03 至 2008/05	
台北榮總	外科部	住院(總)醫師	自 1980/08 至 1985/07	
專長				
1. 經口內視鏡甲狀腺切除術(共施行共 2200 例，領先全國) 2. 達文西手術 3. 高級腹腔鏡手術 4. 胃腸、肝、膽、胰癌症手術 5. 乳房(癌)手術				
個人研究專利： 共 4 件(附件一)。				

邀請演講：北醫、安南、嘉基、部桃、內分泌外科醫學會。(附件二)

另有高長、高榮、2018 亞太內分泌外科會議。

示範手術教學：國內共 8 家 15 位醫師(附件三)、國外有薩爾瓦多長期受訓(附件四)。

醫院經營成效：優(獲傑克醫生 Dr. Jack 評比為台灣非常好醫院)，佳里奇美醫院業績大幅成長，獲利率(稅前)：穩定達 10%。(附件五)

主持之研究計劃 (自 2011 年起至今)

一、國科會主持人 (3 件)

1. 評估以微核糖核酸及所調控蛋白做為胃癌之預後生物標記與治療標的之可行性、國科會、2013/08-2014/07、主持人
2. CerS6 蛋白質過度表現於胃癌之臨床意義及致癌機轉、科技部、2015/08-2016/07、主持人
3. USP3 蛋白質過度表現於胃癌之臨床意義及致癌機轉、科技部、2016/08-2017/07、主持人

二、國科會共同主持人 (5 件)

三、奇美醫院 (14 件)

SCI 論文著述：自 2011 年起至今共計 32 篇，其中擔任第一或通訊作者共 22 篇。(附件六)

規劃與期望：

1. 成立優質血液淨化中心
2. 服務鄉親
3. 最佳外科診所

血液淨化/雙重過濾血漿分離術

溫義輝醫師 外科診所 附設淨血中心

何謂高血脂

人體血液中的脂質稱為血脂，這些脂質包含膽固醇、三酸甘油脂(TG)、LDL(低密度脂蛋白)、HDL(高密度) 等等。血脂過高時便是高血脂。

診斷方式為空腹 12 至 14 小時候，檢測血液中各脂質的濃度，依據濃度不同

可以區分為：

◆高膽固醇血症

總膽固醇 ≥ 200 mg/dl

◆混合型高血脂症

總膽固醇 ≥ 200 mg/dl 且

三酸甘油脂(TG) ≥ 200 mg/dl

◆高三酸甘油脂血症

三酸甘油脂(TG) ≥ 200 mg/dl 且

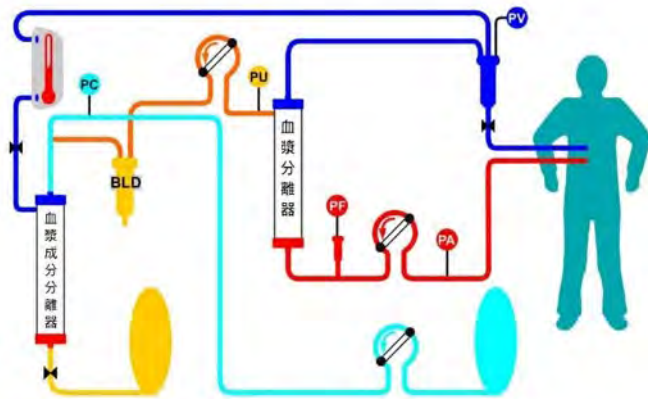
HDL ≤ 40 mg/dl

高血脂風險

長期高血脂容易導致動脈粥狀硬化、高血壓、動脈阻塞，增加心肌梗塞、心臟衰竭、腦中風、肢體末端疼痛、急慢性胰臟炎的風險。

何謂血脂肪瀉清術

將血液引出體外藉由血漿分離器分離出血球與血漿，血漿再經由血漿成分分離器，移除膽固醇、LDL、三酸甘油脂(TG) 後，再將乾淨的血漿與血球送回體內。血脂肪瀟清術利用物理性移除，能治療一般藥物難以治療病症，並且避免藥物引起的不良反應與副作用，在國外已經施行超過 30 年，是一個成熟穩定、風險低、副作用少的治療。



▲血脂肪瀟清術示意圖

血脂肪瀉清術優點

- ◆迅速有效降低膽固醇、三酸甘油酯、LDL 濃度，預防心血管阻塞及腦中風。
- ◆無藥物副作用，風險低。
- ◆改善血液黏稠度、促進血液循環。
- ◆清除自由基，抗老化、預防慢性疾病。

- ◆分離/稀釋血液中毒物、重金屬、廢物及尿酸，促進新陳代謝。

血脂肪濾清術前-注意事項

- ◆許多因素會導致高血脂，如家族病史、年齡、飲食等等，建議先與醫生討論風險因素，選擇適合治療。
- ◆充足飲水:建議每日飲水量維持在 2000c.c-3000c.c，有助於血液循環。
- ◆均衡飲食:避免過度高油炸、油膩、高鹽、辛辣食物，以免血管過度負擔，影響療程效果。
- ◆血管評估，超音波定位。

血脂肪濾清術後-注意事項

- ◆少數人執行血脂肪濾清術可能發生輕微低血壓、噁心、嘔吐、頭暈。
- ◆保護抽血部位 3 至 7 天內避免抽血部位用力過度，減少不必要刺激。
- ◆增加營養攝取健康蛋白質:蛋、豆、魚、肉類，強化身體機能。

HSUN-YI FU

CARDIOVASCULAR SURGEON INTENSIVIST

WORK EXPERIENCE

Attending physician at Department of Surgery, National Taiwan University Hospital, Taipei, Taiwan	Feb 2024 - present
Attending physician at Department of Surgery, National Taiwan University Hospital Hsin-Chu Branch, Hsin-Chu, Taiwan	Aug 2020 - Jan 2024
Surgical resident at Department of Surgery, National Taiwan University Hospital, Taipei, Taiwan	Aug 2014 - Jul 2020
Postgraduate resident at National Taiwan University Hospital, Taipei, Taiwan	Aug 2012 - Jul 2013

EDUCATION

National Taiwan University College of Medicine Graduate Institute of Clinical Medicine	Sep 2020 - present
National Taiwan University College of Medicine	Sep 2006 - Jun 2012

AREAS OF EXPERTISE

- Cardiovascular surgery
- Extracorporeal life support
- Intensive care
- Heart failure

PUBLICATIONS

- 1.HY Fu, YS Chen, HY Yu, NH Chi, LY Wei, KevinPH Chen, et al. (2024, Aug). Emergent coronary revascularization with percutaneous coronary intervention and coronary artery bypass grafting in patients receiving extracorporeal cardiopulmonary resuscitation. European Journal of Cardio-Thoracic Surgery, 66(2): ezae290. (Accepted).
2. HY Fu, TC Wang, CH Wang, NK Chou, IH Wu, RB Hsu, et al. (2023, Nov). Long-term outcomes of aortic valve replacement in dialysis patients - a nationwide retrospective cohort study. International Journal of Surgery, 109(11):3430-3440.
3. HY Fu, HW Chou, CH Lai, CI Tsao, CW Lu, MT Lin, et al. (2023, Feb). Outcomes of pediatric patients supported with ventricular assist devices single center experience. Journal of the Formosan Medical Association, 122(2):172-181.
4. HY Fu, YC Wang, CI Tsao, SH Yu, YS Chen, HW Chou, et al. (2022, May). Outcome of urgent desensitization in sensitized heart transplant recipients. Journal of the Formosan Medical Association , 121: 969-977.

Near-Infrared Spectroscopy: Clinical Utilization of Tissue Oxygenation Monitoring in Cardiac Critical Care

Abstract

Tissue hypoxia is a major contributor to organ dysfunction and adverse outcomes in cardiac critical care. While conventional hemodynamic parameters, pulse oximetry, and serum lactate remain essential monitoring tools, they may fail to detect regional hypoperfusion or provide timely assessment of tissue oxygen delivery. Near-infrared spectroscopy (NIRS) is a non-invasive technology that continuously measures regional tissue oxygen saturation (rSO_2), offering real-time insight into the balance between oxygen supply and consumption at the microcirculatory level.

Initially developed for cerebral monitoring during cardiac surgery, NIRS has evolved into a valuable adjunct across a broad range of cardiovascular critical care settings. Clinical applications include cerebral protection during cardiopulmonary bypass and aortic surgery, assessment of end-organ perfusion in cardiogenic shock, and monitoring during venoarterial extracorporeal membrane oxygenation (VA-ECMO). Peripheral NIRS monitoring has also emerged as a promising indicator of systemic perfusion and may facilitate early recognition of inadequate circulatory support before conventional biomarkers become abnormal.

This presentation will review the physiological basis of NIRS, discuss the interpretation of cerebral and peripheral tissue oxygenation measurements, and summarize the current evidence supporting its use in cardiac critical care. The advantages, limitations, and potential pitfalls of NIRS monitoring will be highlighted. As cardiovascular critical care increasingly emphasizes early detection of tissue hypoxia and personalized hemodynamic optimization, NIRS represents a promising adjunctive monitoring modality that complements conventional techniques and may improve bedside decision-making and patient outcomes.

Curriculum Vitae

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1. Current position:

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2. Education

PhD in Graduate Institute of Anatomy and Cell Biology, 2014-2022

M.D. School of Medicine. National Taiwan University, Taipei, Taiwan, Oct 2000~June 2007

3. Publications:

Paper: (selected)

1. Wu, Jeng-Hung; Wu, En-Ting; Chou, Heng-Wen; Wang, Ching-Chia ; Lu, Frank Leigh; Wang, Yi-Chia; Huang, Chi-Hsiang; Chen, Shyh-Jye; Chen, Yih-Sharng; Huang, Shu-Chien (2024, Nov). Airway Anomalies in Pediatric Patients After Surgery for Congenital Heart Disease: Single-Center Retrospective Cohort Study, Taiwan 2017–2020. Pediatric Critical Care Medicine, 1;25(11):e438-e446.
2. Yi-Chia Wang , Heng-Wen Chou , Chi-Hsiang Huang , Ming-Tai Lin , Chun-An Chen , Shuenn-Nan Chiu , Chun-Wei Lu , Yih-Sharng Chen , Shu-Chien Huang (2024, Sep). Predictors of left ventricular outflow tract obstruction after biventricular repair in interrupted aortic arch or aortic coarctation. Journal of the Formosan Medical Association. NSTC 112-2314-B-002-180.
3. Kuo, Ting-Chun; Chen, Kuen-Yuan ; Lai, Chieh-Wen; Wang, Yi-Chia; Lin, Ming-Tsan; Chang, Chin-Hao; Wu, Ming-Hsun (2024, May). Comparison of safety, efficacy, and patient satisfaction with thermal ablation versus endoscopic thyroidectomy for benign thyroid nodules in a propensity-matched cohort. International Journal of Surgery, 110(5):p 2568-2576.
4. Ting-Chun Kuo, Kuen-Yuan Chen, Chieh-Wen Lai, Yi-Chia Wang, Ming-Tsan Lin, Chin-Hao Chang, Ming-Hsun Wu (2023, Aug). Synergic evacuation device helps smoke control during endoscopic thyroid surgery. Surgery, 174(2):241-246.

5. Wang YC, Lin PL, Huang CH (2023, Jun). Perioperative Echocardiographic Prediction of Pulmonary Hypertension by Pulmonary Artery Acceleration Time during Cardiac Surgery with Cardiopulmonary Bypass. *J Am Soc Echocardiogr*, 36(6):666-667.
6. Wang, Yi-Chia; Chen, Yih-Sharng; Lin, Pei-Lin; Huang, Chi-Hsiang (2023, Mar). Impact of pulmonary hypertension hemodynamic presentation on perioperative outcomes in patients undergoing elective cardiac surgery: An observational study. *Formosan Journal of Surgery*, 56(2):p 47-53.
7. Wang, Yi-Chia; Chou, Heng-Wen; Chen, Yih-Sharng; Huang, Shu-chien (2023, Mar). Biventricular repair for aortic atresia, ventricular septal defect, and type C interrupted aortic arch. *World Journal for Pediatric and Congenital Heart Surgery*, 14(2):248-250.
8. Yi-Chia Wang, Hsing-Hao Huang, Pei-Ching Lin, Ming-Jiuh Wang , Chi-Hsiang Huang (2023, Mar). Hypothermia is an independent risk factor for prolonged ICU stay in coronary artery bypass surgery: an observational study. *Scientific Reports*, 21;13(1):4626.6
9. Nai-Kwan Chou, Yi-Chia Wang, Chi-Hsiang Huang, Nai-Hsin Chi (2022, Nov). Robotic mitral valve repair in National Taiwan University Hospital: 10-year results. *Annals of Cardiothoracic Surgery*, 11(6):605-613.
10. Wan-Ting Hung, Yi-Chia Wang, Hsing-Hao Huang, Jui-Hung Tai , En-Ting Wu, Jin-Chung Shih, Wen-Ming Hsu (2022, Nov). Surgical resection for congenital lung malformation: Lessons learned from thoracotomy to biportal thoracoscopy under one-lung ventilation.. *J Formos Med Assoc.*, 121(11):2152-2160.
11. Yi-Chia Wang, Yih-Sharng Chen, Sung-Tsang Hsieh (2022, Nov). Neuroprotective Effects of a Cardioplegic Combination (Adenosine, Lidocaine, and Magnesium) in an Ischemic Stroke Model. *Mol Neurobiol.*, 9(11):7045-7055. NSTC 109-2314-B-002-243.
12. Hsun-Yi Fu, Heng-Wen Chou, Yi-Chia Wang, Nai-Kuan Chou, Yih-Sharng Chen (2022, Oct). Extreme size mismatch: bronchus compression by an oversized donor heart in small children. *Heliyon* , 15;8(10):e11095.
13. Yi-Chia Wang, Nai-Hsin Chi, Ya-Chen Wang, Yih-Sharng Chen, Chi-Hsiang Huang (2022, Oct). Retrograde arterial perfusion and its outcome in robotic mitral valve surgery. *Asian J Surg*, 45(10):1849-1854.
14. Yueh-Juh Lin, Yi-Chia Wang, Hui-Hsun Huang, Chi-Hsiang Huang , Pei-Lin Lin (2022, Sep). Efficacy and safety of remifentanyl for endoscopic ultrasound-guided tissue acquisition: a single center retrospective study . *Surg Endosc.*, 36(9):6516-6521.

15. Hsun-Yi Fu, Yi-Chia Wang, Chuan-I Tsao, Sz-Han Yu, Yih-Sharng Chen, Heng-Wen Chou, Nai-Hsin Chi, Chih-Hsien Wang, Ron-Bin Hsu, Shu-Chien Huang, Hsi-Yu Yu, Nai-Kuan Chou (2022, May). Outcome of urgent desensitization in sensitized heart transplant recipients. *Journal of the Formosan Medical Association*, 121(5):969-977.
17. Yi-Chia Wang, Yih-Sharng Chen, Nai-Hsin Chi, Shu-Chien Huang (2022, Apr). Bidirectional Glenn shunt with tricuspid valve resection in patients with infective endocarditis. *JTCVS Tech.*, 2;13:58-61.
18. Ting-Chun Kuo, Kuen-Yuan Chen, Chieh-Wen Lai, Yi-Chia Wang , Ming-Tsan Lin, Chin-Hao Chang, Ming-Hsun Wu (2022, Mar). Transcutaneous Laryngeal Ultrasonography for Assessing Vocal Cord Twitch Response in Thyroid Operation during Predissection Vagus Nerve Stimulation. *J Am Coll Surg*, 1;234(3):359-366..
19. Ting-Chun Kuo, Quan-Yang Duh, Yi-Chia Wang, Chieh-Wen Lai, Kuen-Yuan Chen, Ming-Tsan Lin, and Ming-Hsun Wu (2021, Oct). Practice Patterns and Learning Curve in Transoral Endoscopic Thyroidectomy Vestibular Approach With Neuromonitoring. *Front. Endocrinol*, 21:12:744359.
20. Shih-Hong Chen, Yi-Chia Wang, Anne Chao, Chih-Min Liu, Ching-Tang Chiu, Ming-Jiuh Wang, Yu-Chang Yeh (2021, May). Early prediction of survival at different time intervals in sepsis patients: A visualized prediction model with nomogram and observation study. *Tzu Chi Med J.*, 11;34(1):55-61..
21. Chi-Hsiang Huang, Yi-Chia Wang, Hen-Wen Chou, Shu-Chien Huang (2021, Apr). Near-Infrared Spectroscopy Assessment of Tissue Oxygenation During Selective Cerebral Perfusion for Neonatal Aortic Arch Reconstruction. *Front Med (Lausanne)*.,30;8:637257..
22. Yang HY, Wang YC, Peng HY, Huang CH (2021, Jan). Breath biopsy of breast cancer using sensor array signals and machine learning analysis.. *Scientific Reports*, 8;11(1):103.

Conference full papers (selected)

☐ Wang YC, Huang CH, Huang SC. The impact of temperature on renal function during selective cerebral perfusion in neonatal arch surgery 46th SCA Annual Meeting poster presentation

☐ Wang YC, Huang SC The growth of mitral valve in patient with borderline

□ Wang YC, Huang SC The impact of temperature on gut microbiota in selective cerebral perfusion in neonatal arch surgery ESICM 2024 poster presentation

Publication

1. Yi-Chia Wang, Chi-Hsiang Huang Intraoperative Transesophageal Echocardiography for Congenital Heart Disease *Echocardiography - In Specific Diseases*, 1st ed. INTECH, 2012:115-36

<https://doi.org/10.1111/jgh.14943>

2. Creator of Perioperative TEE website

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題目：

NIRS Monitoring in Pediatric Patients：From Cerebral Oxygenation to Organ Perfusion

摘要：

Near-infrared spectroscopy (NIRS) 是一種非侵入性、連續性監測組織氧合的技術，透過近紅外光穿透組織並分析氧合與去氧血紅素吸收差異，提供局部組織氧飽和度 (regional tissue oxygen saturation, rSO₂) 資訊。相較於傳統生命徵象如心率、血壓與血氧飽和度，NIRS 可進一步反映局部氧供與氧耗平衡，尤其在小兒麻醉、心臟手術及新生兒重症照護中具有重要臨床價值。

NIRS 在小兒病人中的臨床應用，包括腦部監測、腎臟、腸道、肝臟及骨骼肌等 somatic NIRS 應用。由於體型與組織厚度限制，somatic NIRS 在新生兒及小於 10 – 20 kg 兒童中較具可靠性。NIRS 下降時應系統性評估氧合、通氣、血紅素濃度、血壓、心輸出量、血管阻力、體溫、靜脈氧飽和度及特殊情境如癲癇或選擇性腦灌流。在小兒心臟手術中，NIRS 可作為心輸出與器官灌流不足的早期警訊，提醒臨床醫師「良好的血壓不一定代表良好的灌流」。

NIRS 本身不會改變預後，真正影響結果的是臨床團隊能否正確解讀訊號並針對病因及時介入。NIRS 應被視為 HR、BP、CVP 與 TEE 之外的重要輔助監測工具，用以強化小兒病人圍術期與重症照護中的灌流管理。

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學經歷：

- 國立陽明大學醫學系畢業(2010.06)
- 台中榮總麻醉部住院醫師
- 台中榮總麻醉部總醫師
- 台灣麻醉專科醫師(2014.11)
- 台中榮總麻醉部心胸麻醉科主治醫師(2016.01-)
- 台灣心臟胸腔血管麻醉專科醫師(2021.12-)
- International Postgraduate Diploma of Regional Anesthesia and Analgesia, School of Medicine, University of Montpellier, France (2019-2020)
- 澳洲皇家墨爾本大學附設醫院訪問學者(Visiting Scholar) (2022-2023)
- 台灣醫學教育學會認證 一般醫學訓練(PGY)教師資格

著作：

1. Chen SJ, Shen CH, Chuang CY, **Chang YT**. Impact of the enhanced recovery after surgery (ERAS) protocol on 3-year survival and outcomes following esophagectomy: a retrospective cohort study of 124 patients. *BMC Anesthesiol*. 2025;25(1):256. doi:10.1186/s12871-025-03124-9
2. Hsiao YC, **Chang YT**, Cheng CS, Lien KH. Dexmedetomidine infusion on blood loss in orthognathic surgery: A retrospective study on its efficacy. *J Formos Med Assoc*. Published online February 13, 2025. doi:10.1016/j.jfma.2025.02.009
3. Liang TW, Shen CH, Wu YS, **Chang YT**. Erector spinae plane block reduces opioid consumption and improves incentive spirometry volume after cardiac surgery: A retrospective cohort study. *J Chin Med Assoc*. 2024;87(5):550–557.
4. **Chang Y**, Shen C. Total Intravenous Anesthesia and Postoperative Pulmonary Complications—Reply. *JAMA Otolaryngol Head Neck Surg*. 2023;149(4):376–377. doi:10.1001/jamaoto.2022.4967
5. **Chang YT**, Lai CS, Lu CT, Wu CY, Shen CH. Effect of Total Intravenous Anesthesia on Postoperative Pulmonary Complications in Patients Undergoing Microvascular Reconstruction for Head and Neck Cancer: A Randomized Clinical Trial. *JAMA Otolaryngol Head Neck Surg*. 2022;148(11):1013–1021. doi:10.1001/jamaoto.2022.2552
6. Lai CS, Shen CH, **Chang YT**, Liu SA, Lu CT, Tsai YC, Chen IC, Feng CH, Wu CY. Recipient vessel selection for multiple free flap transfers in head and neck reconstruction at different periods. *Microsurgery*. 2021;1–10.
7. **Chang YT**, Wu CC, Tang TY, Lu CT, Lai CS, Shen CH. Differences between Total Intravenous Anesthesia and Inhalation Anesthesia in Free Flap Surgery of Head and Neck Cancer. *PLoS One*. 2016;11:e0147713.
8. **Chang YT**, Tsai TC, Hsu H, Chen YM, Chi KP, Peng SY. Sedation for gastrointestinal endoscopy with the application of target-controlled infusion. *Turk J Gastroenterol*. 2015;26:417–422.

獲獎：

2023 112 年台中榮總醫師優良論文獎

2021 110 年輔導會優良醫師

2020 臺中榮總優良臨床教師-主治醫師

2019 臺中榮總優良臨床教師-主治醫師

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Perioperative Brain Health: Cerebral Oximetry Monitoring

如何維持腦部健康？手術當中的腦血氧監測

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張詒婷

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Preserving perioperative brain health hinges on real-time insight into cerebral perfusion, and near-infrared spectroscopy (NIRS) remains the most accessible bedside tool to provide it. Between 2020 and 2026, NIRS has evolved from a niche cerebral oxygenation monitor into a versatile platform that informs cardiac, somatic, and multi-modal neuromonitoring decisions. This 15-minute lecture frames that evolution around four practical questions every anesthesiologist now faces, integrating recent guidelines (ERAS-USA 2020, EACTS/EACTAIC/EBCP 2024) with emerging RCT and observational data.

For cardiac surgery, NIRS remains anchored by two principles: pre-induction baseline (Strong, LOE B) and algorithm-guided intervention (Class IIa, Level B). Two 2025–2026 applications expand its role beyond established use: NIRS as an early warning of low cardiac output syndrome, where rSO_2 drops $>20\%$ precede a fall in cardiac index (Silaschi 2025, AUROC 0.99); and individualized cerebral autoregulation–based MAP targeting in the ongoing PRECISION trial (Gomes 2026). In non-cardiac surgery, the Bieze 2025 algorithm RCT shortened desaturation time from 23 to 9 minutes but did not improve outcomes, reinforcing a "safety net," risk-stratified rather than routine, approach.

Adult renal NIRS fails because the renal cortex sits 4.6 cm beneath the skin, well outside the 2–2.5 cm penetration depth of clinical sensors — what is measured is subcutaneous fat and back muscle. Limb and somatic NIRS, in contrast, fall squarely within this depth and have demonstrated value across six clinical scenarios: VA-ECMO distal perfusion (where routine NIRS reduced surgical limb ischemia from 8.5% to 2.6%; Vinogradsky 2023), TAAA paraspinal monitoring, PAD severity assessment and post-endovascular prognosis, free-flap surveillance, and compartment syndrome.

Looking forward, multi-modal integration is the frontier: NIRS plus EEG identifies the cognitively fragile brain through reduced spectral edge frequency (Behera 2026) and predicts return of spontaneous circulation during prolonged CPR via alpha-wave reappearance under maintained rSO_2 (Huppert 2026, OR 5.4). A six-pillar mental model — baseline-anchored, algorithm-guided, multi-modal, context-aware, individualized, and limb-aware — summarizes how to read NIRS in 2026. The take-home: NIRS is not a single number, it is a safety net for perioperative brain health.

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Medical Education

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Experience

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2012 - 2015	Attending Surgeon, Division of Thoracic Surgery, Department of Surgery, Chia-Yi Christian Hospital, Chia-Yi, Taiwan
2015 - 2017	Attending Surgeon, Division of Thoracic Surgery, Department of Surgery, National Cheng-Kung University Hospital, Dou-Liou Branch, Yun-Lin, Taiwan
2017 - Present	Attending Surgeon, Division of Thoracic Surgery, Department of Surgery, National Cheng-Kung University Hospital, Tainan, Taiwan
2023 - Present	Clinical Assistant Professor, Department of Surgery, National Cheng Kung University

Board Certifications

Board-Certified General Surgeon, Taiwan Surgical Association, 2012

Board-Certified Thoracic Surgeon, Taiwan Association of Thoracic & Cardiovascular Surgery, 2013

Professional Certifications

Certified Thoracic Surgery Instructor, Taiwan Association of Thoracic & Cardiovascular Surgery (TATCS), 2021

Certified Lung Cancer Specialist, Taiwan Lung Cancer Society (TLCS), 2025

肺部結節篩檢策略及治療新知

演講者：黃維立醫師

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隨著低劑量電腦斷層 (low-dose computed tomography, LDCT) 肺癌篩檢的普及，臨床上發現肺部結節的機會大幅增加。如何從眾多肺部結節中辨識具有惡性風險的病灶，在避免過度檢查與治療的同時掌握早期肺癌的診療時機，已成為肺癌篩檢與臨床照護的重要課題。

本演講將從胸腔外科臨床實務的角度，探討肺部結節由發現、風險評估至治療決策的臨床路徑。內容涵蓋我國 LDCT 肺癌篩檢政策與適用族群，以及篩檢或其他影像檢查發現肺部結節後的評估原則。藉由胸部電腦斷層影像，說明結節大小、型態、邊緣特徵、實質成分及時間變化等重要影像特徵，並探討如何整合個人危險因子與影像表現評估惡性風險。

針對臨床日益常見的毛玻璃結節 (ground-glass nodule, GGN)，將進一步探討純毛玻璃結節與部分實質結節的影像特徵、自然病程、惡性風險及追蹤策略，並說明結節增大、密度增加及實質成分出現或增加對臨床決策的意義。對於具較高惡性風險的肺部結節，則進一步探討持續影像追蹤、進一步診斷或外科介入的適當時機。

最後，將介紹早期肺癌外科治療的近期進展，包括微創手術及次肺葉切除在小型周邊型肺癌治療中的角色。藉由整合肺癌篩檢、影像風險評估、結節追蹤與外科治療策略，建立從「肺部結節發現」至「適時診斷與治療」的臨床決策架構。

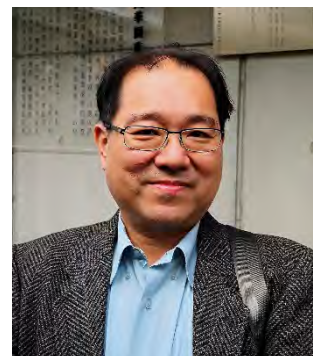
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專業領域

1. Taiwan Surgical Association (1999)
2. Taiwan Association of Thoracic & Cardiovascular Surgery
3. Taiwan Society of Pulmonary and Critical Care Medicine
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6. American College of Chest Physicians (FCCP)
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8. Taiwan Association of Medical Education, Deputy Secretary-General (2017~2020)
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10. Taiwan Nursing Specialist Licensing Certification and Examination Committee (2020~)

研究領域: 胸腔外科，重症醫療・醫學教育

Publication:

1. **Ming-Ju Hsieh**, Seong Yong Park, Yun-Wen Wen, Dae Joon Kim, Chien-Hung Chiu & Yin-Kai Chao. Impact of prior thoracoscopic experience on the learning curve of robotic McKeown esophagectomy: a multidimensional analysis. Surgical Endoscopy publish online 24 Jan 2022
2. Ching Feng Wu, Ching Yang Wu, Yin Kai Chao, Diego Gonzalez-Rivas, **Ming Ju Hsieh***, Yu Bin Pan & Lan Yan Yang. Comparative early results of a robotics-assisted endoscope holder in single port thoracoscopic surgery in the era of COVID-19. Surgical Endoscopy Accepted: 11 January 2022
3. Hsin-Yueh Fang⁺, Kuei-An Chen⁺, Yu-Wen Wen, Chih-Tsung Wen, Kuang-Tse Pan, Chien-Hung Chiu, **Ming-Ju Hsieh**, and Yin-Kai Chao*. Efficacy and Safety of Preoperative vs. Intraoperative Computed Tomography-Guided Lung Tumor Localization: A Randomized Controlled Trial. Front Surg. 2021; 8: 809908.
4. Yu-Che Chang, Nothando Sithulile Nkambule, Shou-Yen Chen, **Ming-Ju Hsieh**, Chung-Hsien Chaou*. Exploring the Impact of Pre-course High-Fidelity Simulation on Professional Socialization of Medical Students in Emergency Medicine Internship Rotation—A Qualitative Approach. Front Med (Lausanne). 2022 Jun 30;9:933212.
5. Yu-Ling Chang, **Ming-Ju Hsieh**, Tsui-Hsia Feng, Shu-Ting Shang, Yun-Fang Tsai*. Effectiveness of multiple scenario simulations of acute and critical care for undergraduate nursing students: A quasi-experimental design. Nurse Educ Today. 2022 Nov;118: 105526.
6. Yi-Ping Chao⁺, Chung-Jan Kang⁺, Hai-Hua Chuang⁺, **Ming-Ju Hsieh**, Yu-Che Chang, Terry B. J. Kuo, Cheryl C. H. Yang, Chung-Guei Huang, Tuan-Jen Fang, Hsueh-Yu Li, Li-Ang Lee*. Comparison of the effect of 360° versus two-dimensional virtual reality video on history taking and physical examination skills learning among undergraduate medical students: a randomized controlled trial. Virtual Real. 2023;27(2):637-650.

7. Po-Lin Chen, Ying-Ju Chen, Chih-Ping Chung, Chen-June Seak, Jiann-Shing Jeng, **Ming-Ju Hsieh**, Li-Ming Lien, Jiann-Hwa Chen, Yu-Wei Chen, Te-Fa Chiu, Jiunn-Tay Lee, Chip-Jin Ng*. Dual Antiplatelet Therapy in the Management of Acute Minor Ischemic Stroke and High-Risk Transient Ischemic Attack: An Expert Consensus Statement From Taiwan Stroke Society and Taiwan Society of Emergency Medicine. *J Acute Med*. 2022 Sep 1;12(3):85-95.
8. Yu-Ling Chang, Ming-Ju Hsieh, Yu-Che Chang, Shu-Ling Yeh, Shao-Wei Chen, Yun-Fang Tsai*. Self-efficacy of caring for patients in the intensive care unit with delirium: Development and validation of a scale for intensive care unit nurses. *Aust Crit Care*. 2023 Jul;36(4):449-454.
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Presentation:

1. 醫師國考 OSCE 分享 專科護理師甄審命題培訓工作坊 長庚科技大學 Oct. 2021
2. 以跨領域團隊合作照護: 理論, 務實, 與教學 呼吸治療學會 新北市立土城醫院 Nov. 2021
3. OSCE 教案撰寫工作坊 I 新北市立土城醫院 Dec. 2021
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5. 從臨床醫師到大學教師. 嘉義長庚紀念醫院全院性演講 Jan. 2022
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9. 臨床推理教案{案例 1~3}, 111 年度專科護理師臨床推理能力及培訓課程, March April 2023
10. 台灣專科護理師訓練現況與設計 台灣麻醉專科護理學會 Aug. 2023
11. CBME 與 EPAs 物理治療學會年會 Sep. 2023
12. 臨床與教學 高雄長庚紀念醫院外科部演講 Sep. 2023
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14. Enhancing Clinical Preparedness for Uncertainty by Integrating Pre-course Simulation into Emergency Medical Rotation among Medical Clerks: A Qualitative Approach. AMEE2024, Basel, Aug. 2024
15. 圍術期感染與 SSI 台灣胸腔外科醫學會年會 Sep. 2024
16. POCUS in chest surgery and critical care.(Hands On) 台灣胸腔外科醫學會 Dec. 2024
17. 醫學教育歷史與理論 和信醫院 教學部師資培訓演講 Sept. 2025
18. 台日跨學門偏鄉醫學的教學設計的比較與前瞻 引言人, 部落之星: 台日偏鄉醫學教育及政策制度的比較與前瞻研討會 國立陽明交通大學 Oct. 2025

講者：謝明儒

題目：如何增進外科專科護理師的臨床推理能力

摘要

臨床推理（clinical reasoning）是醫療專業人員在面對病人時，整合病史、身體檢查、檢驗結果及臨床證據，建構鑑別診斷、形成診療決策並持續修正判斷的核心能力，也是醫療品質、病人安全及專業勝任力的重要基礎。近年能力導向醫學教育（Competency-based Medical Education, CBME）與可信賴專業活動（Entrustable Professional Activities, EPAs）的發展，更將臨床推理視為各類健康照護專業人員必須具備的重要能力。然而，臨床推理並非單純知識累積或臨床經驗的結果，而是一種融合知識、經驗、認知策略、臨床情境判斷與反思修正的高階思考歷程，因此無法單靠傳統講授式教學建立，必須透過真實臨床情境中的持續練習、教師引導與反思回饋，才能逐步成熟。

臨床推理的重要理論基礎，包括雙重歷程理論（Dual Process Theory）、劇本理論（Script Theory）及認知負荷理論（Cognitive Load Theory）。雙重歷程理論說明臨床決策來自快速直覺辨識與分析性思考的交互運作，提醒教師應培養學生兼顧效率與正確性的推理能力；劇本理論則強調臨床經驗的累積能逐步建立疾病腳本，使學習者能快速辨識疾病模式並提升診斷效率；認知負荷理論則指出，良好的教學設計應降低不必要的認知負荷，透過鷹架式引導，使學生逐步建立完整而穩固的臨床推理架構。

在教學策略方面，近年實證研究所支持的四項重要方法，包括自我解釋（Self-explanation）、測驗強化學習（Test-enhanced Learning）、反思練習（Reflective Practice）及遊戲化學習（Gamification）。自我解釋可促使學生將隱性的推理歷程具體化，增進教師診斷其思考歷程並提供即時回饋；測驗強化學習則利用反覆提取知識與即時回饋，促進知識鞏固及診斷能力提升；反思練習協助學生檢視自身決策過程、辨識推理偏誤並持續修正；遊戲化學習則藉由競賽、情境模擬及團隊合作，提高學生參與度與臨床決策能力。上述策略可依不同教學情境靈活整合，有效提升學習成效。

各類臨床教學活動中的臨床推理學習機會，包括案例討論會、臨床巡房、教學門診、晨會、急診教學、會診、M&M 討論會及病歷書寫等。不同教學場域具有不同的教育特色，目前臨床推理教學面臨的挑戰，包括臨床工作繁忙、教學時間不足、教師缺乏系統化推理教學訓練、課程碎片化及評量工具不足等

問題。面對快速演變的醫療環境，未來應將臨床推理明確納入正式課程目標與能力評量架構，建立結構化且循序漸進的教學模式，並善用標準化病人、虛擬病人、模擬教學及人工智慧（Artificial Intelligence, AI）等新興教育工具，提供多元且高品質的學習機會。AI 除可協助學生獲取最新醫學資訊、模擬臨床情境及檢視推理盲點外，更應作為促進思考與反思的輔助工具，而非取代臨床判斷。

總結而言，臨床推理是連結基礎醫學知識與臨床實務能力的核心橋樑，也是培育具備專業判斷力、安全意識與終身學習能力醫療人才的關鍵。唯有透過刻意設計的臨床教學活動、結合理論基礎、實證教學策略、多元評量方式及科技輔助教學，才能使臨床推理成為一項可觀察、可訓練、可評估且能持續精進的核心能力，進而提升醫療品質、病人安全及健康照護教育的整體成效。

Type A Aortic Dissection Repair Using a Thoracic Branch Endoprosthesis with Retrograde In Situ Branched Stent Grafting: A Case Report

阮經倫 Ching-Lun Juan, and 張瑞宗 Jui-Tsung Chung

Acute Stanford type A aortic dissection is conventionally managed with emergent open surgical repair. However, treatment remains challenging in patients with complex aortic arch anatomy or prohibitive surgical risk. Recent advances in endovascular technology have expanded the potential role of thoracic branch endoprostheses (TBE), although their application in the ascending aorta and aortic arch remains limited.

We present a case of Stanford type A aortic dissection successfully treated using a thoracic branch endoprosthesis combined with retrograde in situ branched stent grafting for supra-aortic branch reconstruction. This strategy enabled complete exclusion of the proximal entry tear while maintaining cerebral and upper extremity perfusion without conventional total arch replacement.

This case highlights the feasibility of combining a thoracic branch endoprosthesis with retrograde in situ branched stent grafting as an alternative arch reconstruction strategy in carefully selected patients with type A aortic dissection. As endovascular technology continues to evolve, this technique may provide a less invasive treatment option for patients in whom conventional open arch repair is technically challenging or carries excessive operative risk.

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B. 發表方式：口頭報告

C. 文章屬性：病例報告

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病例報告：63 歲男性矯正型大動脈轉位合併體循環房室瓣逆流及心衰竭，以機械手臂輔助行系統房室瓣置換

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Case report: A 63-year-old male with congenitally corrected Transposition of Great Arteries and systemic atrioventricular valve regurgitation and heart failure, replacing valve with robot-assistance

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Objective:

This case demonstrates the feasibility and clinical advantages of robotic-assisted systemic atrioventricular valve replacement (AVVR) in an adult patient with congenitally corrected transposition of the great arteries (ccTGA).

Case Summary:

A 63-year-old male presented with severe systemic AV valve regurgitation and NYHA class III heart failure. Despite optimal medical therapy, he experienced pulmonary hypertension and recurrent hospitalizations. He underwent robotic-assisted AVVR. Utilizing the da Vinci system, we achieved excellent visualization and access to the deep surgical field of the systemic AV valve, enabling precise valve excision and secure prosthesis placement while meticulously avoiding the atypical conduction system. His postoperative recovery was uneventful.

Discussion:

In ccTGA, systemic AV valve exposure via a conventional right thoracotomy is notoriously difficult due to the abnormal spatial relationship of the great arteries and the valve orienting posteriorly—a view that remains challenging even through a sternotomy. Using a robotic approach, the third instrument arm provided effective traction for aortic root exposure, facilitating clear visualization during aortic cross-clamping and valve intervention.

Conclusion:

Robotic-assisted AVVR is a safe, effective, and minimally invasive alternative for managing complex systemic AV valve regurgitation in adult ccTGA patients.

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Title

First-in-Human Totally Robotic HeartMate 3 Left Ventricular Assist Device
Implantation Through a Right Mini-Thoracotomy

Author

Nai-Hsin Chi

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Background

Durable left ventricular assist device (LVAD) implantation is traditionally performed through median sternotomy or left thoracotomy-based minimally invasive approaches. Although robotic assistance has been reported for selected components of LVAD implantation, totally robotic implantation through a right mini-thoracotomy without left thoracotomy has not been previously described.

Case Presentation / Technique

A 40-year-old man with ischemic cardiomyopathy after non-ST-elevation myocardial infarction, 3-vessel coronary artery disease, prior left anterior descending artery stenting, inotrope-dependent cardiogenic shock, INTERMACS profile II, and left ventricular apical thrombus underwent HeartMate 3 implantation as bridge to transplantation. Cardiopulmonary bypass was established through right femoral arterial and venous cannulation. Through a 7-cm right fourth intercostal mini-thoracotomy, the Da Vinci Xi system was used for right pericardiotomy, apical cuff fixation, apical coring with simultaneous thrombus removal, pump assembly, driveline tunneling, and outflow graft anastomosis to the ascending aorta. The procedure was performed without aortic cross-clamping or cardioplegic arrest.

Results

Cardiopulmonary bypass time was 227 minutes. Estimated blood loss was 50 mL. The patient was weaned smoothly from cardiopulmonary bypass with pump flow of 4.2 L/min at 4800 rpm. Postoperative transesophageal echocardiography

confirmed satisfactory pump position and no residual left ventricular thrombus. The patient was extubated on postoperative day 1, transferred to the general ward on postoperative day 7, and discharged home on postoperative day 20. At outpatient follow-up, he was in New York Heart Association functional class I.

Conclusion

This first-in-human experience demonstrates the feasibility of totally robotic HeartMate 3 LVAD implantation through a right mini-thoracotomy. This approach represents a distinct sternum-sparing and left-thoracotomy-avoiding strategy for durable LVAD implantation, with all critical apical and outflow graft steps completed robotically.

Title**Totally Robotic Transthoracic Orthotopic Heart Transplantation: Initial Experience****Author****Nai-Hsin Chi****National Taiwan University Hospital****Department of surgery****Background:**

Robotic cardiac surgery has expanded the indications of minimally invasive approaches in complex intracardiac procedures. Building on our institutional experience in robotic mitral surgery and robotic transmitral left ventricular thrombectomy, we applied a totally robotic technique to orthotopic heart transplantation. We report the technical details and initial clinical experience of this approach.

Case Presentation:

A 66-year-old man with ischemic cardiomyopathy after non-ST-elevation myocardial infarction developed refractory cardiogenic shock despite coronary revascularization and intra-aortic balloon pump support. Echocardiography showed severe left ventricular dysfunction with an ejection fraction of approximately 20%, moderate mitral regurgitation, and moderate-to-severe tricuspid regurgitation. He was transferred for advanced heart failure management and listed for transplantation. The donor was a 33-year-old woman with preserved biventricular function and no coronary artery disease.

Surgical Technique:

Under general anesthesia and transesophageal echocardiographic guidance, peripheral cardiopulmonary bypass was established through the right internal jugular vein and femoral vessels. A 7-cm right mini-thoracotomy and robotic ports were created using a standardized da Vinci Xi configuration. Recipient cardiectomy and donor heart implantation were performed robotically. The

anastomotic sequence was left atrium, pulmonary artery, ascending aorta, and right atrium. Total anastomotic time was 82 minutes. Cardiopulmonary bypass time was 204 minutes, aortic cross-clamp time was 101 minutes, operative time was 225 minutes, and blood loss was 300 mL.

Conclusions:

Totally robotic orthotopic heart transplantation is technically feasible in selected patients and represents a further evolution of minimally invasive robotic cardiac surgery.

Case Presentation

A previously healthy woman with no known history of hypertension, diabetes mellitus, coronary artery disease, or other systemic illness presented with progressively worsening chest tightness and exertional dyspnea over six months. Initially, symptoms occurred only during strenuous activity but gradually progressed to ordinary daily activities, prompting referral to our cardiovascular outpatient clinic.

Transthoracic echocardiography demonstrated a heavily calcified aortic valve with suspected bicuspid morphology. Doppler evaluation revealed **critical aortic stenosis**, with a peak transvalvular pressure gradient of **149 mmHg**, mean gradient of **93 mmHg**, and calculated aortic valve area of **0.48 cm²** using the continuity equation. Minimal aortic regurgitation was present. Left ventricular systolic function remained preserved (LVEF 72%) despite concentric left ventricular hypertrophy and moderate diastolic dysfunction. Mild mitral regurgitation, moderate tricuspid regurgitation, and mild pulmonary regurgitation were also noted. The estimated right ventricular systolic pressure was **39 mmHg**.

Preoperative coronary angiography demonstrated patent coronary arteries without obstructive coronary artery disease. Owing to extensive calcification of the aortic valve, repeated attempts to cross the valve with a JR4 catheter for left ventricular pressure recording were unsuccessful, suggesting critical valvular obstruction.

Non-contrast computed tomography further confirmed dense calcification confined to the aortic valve without significant ascending aortic dilatation.

Given her symptomatic critical aortic stenosis, surgical intervention was recommended.

Operative Findings

Median sternotomy was performed under cardiopulmonary bypass using ascending aortic and bicaval cannulation. Myocardial protection was achieved with antegrade **histidine-tryptophan-ketoglutarate (HTK) cardioplegia**.

After transverse aortotomy, the aortic valve was found to be a **Sievers type 0 bicuspid aortic valve** with extensive calcification involving both valve cusps and the entire aortic annulus. Following complete excision of the calcified valve and annular debridement, the native annulus measured only **20 mm**, which was considered inadequate for implantation of an appropriately sized prosthetic valve.

To overcome the severe annular hypoplasia, a **sequential aortic root enlargement using the telescope method** was performed. The native aortic wall was infolded to create an effective annular diameter of approximately **22 mm**, followed by circumferential augmentation using a short **24-mm Gelsoft Plus vascular graft**, thereby enlarging the reconstructed annulus sufficiently for prosthetic valve implantation.

Subsequently, a **Bentall procedure using the modified Cabrol technique** was performed. A **23-mm Edwards INSPIRIS RESILIA bioprosthetic valve** was implanted within a **26-mm Terumo Gelweave vascular graft**. Because direct coronary button reimplantation was considered unfavorable after root reconstruction, both the left main coronary artery and right coronary artery were reconstructed individually using **8-mm Gelsoft Plus graft interposition** according to the modified Cabrol technique. Distal ascending aortic reconstruction was completed with a two-layer hand-sewn anastomosis.

Inspection of the tricuspid valve revealed annular dilatation without significant leaflet pathology. Therefore, **tricuspid annuloplasty** was performed using a **30-mm Edwards MC3 annuloplasty ring**. Saline testing confirmed satisfactory valve competence after repair.

A patent foramen ovale was identified and closed directly with pledgeted sutures.

Following release of the aortic cross-clamp, the heart resumed sinus activity after electrical defibrillation. However, persistent severe bradycardia with ventricular escape rhythm of approximately **20 beats/min** remained despite temporary pacing

support. Consequently, a **permanent epicardial bipolar pacing lead** was sutured onto the anterior right ventricular surface and tunneled to the left subclavian region for future pacemaker implantation.

The pericardium was reconstructed using a **GORE PRECLUDE® pericardial membrane**. The patient was successfully weaned from cardiopulmonary bypass with stable hemodynamics, and the operation was completed without major intraoperative complications.

RIBS 技術進行全主動脈弓血管內重建：一名經歷兩次心臟手術後併發主動脈剝離之 28 歲女性病例

陳孟皓醫師,黃懷緒主任

振興醫院心臟血管外科

Total Endovascular Aortic Arch Reconstruction Using the RIBS Technique in a 28-Year-Old Female with Aortic Dissection After Two Previous Cardiac Surgeries

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Aortic arch pathologies in patients with a history of multiple open cardiac surgeries pose a formidable surgical challenge due to severe adhesions and the prohibitively high morbidity and mortality associated with 3rd sternotomy. Total endovascular aortic arch reconstruction has emerged as a less invasive alternative. The Retrograde In Situ Branched Stent grafting (RIBS) technique offers a customized approach to preserve supra-aortic branches.

We report the case of a 28-year-old female who had previously undergone an intra-cardiac ventricular septal defect (VSD) repair and a subsequent redo-sternotomy with a Bentall's procedure. She presented to the emergency department with sudden-onset chest pain. Imaging revealed an ascending aortic contained rupture and a giant aneurysm involving the aortic arch and descending thoracic aorta, complicated by aortic dissection. To avoid the extreme risks of a third sternotomy, a total endovascular approach was elected. The procedure involved a physician-modified thoracic endovascular aortic repair (pTEVAR), a left carotid-subclavian bypass, and the RIBS technique to reconstruct the innominate and left common carotid arteries. The left subclavian artery stump was embolized. Postoperative angiography demonstrated patent branch vessels with no evidence of type I, II, or III endoleaks.

The RIBS technique is a safe, feasible, and highly effective alternative for complex total aortic arch reconstruction, particularly in high-risk patients for whom 3rd sternotomy is contraindicated.

A 型主動脈剝離接受經導管電燒主動脈中隔切開術後之血管攝影再灌流與延遲器官功能恢復

Angiographic Reperfusion Without Immediate Organ Recovery After Transcatheter Electrosurgical Aortic Septotomy in Type A Aortic Dissection

作者：葉競仁，劉明遠，蔡孝恩，林明賢，吳毅暉

Authors: [Ye Jing-ren]; Ming-Yuan Liu, Hsiao-En Tsai, Ming-Hsien Lin, I-Hui Wu

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Background

Transcatheter electrosurgical aortic septotomy (TEAS) has been reported mainly as an adjunct to endovascular repair of chronic post-dissection aneurysms. Its role in nonaneurysmal chronic type A dissection presenting with acute malperfusion is less established. We describe a temporal dissociation between angiographic reperfusion after TEAS and subsequent functional renal and motor recovery after definitive proximal aortic repair.

Case Presentation

A 68-year-old patient presented with acute right lower-extremity paralysis (Medical Research Council [MRC] grade 0), cyanosis, and urinary incontinence. Computed tomography angiography demonstrated Stanford type A aortic dissection with severe true-lumen compression, right common iliac artery occlusion, and renal malperfusion. The superior mesenteric and right renal arteries arose from the true lumen, whereas the celiac and left renal arteries arose from the false lumen. Extensive calcification of the abdominal dissection septum without significant aneurysmal degeneration suggested a presumed chronic process.

Emergency femoro-femoral bypass restored pulsatile flow in the right superficial femoral, deep femoral, and popliteal arteries. Nevertheless, right lower-extremity strength improved only to MRC grade 1, with movement limited to the toes. Severe rhabdomyolysis developed, with creatine kinase increasing from 15,039 U/L to >100,000 U/L, followed by dialysis-dependent acute kidney injury.

On hospital day 6, angiography showed persistent true-lumen compression, weak bypass flow, and bilateral iliac inflow compromise. TEAS was performed from Zones 5 to 10 with prophylactic superior mesenteric artery bare-metal stenting. Completion angiography demonstrated a newly created common aortic channel, recovery of visceral perfusion, and restoration of bilateral iliac flow without a significant pressure gradient relative to systemic blood pressure. (Figure 1)

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演講者聯絡資料：Tel: [please complete]; Fax: [please complete]; E-Mail: [please complete]

Case Presentation (continued)

Despite successful angiographic reperfusion, functional recovery did not occur promptly. The patient remained dependent on intermittent hemodialysis, serum creatinine reached 6.82 mg/dL, and right lower-extremity strength remained at MRC grade 1. The final heparin-free hemodialysis session was completed on hospital day 29.

On hospital day 30, definitive proximal aortic repair was performed. The dominant intimal tear was identified along the lesser curvature of the ascending aorta and excluded by hemiarch replacement using a 30-mm branched graft. Simultaneous antegrade thoracic endovascular aortic repair was performed using a 28-mm × 10-cm stent graft in the descending thoracic aorta. Organized thrombus between the intima and adventitia further supported chronicity.

No further renal replacement therapy was required after definitive repair. Spontaneous urine output returned, and serum creatinine decreased from 3.25 mg/dL before surgery to 1.62 mg/dL by postoperative day 7. During the same postoperative period, right lower-extremity strength improved from MRC grade 1 to grade 3.

Discussion

TEAS restored macroscopic branch-vessel flow but did not immediately restore renal or lower-extremity function. Persistent inflow through the proximal entry tear may have maintained an unfavorable true- and false-lumen pressure relationship despite satisfactory angiographic findings. Exclusion of the dominant proximal entry tear, stabilization of the descending thoracic aorta by antegrade TEVAR, and the previously created common channel may together have rebalanced aortic hemodynamics and improved effective organ perfusion. Because the celiac and left renal arteries arose from the false lumen, this mechanism should not be described as complete redirection of flow into the true lumen. Delayed recovery from rhabdomyolysis-associated acute tubular injury, ischemic neuropathy or myopathy, and rehabilitation could also have contributed; therefore, causality cannot be established.

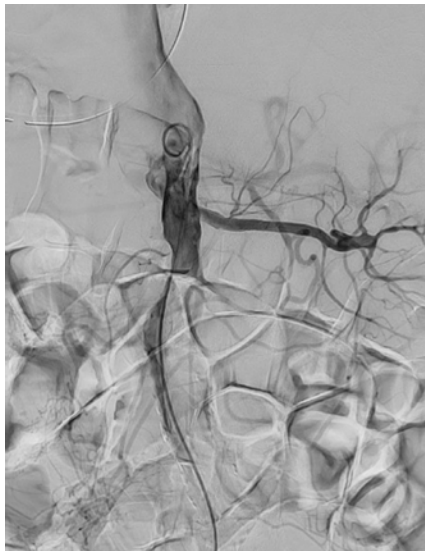
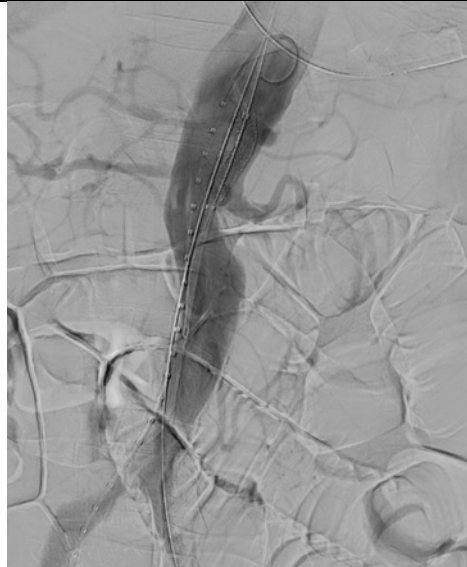
Conclusion

In presumed chronic type A aortic dissection presenting with acute-on-chronic malperfusion, angiographic branch-vessel patency after TEAS may not ensure functional organ recovery. Persistent renal or limb dysfunction should raise concern for unresolved central aortic hemodynamic malperfusion and the need for definitive proximal entry-tear exclusion and distal true-lumen stabilization.

Figure 1. Aortography before and after transcatheter electrosurgical aortic septotomy. Preintervention angiography demonstrated persistent true-lumen compression and compromised aortoiliac perfusion. Completion angiography after Zone 5–10 septotomy and prophylactic superior mesenteric artery bare-metal stenting demonstrated creation of a common aortic channel and restoration of visceral and bilateral iliac flow.

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演講者聯絡資料：Tel: [please complete]; Fax: [please complete]; E-Mail: [please complete]

	
Before TEAS	After TEAS

發表科別：〔請填寫〕 發表方式：☐口頭報告 ☐張貼海報 文章屬性：☐臨床研究 ☐基礎研究 ☒病例報告

演講者聯絡資料： Tel: [please complete]; Fax: [please complete]; E-Mail: [please complete]

反覆感染性心內膜炎揭示隱匿性濾泡性淋巴瘤：病例報告

雷凡卓醫師

林口長庚紀念醫院胸腔及心臟血管外科

Unmasked Occult Follicular Lymphoma in a Patient With Recurrent Endocarditis: A Case Report

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Background: Endocarditis from gut-derived organisms can be a sentinel for occult malignancy; recurrence from a different organism denotes reinfection, not relapse.

Case Summary: A male patient in his sixties presented with septic shock and a giant mitral vegetation; blood and valve cultures grew group B Streptococcus (GBS), prompting emergent mitral valve replacement (MVR). On post-operative day 24, he developed acute heart failure and severe pulmonary edema. Further examination disclosed a “rocking” prosthesis and new vegetation; cultures were positive for Enterococcus faecalis. He was placed under veno-arterial extracorporeal membrane oxygenation and underwent redo-MVR. Because E. faecalis and GBS endocarditis are linked to occult malignancy. Back-review of the admission computed tomography revealed overlooked lymphadenopathy; lymph-node biopsy and positron-emission tomography disclosed follicular lymphoma (Lugano II), not colorectal cancer. Patient was discharged uneventfully.

Discussion: The finding of E. faecalis drove the investigation that led to the diagnosis of indolent lymphoma. The literature regarding hematological malignancy and infective endocarditis is scarce. This is the first report linking E. fecalis and infective endocarditis.

Take-Home Messages: Enterococcal endocarditis warrants a malignancy search broader than colorectal cancer, and reinfection by a new organism may suggest a predisposing extracardiac source.

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LAVA-ECMO作為ECPR後延遲冠狀動脈繞道手術的橋接策略：乳酸清除與抗栓治療的考量

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LAVA-ECMO as a Bridge to Delayed CABG After ECPR: The Role of Lactate Clearance and Antithrombotic Exposure

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Purpose:

Emergency coronary artery bypass grafting (CABG) immediately after extracorporeal cardiopulmonary resuscitation (ECPR) carries substantial risk in patients with profound hyperlactatemia and recent dual antiplatelet therapy (DAPT) loading. Left atrial venoarterial extracorporeal membrane oxygenation (LAVA-ECMO) provides systemic circulatory support and left-heart decompression, potentially creating a window for metabolic recovery and optimization of surgical timing.

Materials and Methods:

We retrospectively reviewed three patients who developed cardiac arrest secondary to acute myocardial infarction with complex coronary artery disease. All patients received aspirin and ticagrelor loading, systemic heparinization, and LAVA-ECMO during ECPR; one additionally received tirofiban. Rather than proceeding directly to immediate salvage CABG, patients were supported with LAVA-ECMO while serial lactate levels, bleeding risk, and clinical status were assessed. CABG timing was individualized according to metabolic recovery and the urgency of revascularization.

Results:

The median age was 72 years (range, 69–75), and two patients were female. Two patients had ST-segment elevation myocardial infarction. One experienced out-of-hospital cardiac arrest and two experienced in-hospital cardiac arrest. Two patients had left main and three-vessel coronary artery disease, and one had two-vessel disease. Median peak lactate was 14.82 mmol/L (range, 10.33–15.56) and decreased to 2.30 mmol/L (range, 2.06–11.61) before CABG, corresponding to a median peak-to-preoperative lactate clearance of 80.1% (range, 21.7%–85.2%). CABG was performed 1–3 days after ECPR while all patients remained on ECMO. The intervals from DAPT loading to CABG were 7, 45, and 72 hours. Median 24-hour postoperative chest-tube drainage was 975 mL (range, 615–1,735), and median intraoperative red-cell transfusion was 5 units (range, 4–11). ECMO support lasted a median of 17 days, and two patients survived to discharge.

Conclusion:

Early LAVA-ECMO during ECPR provided systemic perfusion and left-heart decompression, allowing CABG timing to be guided by lactate trajectory and antithrombotic-associated bleeding risk. When clinically feasible, deferring CABG may permit metabolic recovery and extend the interval from DAPT loading before surgery. Larger comparative studies are required to determine whether this strategy reduces perioperative bleeding or improves survival.

Keywords: ECPR; LAVA-ECMO; dual antiplatelet therapy; anticoagulant; Lactate Clearance

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PERM1 於心肌再灌流傷害之抗氧化路徑

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PERM1-Mediated Antioxidant Pathways in Myocardial Ischemia–Reperfusion Injury

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Purpose:

Ischemia/reperfusion (IR) enhances oxidative stress, leading to myocardial injury. Although Perm1 has been reported to promote cytoprotective effects, its role in protecting the heart against IR injury remains unclear. This study aimed to investigate whether Perm1 attenuates myocardial IR injury through regulation of antioxidant signaling.

Materials and Methods:

The authors evaluated endogenous Perm1 expression during myocardial IR injury and examined the effects of Perm1 overexpression or knockdown on oxidative stress, myocardial injury, and antioxidant signaling. The expression of Nrf2 and its downstream antioxidant genes was also analyzed.

Results:

Perm1 expression was significantly downregulated following myocardial IR injury. Restoration of Perm1 expression attenuated myocardial injury and reduced oxidative stress, whereas Perm1 knockdown aggravated oxidative damage. These protective effects were associated with activation of Nrf2 and increased expression of antioxidant genes, suggesting that Perm1 alleviates IR injury by enhancing the endogenous antioxidant response.

Conclusion:

Perm1 protects the myocardium against ischemia/reperfusion injury by enhancing

antioxidant signaling through the Nrf2 pathway, highlighting Perm1 as a potential therapeutic target for myocardial IR injury.

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以沾黏分離術及外部支架置放治療 ACTA2 平滑肌功能障礙症候群之呼吸道壓迫：病
例報告

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**Airway Decompression by Adhesiolysis and External Stenting in ACTA2 Smooth
Muscle Dysfunction Syndrome: A Case Report**

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Purpose

External stenting — suspending a collapsed airway to an externally placed rigid prosthesis — is an established and reliable method for relieving airway compression in small children. We report its application, using a covered stent graft, in the uncommon setting of a child with ACTA2 mutation–related smooth muscle dysfunction syndrome and severe pulmonary hypertension, in whom progressive extrinsic left main bronchus compression precipitated recurrent, life-threatening respiratory failure.

Brief History

A 9-year-old Taiwanese girl with ACTA2 mutation–related multisystemic smooth muscle dysfunction syndrome (non-obstructive megacystis, congenital mydriasis) and severe pulmonary arterial hypertension of multifactorial origin, on triple therapy (bosentan, sildenafil, iloprost) with home oxygen, and a prior 2021 stroke with residual left-sided weakness. As a neonate she had a large PDA, ASD, and coarctation, treated by PDA division and aortoplasty in 2017; the ASD was intentionally left open to serve as a pressure pop-off for her pulmonary hypertension. Subsequent bronchoscopy showed bronchomalacia with near-total left main bronchus collapse. In 2026 she presented with human metapneumovirus pneumonia progressing to acute hypoxemic respiratory failure requiring intubation, and CT and bronchoscopy confirmed bronchomalacia with significant external compression of the

left main bronchus and left lung collapse. Because she could not be weaned from the ventilator, surgical decompression was indicated. On 2026/06/09 she underwent left main bronchus decompression via adhesiolysis with external covered-stent implantation (16 mm BeGraft reinforced with a 20 mm GoreTex wrap), partial ASD closure, and right upper lobe bullae resection. The ASD was only partially closed — again to preserve a pressure-relieving fenestration given her pulmonary hypertension — and post-operative TEE confirmed a residual, predominantly left-to-right shunt. Left lung expansion improved intraoperatively after adhesiolysis. She was weaned and extubated on postoperative day 6 and discharged in stable condition on 2026/07/03.

Conclusion

Extrinsic left main bronchus compression is a serious and under-recognized complication in children with ACTA2-related vasculopathy and pulmonary hypertension. Consistent with prior experience in tracheobronchomalacia and vascular compression, external stenting — here with a covered stent graft combined with adhesiolysis — effectively relieved the compression and restored lung expansion while avoiding the granulation, mucus impaction, and erosion risks of an intraluminal airway stent. This case extends the applicability of an established external-stenting approach to the rare context of ACTA2 smooth muscle dysfunction syndrome.

Key Words

ACTA2 mutation; smooth muscle dysfunction syndrome; pulmonary arterial hypertension; left main bronchus compression; bronchomalacia; external airway stenting

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Targeting Epicardial Adipose Tissue Remodeling Through SIRT1 Activation as a Novel Therapeutic Strategy for Cardiovascular Disease

以 SIRT1 活化重塑心外膜脂肪組織作為心血管疾病新穎治療策略之研究

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Purpose: Epicardial adipose tissue (EpAT) is increasingly recognized as an active endocrine organ that contributes to cardiovascular remodeling through adipokine secretion and inflammatory signaling. Dysfunctional adipocytes lose their thermogenic phenotype and promote vascular injury; however, the molecular mechanisms underlying this process remain incompletely understood. Sirtuin 1 (SIRT1), a NAD⁺-dependent deacetylase, has been implicated in metabolic regulation and adipocyte remodeling. We therefore investigated whether activation of SIRT1 promotes adipocyte browning, attenuates adipose dysfunction, and subsequently preserves vascular endothelial homeostasis through adipocyte–endothelial crosstalk.

Materials and Methods: Primary murine epicardial adipocytes and differentiated 3T3-L1 adipocytes were used to investigate the effects of SIRT1 activation (SRT1720) or inhibition (EX527). Adipocyte function was evaluated by Oil Red O staining, AlamarBlue assays, quantitative PCR, Western blotting, and immunofluorescence. Adipocyte–endothelial interactions were assessed using a transwell co-culture system with HUVECs. In vivo studies were performed in SIRT1-deficient mice, high-fat diet models, and epicardial adipose tissue manipulation models to evaluate the role of adipose remodeling in cardiovascular protection.

Results: Activation of SIRT1 markedly reduced intracellular lipid accumulation while enhancing the expression of thermogenic genes, including **UCP1**, **PGC-1 α** , and **PRDM16**, indicating induction of adipocyte browning. Conversely, pharmacological inhibition or genetic depletion of SIRT1 promoted adipocyte hypertrophy and excessive lipid deposition both in vitro and in vivo. Conditioned adipocytes with impaired SIRT1 activity induced phenotypic alterations in endothelial cells characterized by impaired cellular integrity and increased migratory behavior, suggesting endothelial dysfunction. Furthermore, activation of SIRT1 alleviated obesity-associated adipose remodeling and demonstrated protective effects in murine cardiovascular models. Collectively, these findings indicate that SIRT1 remodels epicardial adipose tissue toward a metabolically favorable phenotype, thereby improving adipocyte–vascular communication and limiting cardiovascular injury.

Conclusion: SIRT1 serves as a central regulator of epicardial adipose tissue remodeling by promoting adipocyte browning and suppressing pathological lipid accumulation. Restoration of healthy adipose function subsequently improves adipocyte–endothelial communication and preserves vascular homeostasis. These findings suggest that targeting SIRT1-mediated adipose remodeling may represent a promising therapeutic strategy for obesity-associated cardiovascular disease and highlight epicardial adipose tissue as an important therapeutic target in cardiovascular medicine

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Beyond the Two-Decade Milestone: Clinical Outcomes of 20-Year Heart Transplant Survivors in NTUH

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Introduction

Since the first successful procedure in 1967, heart transplantation has remained the gold standard treatment for end-stage heart failure. However, surviving beyond two decades remains a formidable challenge in clinical practice. According to a comprehensive analysis of the United Network for Organ Sharing (UNOS) registry involving 20,658 recipients, the median survival for adult recipients is approximately 10.1 years, with a 20-year survival rate of only 17.2%.

International literature highlights varying outcomes and management challenges. While 20-year survival rates typically fall below 20%, University Hospital Zurich reported an exceptional rate of 55.6%, primarily attributed to highly selected cases with remarkably short ischemic times (71.2 minutes). Across these cohorts, younger recipient age is consistently identified as a dominant independent predictor of longevity. However, survivors into the third decade face an inevitable shift toward chronic complications, with malignancy and cardiac allograft vasculopathy (CAV) emerging as the leading causes of late mortality.

As a leading institution in Taiwan, National Taiwan University Hospital (NTUH) has managed complex transplant cases from the early era through to the present. This study investigates the clinical characteristics of NTUH recipients who have successfully survived for more than twenty years. By analyzing these trajectories, we aim to identify the factors that enabled these patients to exceed international benchmarks, providing practical insights for the long-term management of heart transplant recipients.

Methods

Study Design

A retrospective cohort study was conducted involving all patients who underwent orthotopic heart transplantation in NTUH between July 17, 1987, and December 31, 2005. During this period, a total of 266 cases were identified. All clinical data and long-term outcomes were systematically reviewed, with a longitudinal follow-up extending through March 31, 2026. The inclusion of this specific historical cohort allows for a minimum potential follow-up of 20 years for all surviving recipients, enabling a comprehensive analysis of ultra-long-term survival and late-phase clinical trajectories.

Statistical Analysis

Categorical variables were analyzed using the Chi-square test or Fisher's exact test, as appropriate. Cumulative survival rates and ESRD-free survival rates were estimated using the Kaplan-Meier method. To account for the high mortality rate in this long-term cohort, the cumulative incidence function (CIF) was employed to estimate the incidence of ESRD, with death treated as a competing risk. Cox proportional hazards regression analysis was performed to identify independent predictors associated with 20-year mortality. Variables with clinical significance or those showing potential associations in univariable analysis were entered into the multivariable model to calculate adjusted hazard ratios (HRs) and 95% confidence intervals (CIs). All statistical analyses were performed using R software (version 4.5.3). A two-tailed p-value of < 0.05 was considered statistically significant.

Results

Baseline Characteristics

A total of 266 patients who underwent heart transplantation in NTUH between 1987 and 2005 were included in this study, with follow-up extending through March 31, 2026. The baseline characteristics are summarized in Table 1. 47 survived ≥ 20 years and 219 survived < 20 years. A significant difference was observed in recipient age at the time of transplantation; survivors reaching the 20-year milestone were significantly younger, with a median age of 42.0 years compared to 49.0 years in the shorter-survival group ($p = 0.009$). Regarding the primary etiology for transplantation, non-ischemic cardiomyopathy (NICM) was the most prevalent diagnosis across all groups, particularly among the ≥ 20 -year survivors where it accounted for 68% of cases. Regarding surgical and perioperative profiles, the median ischemic time was 140 minutes (IQR, 100-212); the median cardiopulmonary bypass (CPB) time was 151 minutes (IQR, 122-199). Preoperative renal function showed a median serum creatinine level of 1.2 mg/dL (IQR, 0.9-1.5).

During the ultra-long-term follow-up, survivors faced significant cumulative morbidities. ESRD was documented in 58 patients (22%). Additionally, post-transplant malignancies developed in 35 patients (13%), with the most prevalent types being post-transplant lymphoproliferative disorder (PTLD) ($n = 9$), skin cancer ($n = 4$), and various solid organ tumors, reflecting the long-term impact of sustained immunosuppression and patient aging. These findings underscore the evolving clinical challenges encountered during three decades of post-transplantation care at our institution.

Long-term Outcomes

The long-term survival of the study cohort was evaluated using Kaplan-Meier analysis. The median survival time for heart transplant recipients at our institution was 8.33 years, with a 20-year survival rate of 19.6%. Regarding the causes of death, excluding cases with unknown etiology, infection was

identified as the leading cause of mortality, followed by CAV and graft failure.

Renal Outcomes and Competing Risk Analysis

The renal outcomes were analyzed using two distinct statistical approaches. The 20-year ESRD-free survival rate, estimated by the Kaplan-Meier method as a conditional probability, was 57.1%. However, when accounting for death as a competing risk, the cumulative incidence of ESRD, the actual incidence was approximately 20% by the 20-year mark. Analysis of risk factors for ESRD via forest plot identified recipient diabetes mellitus (DM) and older recipient age as significant contributors to the development of end-stage renal disease.

Predictors of 20-Year Mortality

Multivariable Cox-regression analysis was performed to identify independent predictors of 20-year mortality. The results revealed that CPB time (HR 1.01; 95% CI 1.00-1.01; $p < 0.001$) and recipient being a previous smoker (HR 2.27; 95% CI 1.30-3.94; $p = 0.004$) were significantly associated with increased long-term mortality. Additionally, recipient age showed a trend toward significance as an independent predictor (HR 1.02; 95% CI 1.00-1.03; $p = 0.056$), suggesting its potential impact on ultra-long-term survival.

Discussion

This retrospective analysis of 266 heart transplant recipients spanning nearly four decades demonstrates that ultra-long-term survival beyond 20 years is an achievable milestone at our institution. Our findings indicate that while recipient age remains a critical biological factor, the cumulative impact of perioperative management and lifestyle factors significantly dictates whether a patient can reach the third decade post-transplant.

A key finding in our multivariable analysis was the impact of CPB time on 20-year mortality. This suggests that the quality of early surgical protection and the physiological stress during the perioperative period have long-lasting effects that resonate even decades later. Furthermore, the significant association between previous smoking history and long-term mortality (HR 2.27) underscores the importance of recipient vascular health and the enduring risk of tobacco-related systemic damage, even after transplantation. While recipient age showed a trend toward significance, it remains a cornerstone of ultra-long-term survival, likely reflecting the superior biological reserve and resilience of younger patients against the stresses of chronic immunosuppression.

The transition into the second and third decades post-transplant brings a distinct shift in clinical challenges. Our study highlights that longevity comes with a cumulative systemic cost. The 13% malignancy rate and the 20% actual cumulative incidence of ESRD (after accounting for competing

risks) emphasize the unavoidable toxicities associated with long-term calcineurin inhibitor exposure and aging. The identification of diabetes mellitus and older age as significant risk factors for ESRD further guides us toward more personalized, renal-protective management strategies for high-risk subgroups. As infection and CAV remain the leading causes of late mortality, the focus of care for long-term survivors must evolve from preventing acute rejection to a comprehensive management of chronic systemic morbidities.

Limitations

Several limitations to this study should be noted. First, the retrospective nature over a 38-year span introduces era effect, as surgical techniques, organ preservation methods, and immunosuppressive protocols have evolved significantly. Second, as a single-center study in NTUH, the findings may reflect specific institutional practices and a specific patient population in Taiwan. Lastly, despite our extensive dataset, some granular data from the late 1980s were incomplete, which may limit the analysis of certain donor-specific or early perioperative variables.

Conclusion

In conclusion, heart transplantation in NTUH has achieved a 20-year survival rate of 19.6%, with some patients surviving over 30 years. While surgical precision—reflected in CPB time—is the foundation for early success, long-term survival is heavily influenced by recipient-specific factors such as smoking history and recipient age. As more patients cross the 20-year milestone, the primary clinical challenge shifts to the prevention and management of late-phase complications, particularly infections, CAV and graft failure, to ensure both the quantity and quality of life in the third decade and beyond.

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115 年年會一般論文投稿稿紙
急性心肌梗塞併發心室中隔缺損外科修補的經驗與檢討
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Lessons learned from surgical repair for acute myocardial infarction complicated with ventricular septal rupture

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Purpose: Ventricular septal rupture (VSR) represents a catastrophic mechanical complication of acute myocardial infarction (AMI), typically manifesting within 8–24 hours of insult. Despite the widespread adoption of percutaneous coronary intervention (PCI), which has lowered VSR incidence to 0.1–0.3%, contemporary mortality rates persistently range between 45% and 80%. This study aims to evaluate outcomes of post-AMI VSR surgical repairs performed across variable surgeon experience levels and training backgrounds to elucidate key therapeutic lessons.

Materials and Methods: A retrospective chart review was conducted on all patients who underwent surgical VSR repair following AMI at China Medical University Hospital over an 18-year period. Baseline demographics, electrocardiographic and radiographic findings, angiographic profiles, and preoperative mechanical circulatory support (IABP/ECMO) utilization were traced. Chronological intervals from PCI to VSR diagnosis, and from diagnosis to surgical intervention, were calculated alongside surgical techniques and concomitant procedures.

Results: The cohort comprised seven patients (2 males, 5 females; mean age 78 ± 10.7 years). Emergent PCI was performed in six patients, primarily addressing total occlusions of the left anterior descending or right coronary arteries. The mean time from PCI to VSR diagnosis was 2.5 days (range, 0–4 days), with subsequent clinical deterioration characterized by cardiogenic shock and respiratory failure. The mean diagnosis-to-surgery interval was 58.7 hours (range, 1–236.5 hours). Surgical strategies included the Takashi modified exclusion (n=3), David exclusion (n=2), and classic inclusion (n=2) techniques. Concomitant procedures involved bypass grafting (n=2) and aortic valve replacement (n=1). Three early deaths occurred (two due to exsanguination, one via ventricular fibrillation), and two late deaths were attributed to non-cardiac sequelae. Notably, all three survivors (all repaired via the Takashi method) exhibited residual shunts, one of which was successfully managed via transcatheter closure device salvage on postoperative day 40.

Conclusion: Optimizing outcomes in post-AMI VSR demands rapid revascularization to salvage myocardium, proactive antiarrhythmic strategies, and timely, experienced surgical or endovascular intervention. Endovascular techniques provide pivotal utility in both primary repair and post-surgical salvage scenarios.

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接受外科主動脈瓣置換術之二葉式主動脈瓣患者積極主動脈修復之安全性與長期結果：全國性世代研究

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Safety and Long-Term Outcomes of Proactive Aortic Repair in Patients with Bicuspid Aortic Valve Undergoing Surgical Aortic Valve Replacement: A Nationwide Cohort Study

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Purpose

We compared long-term outcomes of isolated surgical aortic valve replacement (SAVR) between bicuspid aortic valve (BAV) and tricuspid aortic valve (TAV) patients, and assessed the impact of concomitant aortic surgery in the BAV cohort.

Materials and Methods

Using Taiwan's National Health Insurance Research Database linked with the Taiwan Death Registry, this nationwide retrospective cohort study included patients undergoing SAVR during 2001–2021, followed until 2022. Propensity score matching (1:2) compared 2 cohorts: (1) BAV versus TAV undergoing isolated SAVR, and (2) BAV undergoing isolated SAVR versus concomitant aortic surgery. Primary outcomes were in-hospital mortality, late mortality, and long-term risk of acute aortic events.

Results

Of 14,554 eligible patients, 1,879 (12.9%) had BAV. After matching (1,246 BAV vs 2,492 TAV), BAV patients had lower in-hospital mortality (2.1% vs 3.3%, odds ratio [OR] 0.63, 95% confidence interval [CI] 0.40–0.98) and superior long-term survival (hazard ratio [HR] 0.79; 95% CI 0.70–0.90), with no difference in aortic events. In the matched BAV cohort (316 concomitant aortic surgery vs. 632 isolated SAVR), concomitant surgery was not associated with increased in-hospital mortality (2.2% vs 1.9%, OR 1.17, 95% CI 0.46–3.00), long-term mortality (HR 0.72, 95% CI: 0.49–1.05), or composite acute aortic events (HR 1.46; 95% CI: 0.58–3.65).

Conclusions

BAV patients undergoing SAVR demonstrated a favorable long-term prognosis with a significant survival advantage over TAV patients. Concomitant aortic surgery, when performed for established indications, did not increase in-hospital mortality and yielded comparable long-term survival, suggesting this aggressive approach did not appear to

compromise the excellent survival inherent to the BAV population.

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115 年年會一般論文投稿稿紙
微創多血管冠狀動脈繞道手術_嘉義基督教醫院早期經驗
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Minimally invasive multi-vessel coronary artery bypass grafting in Chiayi Christian hospital: Early experience

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Purpose:

Minimally invasive coronary artery bypass grafting (MICS CABG) has evolved to achieve complete revascularization while avoiding full median sternotomy. However, restricted working spaces and target vessel exposure present steep technical challenges. We evaluated our institutional workflow optimization strategies and clinical outcomes comparing conventional, MICS, and robotic-assisted CABG.

Materials and Methods:

Fifty consecutive patients undergoing isolated CABG in 2025 were analyzed (25 Conventional, 10 MICS, 15 Robotic). Our standardized MICS/Robotic protocol incorporates thoracoscopic or robotic skeletonized internal mammary artery harvest, concurrent endoscopic radial artery harvest (ERAH) using a LigaSure device during anesthesia line placement, pericardial slinging maneuvers for cardiac exposure, beating coronary bypass under cardiopulmonary bypass (CPB) support (if needed) as a safety backup, and multimodal analgesia (serratus anterior plane and intercostal nerve blocks).

Results:

Off-pump rates were consistent across conventional (32%), MICS (30%), and robotic (33%) cohorts. Median CPB durations were 93, 96, and 114.5 minutes, respectively. MICS and robotic techniques achieved significantly higher operating room (OR) extubation rates (90.0% and 93.3% vs. 4.0% in conventional), with 100% extubated within 6 hours (vs. 72.0% in conventional). Median ICU stay was reduced by nearly two-thirds (21.5 hours in MICS and 22.0 hours in Robotic vs. 61.5 hours in conventional). Overall hospital stay was shortened from 16.5 days to 7 days (MICS) and 9 days (Robotic). Both MICS and Robotic groups achieved 0% 30-day mortality and 0% stroke rates.

Conclusion:

Integrating MICS and robotic multivessel CABG with optimized operative workflows and advanced exposure/analgesic strategies is a feasible alternative strategy that accelerates early extubation and post-operative recovery without compromising patient safety.

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應用 **Thoraflex** 人工血管於急性 A 型主動脈剝離：
單一中心之手術預後、神經併發症及遠端主動脈事件追蹤

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Clinical Outcomes, Neurological Complications, and Late Aortic Events Following Total Arch Replacement with the Thoraflex Graft in Acute Type A Aortic Dissection: A Single-Center Experience

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Background: Total arch replacement (TAR) utilizing the frozen elephant trunk (FET) technique has become an established intervention for acute type A aortic dissection (ATAAD) extending into the arch and descending aorta. The Thoraflex Hybrid graft, featuring a four-branched prosthetic body integrated with a nitinol-stented distal stent graft, is designed to simplify arch reconstruction, seal distal entry tears, and promote downstream aortic remodeling. This single-center study evaluated early surgical outcomes, postoperative neurological complications, specifically spinal cord injury (paraplegia), and late aortic events, including distal stent graft-induced new entry (dSINE), distal expansion, and the requirement for secondary re-interventions.

Methods: We retrospectively analyzed 27 consecutive patients presenting with ATAAD who underwent emergency repair using the Thoraflex Hybrid graft at our institution between 2020 and 2024. Preoperative clinical demographics, operative profiles, early postoperative morbidity, in-hospital mortality, and follow-up clinical and computed tomography angiography (CTA) surveillance records were systematically reviewed. Primary endpoints included in-hospital mortality, incidence of postoperative paraplegia, late aortic events (distal dilation, dSINE, or rupture), and secondary aortic re-intervention rates.

Results: The cohort comprised 27 patients with a median age of 54 years (95% CI, 48-61 years), with 85.2% (n = 23) being male. Preoperative malperfusion syndrome was identified in 29.6% (n = 8) of patients. Emergency repair was executed successfully in all patients, with 96.3% (n = 26) undergoing complete TAR. Right subclavian artery cannulation (92.6%) was predominantly utilized. Median cardiopulmonary bypass and circulatory arrest times were 227 minutes (95% CI, 197–251) and 45 minutes (95% CI, 40–50), respectively. Outstanding early survival was achieved, with zero in-hospital mortality (0%, 0/27). Major postoperative complications included new cerebrovascular accident in 11.1% (n = 3), low cardiac output syndrome in 22.2% (n = 6), vocal cord palsy

in 18.5% (n = 5), acute kidney injury requiring continuous renal replacement therapy in 3.7% (n = 1), and composite major complications in 14.8% (n = 4). Postoperative paraplegia (spinal cord ischemia) occurred in only 1 patient (3.7%). Median ICU and hospital lengths of stay were 4 days (95% CI, 3–5) and 12 days (95% CI, 10–15), respectively. During mid-term follow-up, late aortic events developed in 3 patients (11.1%), all manifesting as distal dissection progression/dSINE. No cases of distal aortic expansion/dilation (0%), graft migration (0%), endoleak (0%), or aortic rupture (0%) were observed. All 3 patients (11.1%) with late distal events successfully underwent secondary endovascular re-intervention (TEVAR), achieving a 100% technical success rate with zero late aortic-related deaths (0%).

Conclusions: Total arch replacement with the Thoraflex Hybrid graft for ATAAD yields exceptional early safety with a 0% in-hospital mortality rate and a low risk of spinal cord injury (3.7% paraplegia). Late aortic events are primarily confined to distal dissection/dSINE (11.1%), which can be safely and effectively managed via secondary endovascular stent graft re-intervention.

Keywords: Acute Type A Aortic Dissection, Thoraflex Hybrid Graft, Frozen Elephant Trunk, Paraplegia, Late Aortic Events, Re-intervention.

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主動脈瓣置換術後「病人-瓣膜不匹配」與「有效開口面積指數」 對不良事件之預後影響

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Prognostic Impact of Patient-Prosthesis Mismatch and Indexed Effective Orifice Area on Major Adverse Events Following Aortic Valve Replacement

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Objectives:

This study aimed to investigate the prognostic significance of patient-prosthesis mismatch (PPM) and postoperative indexed effective orifice area (EOAI) on long-term major adverse cardiovascular and cerebral events (MACCE) and structural reverse remodeling after surgical aortic valve replacement (AVR) for severe aortic stenosis.

Methods:

We retrospectively analyzed 120 patients who underwent AVR for isolated severe aortic stenosis between 2015 and 2020. Preoperative and routine follow-up (6 to 24 months) echocardiographic parameters were systematically reviewed. Multivariable Cox proportional hazards regression, adjusted for age, sex, hypertension, baseline systolic dysfunction, and ventricular dilation, was employed to evaluate the impact of PPM and EOA on cumulative MACCE. Linear regression was utilized to assess the influence of these specific parameters on relative left ventricular mass index (LVMI) regression.

Results:

The mean cohort age was 67.7 ± 10.2 years, with an average tracking period of 3.6 ± 2.0 years. Over the follow-up, MACCE occurred in 44 patients (36.7%), while moderate-to-severe PPM was identified in 59 patients (49.2%). Multivariable Cox analysis demonstrated that the presence of PPM (HR: 2.75, $p = 0.004$) and a smaller postoperative EOA were robust independent predictors of increased MACCE risk. Furthermore, persistent elevation of valvuloarterial impedance ($Z_{va} > 3.5$ mmHg/mL/m², HR: 2.03) and higher stroke work loss significantly correlated with adverse outcomes. Linear modeling revealed that lower postoperative EOA ($B = -16.40$, $p = 0.019$) and the presence of PPM severely hindered structural reverse remodeling.

Conclusions:

Postoperative EOA and the resultant PPM are critical determinants of both structural recovery and long-term clinical prognosis following AVR. The presence of PPM not only blunts left ventricular mass regression but acts as a powerful independent predictor for

long-term MACCE. Surgical strategies prioritizing optimal prosthesis sizing to maximize EOAI and prevent PPM are essential to improve cardiovascular outcomes.

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術前灌流不足綜合症及多器官區域積累
對急性A型主動脈剝離手術死亡率與併發症之影響

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Impact of Preoperative Malperfusion Syndrome and Multi-Organ Region Involvement on Mortality and Morbidity in Acute Type A Aortic Dissection

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Background: Preoperative malperfusion syndrome (MPS) is a catastrophic complication in acute type A aortic dissection (ATAAD). This study evaluated the impact of overall MPS, specific organ involvement, and cumulative malperfused regions on intraoperative mortality, in-hospital mortality, and major postoperative complications.

Methods: We retrospectively analyzed 200 consecutive patients undergoing emergency surgical repair for ATAAD between 2020 and 2024. Patients were stratified into MPS (n = 74, 37.0%) and non-MPS (n = 126, 63.0%) groups. Primary endpoints were operative (intraoperative) mortality, in-hospital mortality, and major postoperative complications, including low cardiac output syndrome (LCOS), stroke, acute kidney injury (AKI) requiring continuous renal replacement therapy (CRRT), prolonged ventilation, and acute respiratory distress syndrome (ARDS). Odds ratios (ORs) were calculated for organ-specific MPS (cardiac, cerebral, mesenteric, renal, limbs) and cumulative malperfused regions (1, 2, or 3 regions).

Results: Compared with non-MPS patients, MPS patients exhibited significantly higher operative mortality (13.5% [10/74] vs. 0.8% [1/126], $p < 0.001$) and in-hospital mortality (31.1% [23/74] vs. 7.1% [9/126], $p < 0.001$; overall: 16.0% [32/200]). Major postoperative complications were markedly elevated in the MPS group, including ECMO support (10.8% [8/74] vs. 2.4% [3/126], $p = 0.005$), coma (14.9% [11/74] vs. 2.4% [3/126], $p = 0.001$), new CVA (25.7% [19/74] vs. 11.1% [14/126], $p = 0.010$), total CVA (35.1% [26/74] vs. 11.1% [14/126], $p < 0.001$), AKI requiring CRRT (23.0% [17/74] vs. 8.7% [11/126], $p = 0.010$), prolonged ventilation (52.7% [39/74] vs. 27.8% [35/126], $p < 0.001$), and ARDS (20.3% [15/74] vs. 3.2% [4/126], $p < 0.001$). Preoperative MPS independently predicted intraoperative death (OR: 19.5, 95% CI: 2.45–155.97, $p < 0.001$), in-hospital death (OR: 5.9, 95% CI: 2.54–13.55, $p < 0.001$), and composite adverse outcomes (OR: 5.0, 95% CI: 2.66–9.46, $p < 0.01$). Organ-specific analysis revealed that cardiac MPS (intraoperative OR: 27.0; in-hospital OR: 8.9), mesenteric MPS (OR: 10.4 and 8.0), and cerebral MPS (OR: 7.7 and 5.9) carried the highest mortality risks (all $p < 0.01$). Crucially,

surgical risk escalated exponentially with cumulative malperfused regions: intraoperative death OR increased from 5.81 (1 region) to 36.8 (2 regions, $p = 0.001$) and 93.8 (3 regions, $p < 0.001$); in-hospital death OR rose from 2.0 (1 region) to 13.0 (2 regions, $p < 0.001$) and 78.0 (3 regions, $p < 0.001$); and composite adverse outcome OR escalated from 3.0 (1 region, $p = 0.004$) to 10.8 (2 regions, $p < 0.001$) and 24.2 (3 regions, $p = 0.004$).

Conclusions: Preoperative MPS significantly impairs intraoperative and in-hospital survival as well as increases major postoperative morbidity in ATAAD repair. Cardiac, mesenteric, and cerebral malperfusion carry the highest lethal risks, while multi-region involvement drives an exponential surge in adverse outcomes.

Keywords: Acute Type A Aortic Dissection, Malperfusion Syndrome.

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支架併發症之開放手術移除：臺中榮民總醫院經驗
陳冠樺、黃暄喬、蔡忠霖
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Open Repair to Remove Stent-graft Complications: TCVGH Experience

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Purpose: As EVAR and TEVAR have become first-line therapy, a growing population now presents with endograft failure requiring secondary open aortic procedures (SOAP). SOAP is technically demanding and carries substantial risk, yet remains the only definitive treatment for infection, endoleak refractory to endovascular rescue, and graft occlusion. We report our institutional experience with open repair and stent-graft explantation.

Materials and Methods: We retrospectively reviewed consecutive patients undergoing open repair with stent-graft removal for endograft complications at Taichung Veterans General Hospital between June 2019 and January 2026. Index endograft type, indication for conversion, surgical approach, operative strategy, and early outcomes were analyzed. Results were compared with the pooled SOAP literature (J Am Heart Assoc 2017;6:e006618). Given the sample size, only descriptive statistics were applied.

Results: Twenty-five patients underwent open conversion. Nine had failed EVAR or fenestrated EVAR: endoleak in 6 (type I in 5, type II in 1), stent-graft main body occlusion in 1, and stent-graft infection in 2 (aorto-enteric fistula 1, aortitis 1). Sixteen had failed TEVAR: aneurysm—degenerative or dissection-related—in 5 (arch 2, descending 3), retrograde type A dissection in 4, and stent-graft infection in 7 (aorto-esophageal fistula 6, aortitis 1). Infection was therefore the single commonest indication overall (9/25, 36%), and aortic fistula was present in 7. Surgical approach was sternotomy in 5, laparotomy in 2, thoracotomy in 4, thoracoabdominal in 7, and anterolateral thoracotomy with partial sternotomy (ALPS) in 6, with the approach not recorded in 1. Extended approaches (thoracotomy plus ALPS) thus accounted for 10 of 25 patients (40%), substantially higher than the 10–15% reported in previous series, and ALPS use rose from 2 to 6 cases during the study period. Cardiopulmonary bypass was required in the vast majority, with full support and deep hypothermic circulatory arrest in selected cases. Operative mortality was 4 (16%), compared with 10.6% in the pooled SOAP literature, and followed aorto-enteric

fistula after EVAR, infected and ruptured TEVAR, retrograde type A dissection after total arch replacement, and aortic rupture. There was one late death from recurrent aortic fistula. Among the 20 patients with complete morbidity records, acute kidney injury requiring dialysis occurred in 2 and reoperation for bleeding in 4. Outcomes were acceptable for endoleak, whereas infection with aortic fistula requiring extra-anatomic bypass carried the worst prognosis.

Conclusion: Open conversion after failed endovascular repair is an increasing clinical demand: our caseload has expanded rapidly over the study period, and infection with aortic fistula now constitutes the leading indication at our center. These patients require markedly extended surgical fields, and both the graft segment and the proximal and distal control zones must be planned beyond the stented aorta. Endoleak carries a reasonable prognosis, whereas infection remains an ominous condition. As the endovascular population continues to grow, preserving open aortic surgical capability and maintaining lifelong surveillance after EVAR/TEVAR are essential.

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經皮二尖瓣球囊擴張術與二尖瓣手術治療風濕性心臟病之比較

Percutaneous Mitral Balloon Commissurotomy versus Mitral Valve Surgery for Rheumatic Heart Disease

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Purpose

Rheumatic heart disease (RHD) remains a major cardiovascular burden worldwide. However, real-world nationwide data directly comparing long-term outcomes between percutaneous mitral balloon commissurotomy (PMBC) and mitral valve (MV) surgery in rheumatic mitral stenosis (MS) are limited.

Materials and Methods

Patients with rheumatic MS who underwent either PMBC or MV surgery between 2001 and 2021 were identified from Taiwan's National Health Insurance Research Database. Outcomes of interest included in-hospital events, all-cause mortality, and other long-term outcomes such as MV reoperation, hospital readmission, and ischemic stroke. Propensity score matching (PSM) was performed in a 1:1 ratio to balance baseline characteristics and minimize confounding. A subgroup analysis was conducted for patients with atrial fibrillation (AF).

Results

A total of 2,722 patients with rheumatic MS were identified, of whom 755 (27.7%) underwent PMBC and 1,967 (72.3%) underwent MV surgery. After 1:1 PSM, each group comprised 723 patients. The PMBC group showed a lower in-hospital mortality rate than the MV surgery group (1.5% vs. 4.1%). During a mean follow-up of 9.17 years, the risk of all-cause mortality was comparable between the PMBC and MV surgery groups (31.6 and 32.9 events per 1,000 person-years, respectively; hazard ratio [HR], 0.96; 95% confidence interval [CI], 0.81–1.13). However, the PMBC group had a significantly higher risk of MV reoperation (43.5 vs. 4.3 events per 1,000 person-years). In the subgroup with AF, MV surgery with concomitant Maze procedure was associated with lower all-cause mortality compared with MV surgery without Maze (HR, 0.80; 95% CI, 0.67–0.96) and PMBC (HR, 0.79; 95% CI, 0.66–0.94).

Conclusion

In rheumatic MS, PMBC was associated with more favorable perioperative outcomes but

no long-term survival advantage compared with mitral valve surgery, while also being associated with a higher risk of mitral valve reoperation, ischemic stroke, and hospitalization for heart failure. Among patients with atrial fibrillation, concomitant Maze during mitral valve surgery was associated with improved long-term survival.

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急性A型主動脈壁內血腫與主動脈剝離於手術及止血處置上的差異比較

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Operative and hemostatic differences between acute type A intramural hematoma and aortic dissection

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Purpose:

Although acute type A intramural hematoma and classic aortic dissection often present with similar clinical features and are managed with similar operative strategies, their perioperative risk profiles may differ. Whether these differences translate into distinct surgical outcomes remains incompletely understood.

Materials and Methods:

This retrospective single-center study included 351 patients who underwent open surgical repair for acute type A intramural hematoma or aortic dissection between February 2018 and December 2022, with follow-up through November 2023. Baseline characteristics, operative variables, perioperative transfusion requirements, and early and midterm outcomes were compared. Inverse probability of treatment weighting was used to adjust for baseline differences between groups.

Results:

Among the cohort, 31 patients had intramural hematoma and 320 had aortic dissection. Compared with aortic dissection, intramural hematoma patients were older and more frequently had distal aortic involvement and pericardial effusion. Operative times, including cardiopulmonary bypass and circulatory arrest durations, were significantly shorter in the intramural hematoma group. After inverse probability of treatment weighting adjustment, intramural hematoma was associated with lower in-hospital mortality (odds ratio, 0.15; 95% confidence interval, 0.07–0.33), 30-day mortality (odds ratio, 0.20; 95% confidence interval, 0.09–0.43), and midterm mortality (hazard ratio, 0.15; 95% confidence interval, 0.07–0.32). No patient in the intramural hematoma group required open surgical reintervention during follow-up.

Conclusion:

Despite similar clinical presentations, acute type A intramural hematoma and aortic dissection differ in their clinical courses. Patients with intramural hematoma experienced shorter operative times and superior early and midterm survival without open reintervention, supporting the concept that these 2 entities follow distinct perioperative and postoperative courses.

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115 年年會一般論文投稿稿紙
單次手術左前側胸部份胸骨鋸開術治療複雜性胸主動脈瘤-中榮病例探討
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Single staged antero-lateral partial sternotomy approach to treat complex thoracic aortic arch aneurysm-experience in VGHTC

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Purpose:

Open repair still plays a vital role in treatment of both complex thoracic aortic arch and descending pathology. Among thoracotomy methods, antero-lateral partial sternotomy represents single stage for both reliable cardiac protection and better approach for thoracic aorta. Herein we report serial cases of antero-lateral partial sternotomy approach for complex thoracic aortic disease.

Cases description:

We addressed the computed tomography aortography among patients with complex thoracic lesions in descending aorta. Contained rupture of progressed mycotic aneurysm, marked progressed thoracic aneurysm leave endovascular repair inappropriate in these cases. Approach via 3rd or 4th intercostal space, cardiopulmonary circulation support, deep hypothermic cardiac arrest procedures during some proximal anastomosis, surgical fenestration for distal anastomosis, and, removed the endovascular devices were performed in some cases. The details of image, surgical approach, and, management results were presented.

Conclusion:

Open surgical repair remains a crucial treatment option for thoracic aortic diseases. Our cases presented here indicated antero-lateral partial sternotomy as treatment for single staged complex aortic arch lesions, and, even saving the endovascular complications. Antero-lateral partial sternotomy put emphasis on importance of better brain, lung and heart protection.

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經心房間隔雙心室輔助器插管個案報告

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Trans-septal implantation for CentriMag Trans-septal Inflow Cannula Configuration for temporary CentriMag BiVAD: A transseptal, Apex-Sparing Transition from LAVA-ECMO to BiVAD

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1. Background & Rationale

- Clinical Challenge: Fulminant myocarditis with refractory biventricular failure requires urgent mechanical circulatory support (MCS).
- Limitations of Conventional LVAD Inflow:
 - LV Apex: High risk of lethal hemorrhage or ventricular rupture, especially in redo sternotomies (previous RV rupture post repair) and friable inflamed tissue.
 - Right Superior Pulmonary Vein (RSPV): Suboptimal LV unloading and elevated risk of thrombosis.
- Objective: Introduce a novel, apex-sparing trans-septal, trans-mitral step-up strategy transitioning from LAVA-ECMO to temporary CentriMag BiVAD.

2. Case Presentation

- Patient Profile: 45-year-old female with recurrent lymphocytic myocarditis presenting with refractory electrical storm, cardiogenic shock, and LVEF 39% (INTERMACS Profile 1).
- Initial Support: Escalated to LAVA-ECMO (LA-VA ECMO via 19-Fr trans-septal cannula) for LV unloading.
- Complications: Right MCA stroke and echocardiographic evidence of aortic valve thrombosis.
- Indication: Persistent biventricular failure requiring escalation to temporary CentriMag BiVAD as a bridge to transplantation (BTT).

3. Surgical Technique (Redo Sternotomy under CPB)

1. cardiopulmonary Bypass (CPB): Transferred femoral ECMO circuit to CPB; added 19-Fr ascending aortic and 28-Fr SVC cannulae.
2. Exposure & Protection: Aortotomy post-cross-clamping confirmed no root thrombi; antegrade cardioplegia delivered.
3. Trans-septal LVAD Inflow:
 - Removed initial 19-Fr ECMO cannula; dilated interatrial septal puncture site.

- Advanced a 32-Fr cannula across the interatrial septum and mitral valve into the LV under direct visualization and TEE guidance.
- 4. RVAD Inflow: Placed a 22-Fr/32-Fr cannula in the lateral right atrium. Both inflows exited via double-layered 4-0 Prolene purse-string sutures.
- 5. Outflows: 22-Fr arterial cannulae placed into the ascending aorta (LVAD) and pulmonary artery (RVAD).
- 4. Results & Clinical Advantages
 - Hemodynamic Performance: Excellent flow stability without suction events or inflow dynamic limitations.
 - Effective Ventricular Decompression: Serial TEE confirmed robust, sustained LV unloading.
 - Anatomical & Tissue Protection:
 - Avoided hazardous apical dissection in dense adhesions and friable tissue.
 - Utilized fibrous interatrial septum for superior hemostatic control.
 - Clinical Outcome: Preserved native anatomical integrity, greatly simplifying subsequent orthotopic heart transplantation (OHT). Neurological recovery permitted full ambulation post-transplant.
- 5. Conclusion
 - The trans-septal, trans-mitral CentriMag BiVAD configuration is a safe, effective, and apex-sparing escalation strategy for patients with severe myocarditis and redo sternotomies.
 - It successfully bridges critical patients from temporary ECMO to heart transplantation while minimizing surgical morbidity.

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Title:

Mitral Valve Blood Cyst Mimicking Vegetation Causing Moderate Mitral Regurgitation:
A Case Report

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Abstract

Background: Blood cysts of the mitral valve are exceedingly rare in adults. They are typically congenital remnants that regress during infancy. Adult cases can mimic infective endocarditis or tumors.

Case: A 46-year-old man without major systemic disease presented with chest discomfort, shortness of breath, and palpitations for three months. Echocardiography revealed moderate mitral regurgitation and a 1.7 cm cystic lesion on the anterior mitral leaflet. Cardiac MRI demonstrated a filling defect attached to the anterior mitral leaflet and papillary muscle. Surgical intervention was performed. Histopathological examination revealed thinned-walled cystic spaces lined by cobblestone-shaped endothelial cells and fibrosis, consistent with a diagnosis of blood cyst.

Decision-making: Due to concerns for possible tumor or infective endocarditis, surgical resection was indicated. Intraoperatively, a cystic mass without signs of infection was found attached to the papillary muscle. Resection of the mass, mitral valve replacement, and neochordae reconstruction were performed.

Conclusion: This case highlights that blood cysts, although rare, should be considered in the differential diagnosis of mitral masses in adults.

Introduction

Blood cysts are rare, benign cardiac anomalies usually found in neonates and infants, and seldom persist into adulthood. They are congenital remnants that typically regress with age but can occasionally present later in life as intracardiac masses.

Case Presentation

A 46-year-old man presented with intermittent chest discomfort, dyspnea, and palpitations since August 2024. His past medical history included thyroid nodule surgery one year prior. Transthoracic echocardiography (TTE) revealed moderate mitral regurgitation and a 2.1 cm echogenic mass attached to the anterior mitral leaflet (AML). Cardiac MRI showed a 22 × 17 mm filling defect attached to the AML and papillary muscle (Figure). Intraoperative transesophageal echocardiography (TEE) (Figure) demonstrated a well-circumscribed, smoothly contoured, round-to-oval cystic lesion with homogeneously hypoechoic internal characteristics, attached to the atrial surface of the anterior mitral valve leaflet. The mass exhibited synchronous motion with the cardiac cycle, consistent with a mobile, non-infiltrative structure. Color Doppler interrogation revealed no evidence of internal vascular flow, a finding that supports its avascular nature and aids in distinguishing it from vascular neoplasms, papillary fibroelastomas, or infective endocarditic vegetations. Surgical exploration revealed a 3-cm hollow cystic mass originating from the papillary muscle without chordae attachment (Figure). The posterior mitral leaflet was preserved and used for mitral valve replacement. Anterior leaflet and chordae were reconstructed with PTFE neo-chordae. Histopathological examination confirmed thinned-walled cystic spaces lined by cobblestone-shaped

endothelial cells with fibrosis. The postoperative course included transient bradycardia, pleural effusion drainage, atrial flutter requiring cardioversion, and transient hoarseness.

Discussion

Primary cardiac tumors are quite rare, occurring in about 0.02% of autopsies, and most are benign in nature.¹ Among these, blood cysts form a particularly unusual group—especially in adults—since they are more commonly seen in newborns and often regress on their own.² When they do persist into adulthood, it is an uncommon event and they are usually discovered incidentally. However, in certain cases like our patient's, they may lead to symptoms.

A widely accepted theory is that these cysts originate from abnormal development during valvulogenesis, resulting in trapped blood within endothelial-lined spaces.³ Even though they are benign, these cysts can sometimes cause mechanical obstruction or be mistaken for infective endocarditis due to similar imaging features.² On rare occasions, embolic events like transient ischemic attacks or strokes have been linked to such lesions.⁴

When evaluating an intracardiac mass, the differential diagnosis can include thrombi, myxomas, fibroelastomas, vegetations, and other tumors.⁵ Accurate diagnosis depends heavily on multimodal imaging. Transthoracic and transesophageal echocardiography are key for assessing anatomy in real-time, while cardiac MRI is particularly useful for its

superior tissue characterization.⁶ MRI helps differentiate cystic from solid lesions based on how they appear on contrast imaging and signal behavior.⁷

Surgical removal is generally advised in patients who have symptoms, when there's concern about embolic potential, or when imaging cannot definitively exclude malignancy.⁸ When possible, valve-sparing procedures are preferred to preserve the native structure and function of the valve.⁹ Histopathology remains the gold standard for confirming the diagnosis and for distinguishing benign cysts from other rare intracardiac masses.¹⁰

This case serves as a reminder to consider congenital anomalies when evaluating mitral valve masses in adults. Early imaging, a well-considered differential diagnosis, and proper surgical planning are essential for the best outcomes.

Conclusion

Although blood cysts of the mitral valve are exceptionally rare in adults, they remain an important consideration when evaluating intracardiac masses. Accurate diagnosis relies heavily on multimodal imaging, particularly echocardiography and cardiac MRI, which help differentiate these benign lesions from other pathologies. When symptomatic, or when malignancy cannot be excluded, surgical excision not only alleviates symptoms but also enables definitive histopathological diagnosis. Whenever possible, valve-sparing procedures should be pursued to preserve native function. Timely recognition and management are essential to prevent potential complications such as embolic events and to ensure optimal patient outcomes.

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**ECPELLA、CentriMag 與 HeartMate 3 序列性治療成功完成肝細胞癌切除：一位
心因性休克患者之病例報告**

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**Sequential ECPELLA, CentriMag, and Destination HeartMate 3 Therapy Enabling
Hepatectomy in a Patient with Cardiogenic Shock and Hepatocellular Carcinoma**

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Introduction:

Cardiogenic shock after acute myocardial infarction leads to a high mortality which sometimes requires mechanical circulatory support (MCS). The optimal transition from temporary MCS to durable left ventricular assist device (LVAD) support remains particularly challenging in patients who are ineligible for heart transplantation.

We present a patient with underlying hepatocellular carcinoma (HCC). He suffered from ischemic cardiogenic shock then underwent sequential ECPELLA, prolonged Impella 5.5, then conversion to CentriMag support, and eventual HeartMate 3 implantation. Successful hemodynamic recovery subsequently enabled hepatectomy for HCC.

Case Presentation:

A 50-year-old man with history of coronary artery disease treated with multiple percutaneous coronary interventions (PCI), heart failure with reduced ejection fraction (LVEF 34%), hypertension, type 2 diabetes mellitus, and HCC treated with transarterial chemoembolization (TACE), presented with non-ST-elevation myocardial infarction (NSTEMI).

He underwent scheduled PCI for complete in-stent restenosis of the left anterior descending artery (LAD). The procedure was complicated with pulseless electrical activity (PEA). Requiring approximately 20 minutes of cardiopulmonary resuscitation before return of spontaneous circulation. Emergent venoarterial extracorporeal membrane oxygenation (VA-ECMO) and intra-aortic balloon pump (IABP) support were established.

Despite successful resuscitation, the patient remained in profound cardiogenic shock complicated with pulmonary edema, ventricular tachycardia. Transthoracic echocardiography demonstrated severe deterioration of left ventricular systolic function with an LVEF of approximately 14%.

Given persistent cardiogenic shock despite VA-ECMO support, ECPELLA 2.0, consisting of Impella 5.5 combined with VA-ECMO, was implanted to provide systemic circulatory support while unloading the left ventricle. VA-ECMO was then successfully removed. However, myocardial recovery remained insufficient, and prolonged Impella 5.5

support was required.

36 days after Impella implantation, the patient developed recurrent sustained ventricular tachycardia (VT). The Impella was decided to be removed while the temporary mechanical circulatory support was therefore converted to CentriMag. During this surgery, persistent VT continued despite repositioning of the device under transesophageal echocardiographic guidance. Gross inspection of the explanted Impella revealed thrombus formation surrounding the catheter, suggesting device-related thrombosis as the likely cause of recurrent pump dysfunction and ventricular arrhythmias.

Since the patient had a hepatocellular carcinoma, heart transplantation was considered contraindicated. Destination therapy with a self-paid HeartMate 3 LVAD was selected after shared decision-making with the patient and his family. After HeartMate 3 implantation, echocardiography demonstrated persistent severe left ventricular dysfunction with an LVEF of approximately 16–20%.

Following hemodynamic stabilization after durable LVAD implantation, the patient underwent open hepatectomy. The patient continued rehabilitation with stable HeartMate 3 function. The patient was discharged after 173-days hospitalization.

Discussions:

The first important aspect is the use of sequential mechanical MCS rather than reliance on a single device. This case illustrates the concept of bridge-to-decision, in which temporary MCS serves not only to maintain end-organ perfusion but also to allow repeated reassessment before definitive therapeutic decisions are made.

The second notable finding was the occurrence of recurrent ventricular tachycardia after approximately 36 days of Impella support. Early recognition of this complication facilitated timely conversion to CentriMag support before irreversible hemodynamic deterioration occurred.

Perhaps the most distinctive feature of this case is that, in carefully selected patients, durable MCS can facilitate subsequent major non-cardiac surgery that would otherwise be impossible because of severe heart failure.

Conclusion:

This case demonstrates that sequential temporary MCS can successfully bridge selected patients with refractory cardiogenic shock to durable HeartMate 3 implantation. Recognition of Impella thrombosis as a potential cause of recurrent VT was critical for timely escalation of mechanical support. Durable LVAD support ultimately enabled successful curative hepatectomy, highlighting a potential treatment strategy for carefully selected patients with concomitant end-stage heart failure and active solid-organ malignancy.

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Redefining Surgeon Volume in Contemporary Mitral Valve Surgery: Time-Updated Measures of Repair Capability and Long-Term Outcomes.

重新定義當代二尖瓣手術中的外科醫師手術量：以時間更新指標評估二尖瓣修復能力與長期預後。

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Purpose:

The volume–outcome relationship is well established in cardiac surgery, but conventional cumulative volume may not reflect contemporary performance in mitral valve (MV) surgery. We examined whether preceding-year surgeon volume, a time-updated measure of recent operative activity, better captures MV repair capability and long-term outcomes than career-average volume.

Materials and Methods:

Using Taiwan's nationwide health insurance database, we identified 24,472 adults undergoing MV surgery between 2001 and 2022. Surgeon volume was assessed as preceding-year and career-average volume. Associations with MV repair, perioperative outcomes, and long-term outcomes were evaluated using multivariable regression models, with subgroup analyses by etiology.

Results:

Higher surgeon volume was associated with improved perioperative safety under both definitions. However, preceding-year volume was more strongly associated with MV repair. Each 10-case increase in preceding-year volume was associated with higher repair likelihood (adjusted odds ratio [aOR], 1.07; 95% CI, 1.05–1.09), whereas career-average volume was not (aOR, 1.001; 95% CI, 0.98–1.03). Over a mean follow-up of 7.2 years, higher preceding-year volume was associated with lower all-cause mortality (adjusted hazard ratio, 0.96; 95% CI, 0.95–0.98) and showed stronger, more consistent associations across late outcomes than career-average volume. Repair-related volume signals were strongest in degenerative MV disease, evident in infective endocarditis and rheumatic heart disease, and absent in ischemic mitral regurgitation.

Conclusion:

In MV surgery, preceding-year surgeon volume appears to better capture contemporary repair capability and long-term outcome performance than conventional career-average volume, whereas both metrics were associated with improved perioperative safety and lower long-term mortality. The volume–outcome relationship was not uniform across valve etiologies, with the clearest repair-related signal observed in degenerative disease, while associations with long-term outcomes extended across multiple etiologies. These findings support the use of time-updated volume measures as a more clinically relevant framework for evaluating surgical quality and informing referral decisions in modern MV surgery.

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獨立性肺動脈瓣膜置換術後的長期結果：根據潛在疾病、合併三尖瓣手術與生物瓣
膜類型進行比較分析

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**Long-Term Outcomes After Isolated Pulmonary Valve Replacement: Comparative
Analyses by Underlying Etiology, Concomitant Tricuspid Surgery, and Bioprosthesis
Type**

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Purpose:

Pulmonary valve replacement (PVR) is central to managing right ventricular outflow tract dysfunction after repaired congenital heart diseases, yet outcomes are often reported in heterogeneous cohorts. Whether tetralogy of Fallot (TOF) and non-TOF etiologies carry distinct perioperative and long-term risks after isolated PVR remains unclear.

Materials and Methods:

Using Taiwan's National Health Insurance database (2001–2022), we identified 406 patients who underwent isolated PVR (231 TOF, 175 non-TOF). Multivariable regression and Cox proportional hazards models were used to analyze in-hospital and long-term outcomes. Inverse probability of treatment weighting was applied to compare bioprosthetic valve types (bovine vs. porcine).

Results:

Over the 21-year period, overall PVR volumes and bioprosthetic valve usage (especially bovine) increased, while in-hospital mortality significantly declined. TOF accounted for 56.9% of isolated PVR and was associated with lower in-hospital mortality (0.9% vs. 6.9%; adjusted OR, 0.18; 95% CI, 0.05–0.67), shorter ICU stay, and fewer ventilator days. Over 6.4 ± 4.2 years of follow-up, TOF remained associated with lower post-discharge mortality (HR, 0.37; 95% CI, 0.16–0.87), MACCE (HR, 0.61; 95% CI, 0.38–0.99), and all-cause readmission. Redo PVR risk did not differ by TOF status or between bovine and porcine bioprosthesis.

Conclusion:

Outcomes after isolated PVR vary significantly by underlying etiology. TOF patients experience favorable perioperative courses and superior long-term survival, whereas non-TOF patients represented a heterogeneous, higher-risk population. These findings support a nuanced, etiology-specific, and lifetime-oriented approach to PVR management.

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中文題目: 以深度學習胸部 X 光模型進行主動脈瘤檢測

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英文題目: Deep Learning Chest X-ray Model for Aortic Aneurysm Detection

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Purpose: Aortic aneurysms are often asymptomatic and may be missed under current guideline-based screening. Recent studies suggest that deep learning on chest X-ray (CXR) images can provide clinical decision support. We evaluated whether a CXR-based artificial intelligence model could improve early detection of asymptomatic aortic aneurysms.

Materials and Methods: This retrospective study included 55,434 patients (2004–2022). Development and tuning cohorts comprised 29,665 (179,217 CXRs/computed tomography scans [CTs]) and 11,972 patients (74,902 CXRs/CTs) for model training and refinement, respectively. Internal validation included 12,797 patients, using only the first available CXR for performance assessment and longitudinal analysis. For generalizability, external validation was performed in 12,018 patients from a second hospital using the same criteria.

Results: In the internal validation cohort, the deep learning model demonstrated strong discrimination for thoracic aortic aneurysm (TAA), with an area under the curve (AUC), sensitivity, specificity, positive

predictive value (PPV), and negative predictive value (NPV) of 0.861, 74.2%, 80.9%, 4.2%, and 99.6%, respectively; for abdominal aortic aneurysm (AAA), the corresponding values were 0.844, 74.4%, 79.7%, 2.1%, and 99.8%. Performance remained consistent in the external cohort. TAA detection achieved an AUC, sensitivity, specificity, PPV, and NPV of 0.836, 64.5%, 81.4%, 3.6%, and 99.5%, respectively; while AAA detection yielded corresponding values of 0.858, 71.8%, 78.2%, 2.0%, and 99.8%.

Conclusion: Deep learning-based chest radiograph analysis demonstrated high accuracy and NPV for aortic aneurysm detection. Given CXR accessibility and convenience, this approach may facilitate incidental detection; nonetheless, prospective validation remains necessary.

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115 年年會一般論文投稿稿紙

中文題目—感染性心內膜炎患者於臨床結果與手術介入之性別差異

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服務機關及單位(中文)—林口長庚紀念醫院外科部

英文題目--**Sex Differences in Clinical Outcomes and Surgical Interventions for Infective Endocarditis: A Nationwide Registry**

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服務機關及單位(英文) --Department of Surgery, Chang Gung Memorial Hospital, Linkou Medical Center

Purpose:

The differences between women and men in infective endocarditis (IE) are well noted but nationwide population-level data are scarce. Current studies provided controversial results on clinical outcomes, and limited researches focused on surgical IE. Our study elucidates the sex difference in IE from demographic presentation, surgical details, to in-hospital outcomes and late events.

Materials and Methods:

This population-based cohort study used data from the Taiwan National Health Insurance Research Database. Totally 28,976 adult patients with IE between 2001 and 2022 were identified. Propensity score matching was conducted to balance the baseline characteristics between sexes. A subgroup of patients undergoing valve surgery was isolated for comparison. After matching, the primary outcomes were in-hospital mortality and long-term survival, compared using univariate logistic regression and Cox proportional hazard model. Secondary outcomes included perioperative complications and late adverse events.

Results:

A total of 28,976 patients with IE were identified in this study, with 10,580 women and 18,396 men; in the operated group, 1,252 women and 2,881 men were included. Mean age was older in women (63.5 vs. 58.4), and more women had hypertension, diabetes, chronic kidney disease, dialysis, and heart failure than men. In the matched cohort, women had higher in-hospital mortality than men in both overall (21.2% vs 19.8%; odds ratio [OR]: 1.09, 95% confidence interval [CI]: 1.02–1.17) and surgical group (20.7% vs 13.3%; OR: 1.70, 95% CI: 1.37–2.11). The mean follow up was 5.5 years in the whole cohort and 6.6 years in the operated subgroup. Though overall late survival was lower in women than

in men, women undergoing surgery had higher all-cause mortality and more frequent receive redo valve operation.

Conclusion:

Women were less likely to receive a diagnosis of IE, less likely to undergo valve surgery, and had higher in-hospital mortality regardless of surgical intervention. Women who underwent surgery experienced higher rates of perioperative complications. Although women exhibited superior overall late survival, those undergoing surgery had worse long-term outcomes, and required more redo valve surgeries. These findings suggest that considering the diagnosis of IE, implementing early intervention, and ensuring extended follow-up may improve clinical outcomes in women.

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中文題目:全民健保給付之 HeartMate 3 心室輔助器療效分析：台灣單一醫療中心之回顧性研究

作者中文姓名:劉士弘, 蔡宜廷¹,林致源¹,柯宏彥¹,許博順¹,林宜璋¹,楊翔宇¹,蔡建松^{1*}

服務機關及單位(中文):

1.國防醫學大學三軍總醫院外科部心臟血管外科

英文題目:Efficacy of HeartMate 3 ventricular assist devices reimbursed by National Health Insurance: Retrospective analysis from a single center in Taiwan

作者英文姓名-- Shih-Hung Liu , Yi-Ting Tsai¹, Chih-Yuan Lin¹, Hung-Yen Ke¹ , Po-Shun Hsu¹, Yi-Chang Lin¹ , Hsiang-Yu Yang¹, Jui-Tsung Chang¹, Dung-Jang Tsai², Chin Lin², Chien-Sung Tsai^{1*}

服務機關及單位(英文):

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Purpose: Owing to donor shortage, the left ventricular assist device (LVAD) has become the primary bridge to transplantation. Since October 2018, Taiwan's National Health Insurance (NHI) has reimbursed the HeartMate 3 (HM3) LVAD as a bridge to transplantation for eligible patients. This study assessed the outcomes of HM3 implantation at our single center and contextualized them with nationwide data from the Taiwan National Health Insurance Research Database (TaiNHIRD).

Materials and Methods: We retrospectively analyzed 52 patients who underwent NHI-reimbursed HM3 implantation between October 2018 and December 2024. Preoperative profiles, perioperative data, and postoperative outcomes and complications were analyzed. Long-term survival was estimated using Kaplan–Meier methods, and competing outcomes were summarized using cumulative incidence; results are presented alongside TaiNHIRD data for context, with no between-cohort inferential testing.

Results: The overall 1-year, 2-year, and 3-year survival rates were 91.9 %, 75.1 %, and 71.6 %, respectively. Competing risk analysis showed that 61.4 % of patients underwent heart transplantation within 1 year. Driveline infection (23.0 %) and gastrointestinal bleeding (11.5 %) were the most common late complications. Post-transplant survival did not differ significantly between patients with or without prior HM3 support, both in our cohort and in TaiNHIRD.

Conclusion: We demonstrated acceptable efficacy and safety of HM3 for bridging patients to

transplantation in the Taiwanese population. The most common complications were driveline infection and gastrointestinal bleeding. Based on our experience, our findings support consideration of expanding NHI indications to include destination therapy. These results may serve as a reference for other Asian countries considering HM3 adoption for end-stage heart failure.

投稿科別： ☒ 心臟血管外科 ☐ 胸腔外科	文章種類：一般論文
發表方式： ☒ 口頭報告 ☒ 海報展示（可複選 ☒ ）	文章屬性： ☒ 臨床研究 ☐ 基礎研究 ☐ 病例報告

以混合式冠狀動脈再通術治療三條冠狀動脈粥樣硬化性心臟病患者之術後二十七年追蹤
王嬭鈺^{1,2} 王仁愛^{1,2} 曹素琴^{1,2} 吳念怡^{1,2} 孫英哲^{1,2} 吳怡良^{1,2,3} 蔡宗博^{1,2,3}

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A long term of 27 years follow-up of a patient underwent Hybrid Coronary Revascularization (HCR; MICAB+PCI) to treat his triple-vessel Coronary Atherosclerotic Heart Disease (CAD)

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Purpose:

Hybrid coronary artery revascularization (HCR) usually referred to achieve complete or nearly complete coronary revascularization. Long term result of HCR (MIDCAB+PCI) procedure needs to be defined.

Case Report : #8008221

A 83-year-old man presented with triple vessel coronary atherosclerosis heart disease (CAD) associated with angina pectoris ascendens. Patient had undergone staged HCR with first MIDCAB (minimally invasive direct coronary artery bypassing) (LIMA→LAD) in the year of 1998 at age of 55 yrs old. Later he also had undergone couple times of percutaneous coronary intervention (PCI) with stent deployments of RCA in 1999 and at LCX in 2002, respectively. Graft image follow up 13 years after MIDCAB was performed with 64 MSCT angiography at UCLA University Hospital and it revealed the patent LIMA graft and no in-stent restenosis. Patient also had Electron Beam Tomography (EBT) and 640 MSCT angiography to demonstrate the patent LIMA graft as well as mild to moderate in-stent restenosis of RCA and LCX at Long Beach Memorial Hospital. Regarding the blood flow of LIMA to LAD graft measured via the 2nd and 4th ICS by Doppler scan was about 30~60 mL/min and repeated 1024 MSCT angiography that revealed questionable. LCX in-stent restenosis were performed at CSMU Hospital in 2023 and 2025. However, repeated cardiac catheterization revealed the FFR (fractional flow reserve) was 0.82.

Result:

A patent LIMA-LAD (MIDCAB) graft for 27 years, a patent RCA stent for 26 years and a LCX stent (PCI) with mild to moderate in-stent restenosis for 23 years were confirmed by multi-slices computed tomography. Treadmill stress test up to 9 min 12 sec but with positive T-wave depression was performed at 27-year follow up at CSMU Hospital.

Conclusion:

HCR is associated with faster post-operative recovery and offers the possibility of decreasing risk of stroke associated with CABG and vein graft failure while maintain the excellent long-term patency with LIMA graft to LAD. It is a reasonable choice at centers of expertise.

Renal Denervation as an Adjunct to Endovascular Aortic Repair for Difficult-to-Control Hypertension in Type B Aortic Dissection: A Two-Patient Case Series

腎交感神經阻斷術合併主動脈腔內修復治療 B 型主動脈剝離合併難治型高血壓：
兩病例系列

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Abstract

Background: Strict anti-impulse therapy is essential in acute type B aortic dissection, yet blood pressure may remain difficult to control despite intensive multidrug treatment. Catheter-based renal denervation (RDN) has re-emerged as an adjunctive treatment for resistant or uncontrolled hypertension. We describe two patients with type B aortic dissection who underwent RDN in conjunction with endovascular aortic repair.

Case presentation: A 61-year-old man with acute type B aortic dissection underwent thoracic endovascular aortic repair (TEVAR). Persistent hypertension required intravenous agents and approximately 10 antihypertensive drug classes; bilateral RDN was subsequently performed during the index admission. At approximately 11 months, office blood pressure was 128/54 mmHg on a substantially simplified regimen. A 59-year-old man with progressive subacute type B aortic dissection and recurrent chest and back pain underwent TEVAR, endovascular abdominal aortic repair, and RDN. At approximately 3 months, office blood pressure was 103/57 mmHg on amlodipine and bisoprolol.

Conclusion: RDN was technically feasible as an adjunct to endovascular aortic repair in these selected patients and was followed by lower office blood pressure and reduced medication burden. Because medication adjustment, natural recovery after aortic repair, and the absence of standardized ambulatory blood pressure monitoring limit causal interpretation, RDN should be considered investigational in this setting and evaluated in prospective, protocol-driven studies.

Keywords: renal denervation; type B aortic dissection; resistant hypertension; thoracic endovascular aortic repair; endovascular therapy

Introduction

Acute aortic syndromes provoke intense sympathetic activation through severe pain, vascular injury, and hemodynamic stress. In type B aortic dissection, prompt heart-rate and blood-pressure control reduces aortic wall stress and remains a cornerstone of initial management. Nevertheless, some patients require prolonged intravenous therapy and complex multidrug regimens, and unstable blood pressure may complicate perioperative management and long-term aortic protection.

Catheter-based renal denervation attenuates renal afferent and efferent sympathetic signaling by delivering radiofrequency or ultrasound energy around the renal arteries. Contemporary sham-controlled trials and meta-analyses have demonstrated modest but consistent reductions in ambulatory and office blood pressure, leading recent hypertension guidelines to recognize RDN as a potential adjunct for selected patients with resistant hypertension after multidisciplinary assessment. Evidence specifically addressing patients with aortic dissection is limited.

We report two patients with type B aortic dissection treated with endovascular aortic repair and adjunctive RDN. The purpose is to describe procedural integration, subsequent blood-pressure trajectories, and medication burden, while emphasizing the limitations of causal inference in a small retrospective case series.

Case Series

Case 1

A 61-year-old man with known hypertension presented on March 31, 2024, with sharp chest pain radiating to the back. Initial blood pressure was 189/96 mmHg, heart rate was 91 beats/min, and computed tomographic angiography demonstrated Stanford type B aortic dissection. He was admitted to the medical intensive care unit and treated with intravenous nicardipine and labetalol, followed by multiple oral antihypertensive agents.

Despite intensive therapy, blood-pressure control remained pharmacologically demanding. He underwent TEVAR on April 10, 2024. After TEVAR, intravenous nitroglycerin and nicardipine and a broad oral regimen were still required. The regimen immediately before RDN included hydralazine, labetalol, doxazosin, long-acting nitrate, nifedipine, azilsartan, clonidine, furosemide, spironolactone, and minoxidil.

Bilateral catheter-based RDN was performed on April 19, 2024. The presentation images demonstrate selective renal angiography and sequential ablation positions in both renal arteries. No major procedural complication was documented in the available presentation. He was discharged on April 23, 2024, with office blood pressure of 157/82 mmHg. At outpatient follow-up on March 6, 2025, blood pressure was 128/54 mmHg with a heart rate of 66 beats/min while receiving doxazosin, bisoprolol, and a fixed-dose amlodipine/valsartan combination.

Case 2

A 59-year-old man without a previously documented systemic disease had developed acute back pain approximately 2 weeks earlier and was initially treated at another hospital. He presented on October 5, 2024, because of recurrent chest tightness, pain, and radiographic progression of Stanford type B aortic dissection. On admission, blood pressure was 101/71 mmHg and heart rate was 77 beats/min.

During hospitalization, blood-pressure management included intravenous nicardipine together with amlodipine/valsartan, isosorbide dinitrate, labetalol, terazosin, and amlodipine. On October 8, 2024, he underwent TEVAR, endovascular abdominal aortic repair, and catheter-based RDN during the same treatment episode. Angiographic images in the presentation document selective renal artery catheterization and multielectrode ablation positions.

By October 10, blood pressure was approximately 112/53 to 111/66 mmHg. He was discharged on October 15, 2024, on amlodipine/valsartan, labetalol, terazosin, and amlodipine. At outpatient follow-up on January 2, 2025, office blood pressure was 103/57 mmHg with a heart rate of 73 beats/min while receiving amlodipine and bisoprolol.

Procedural Considerations

The presentation indicates transfemoral catheter access and bilateral renal artery treatment with a multielectrode radiofrequency catheter. Ablations were distributed along the renal artery circumference and length, including distal segments where anatomically feasible. Exact device specifications, number of ablations, energy settings, anticoagulation targets, contrast volume, and fluoroscopy time should be retrieved from the operative records before submission.

Before RDN, renal artery anatomy should be reviewed by computed tomography or angiography, and patients with severe renal artery stenosis, unsuitable vessel diameter, advanced renal dysfunction, or

a potentially correctable secondary cause of hypertension should generally be excluded. In patients with aortic dissection, additional attention is required to confirm true-lumen access, renal perfusion, and the relationship between the dissection flap and each renal artery.

Results

Both procedures were technically completed, and the available presentation did not report renal artery dissection, perforation, access-site complication, or loss of renal perfusion. Both patients demonstrated lower office blood pressure and fewer antihypertensive agents during follow-up. Because drug regimens were actively modified throughout hospitalization and follow-up, the observations should be interpreted as longitudinal clinical trajectories rather than isolated treatment effects.

Variable	Case 1: baseline	Case 1: pre-RDN	Case 1: follow-up	Case 2: baseline	Case 2: peri-RDN	Case 2: follow-up
Age/sex	61/M	—	—	59/M	—	—
Aortic pathology	Acute type B dissection	Post-TEVAR	Post-TEVAR	Progressive subacute type B dissection	TEVAR + EVAR	Post-repair
Blood pressure	189/96 mmHg	140/47–133/66 mmHg	128/54 mmHg	101/71 mmHg	106/50–112/55 mmHg	103/57 mmHg
IV antihypertensive therapy	Nicardipine + labetalol	Recent NTG/nicardipine	None reported	Nicardipine	Perioperative	None reported
Approximate oral drug burden	Escalating multidrug therapy	≈10 drug classes	4 pharmacologic agents*	Multiple agents	≥6 pharmacologic agents*	2 agents
RDN date	—	2024/04/19	—	—	2024/10/08	—
Follow-up interval	—	—	≈11 months	—	—	≈3 months

**Combination tablets were counted by pharmacologic components; exact medication reconciliation is required.*

Discussion

The principal observation is that RDN could be integrated into the endovascular management pathway of two patients with type B aortic dissection and clinically difficult blood-pressure control. Both patients subsequently achieved low office blood pressure with simplified oral regimens. These findings are directionally consistent with the known antihypertensive effect of contemporary RDN, but they do not establish that RDN was solely responsible for the improvement.

The rationale for RDN may be particularly relevant in aortic dissection. Persistent sympathetic activation increases heart rate, vasoconstriction, and blood-pressure variability, all of which can increase aortic wall stress. In addition, prolonged exposure to multiple intravenous and oral antihypertensive agents may delay mobilization, complicate discharge planning, and cause adverse

effects. A durable, adherence-independent reduction in sympathetic tone could therefore be attractive in selected patients.

Prior published experience remains sparse. Divchev and colleagues reported six patients who underwent renal sympathetic denervation after endovascular treatment for complicated aortic dissection, with marked reductions in 24-hour ambulatory blood pressure sustained to 1 year. That series supports technical feasibility but predates current-generation multielectrode systems. More recent RDN trials in broader hypertensive populations show smaller average treatment effects than the large reductions observed in early uncontrolled studies, emphasizing that medication adherence, regression to the mean, and follow-up intensity strongly influence apparent response.

Current European guidance permits consideration of catheter-based RDN for patients with resistant hypertension uncontrolled despite an appropriate three-drug regimen, including a thiazide or thiazide-like diuretic, after shared decision-making and multidisciplinary assessment. The present patients were treated in the unusual context of acute or subacute aortic disease, and their regimens did not follow a standardized resistant-hypertension protocol. Consequently, this report should not be interpreted as evidence for routine prophylactic RDN during TEVAR.

Several limitations are important. First, only two patients were included, without a control group. Second, office blood pressure rather than standardized 24-hour ambulatory blood pressure was available. Third, medication regimens changed repeatedly, and the natural reduction in pain and sympathetic drive after successful aortic repair may explain part of the improvement. Fourth, renal function, adherence assessment, secondary-hypertension evaluation, and complete procedural metrics were not available in the presentation. Finally, follow-up durations differed between patients.

A prospective feasibility study should use predefined inclusion criteria, standardized ambulatory blood-pressure monitoring, medication-adherence assessment, renal function and renal artery imaging, and fixed follow-up intervals. Clinically meaningful endpoints should include 24-hour systolic blood pressure, blood-pressure variability, medication burden, renal function, aortic remodeling, reintervention, and adverse events.

Conclusion

In this two-patient case series, catheter-based RDN was technically feasible alongside endovascular aortic repair and was followed by favorable office blood-pressure trajectories and reduced antihypertensive medication burden. These observations support further investigation but are insufficient to establish efficacy or routine indications. Until prospective data are available, RDN in type B aortic dissection should be reserved for carefully selected patients with persistent difficult-to-control hypertension after multidisciplinary evaluation.

Figure Legends

Figure 1. Computed tomographic angiography of Case 1 demonstrating Stanford type B aortic dissection before thoracic endovascular aortic repair.

Figure 2. Case 1: selective renal angiography and multielectrode radiofrequency renal denervation of the left and right renal arteries.

Figure 3. Computed tomographic angiography of Case 2 demonstrating progressive Stanford type B aortic dissection.

Figure 4. Case 2: endovascular aortic repair and bilateral renal denervation during the same treatment episode.

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Figures

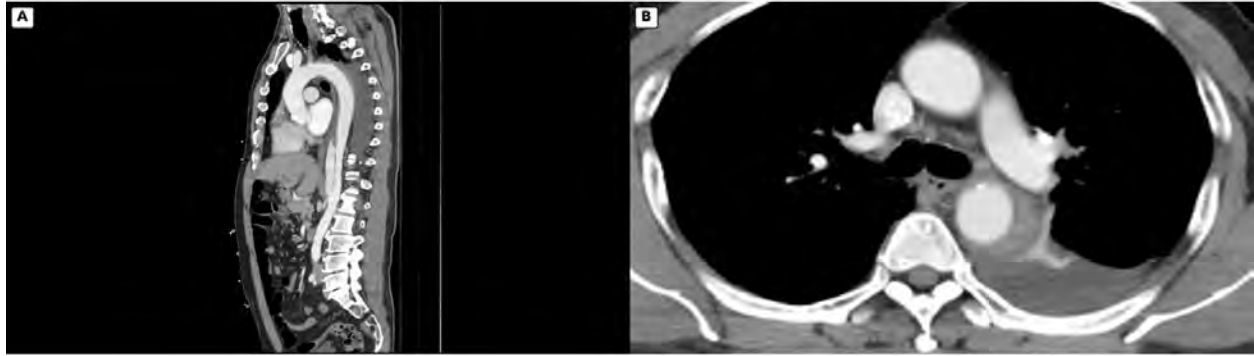


Figure 1. Preoperative computed tomographic angiography of Case 1. (A) Sagittal reconstruction demonstrates Stanford type B aortic dissection extending along the descending thoracic and abdominal aorta. (B) Axial image shows the true and false lumens in the descending thoracic aorta with associated left pleural fluid.

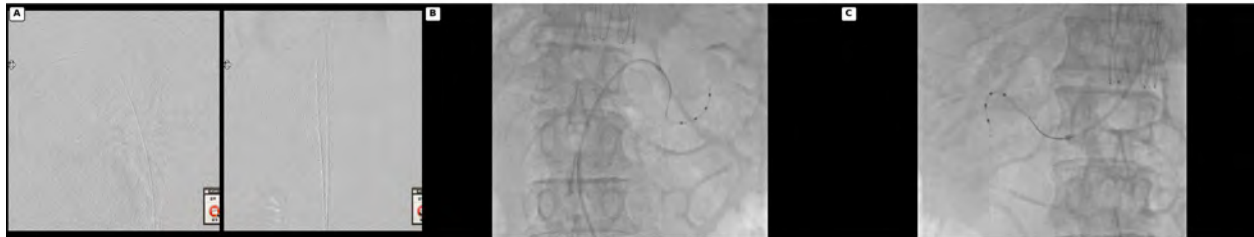


Figure 2. Endovascular treatment and renal denervation in Case 1. (A) Fluoroscopic images obtained during thoracic endovascular aortic repair. (B, C) Catheter-based radiofrequency renal denervation of the left and right renal arteries, respectively; the multielectrode catheter was positioned sequentially along the renal artery to provide circumferential ablation.

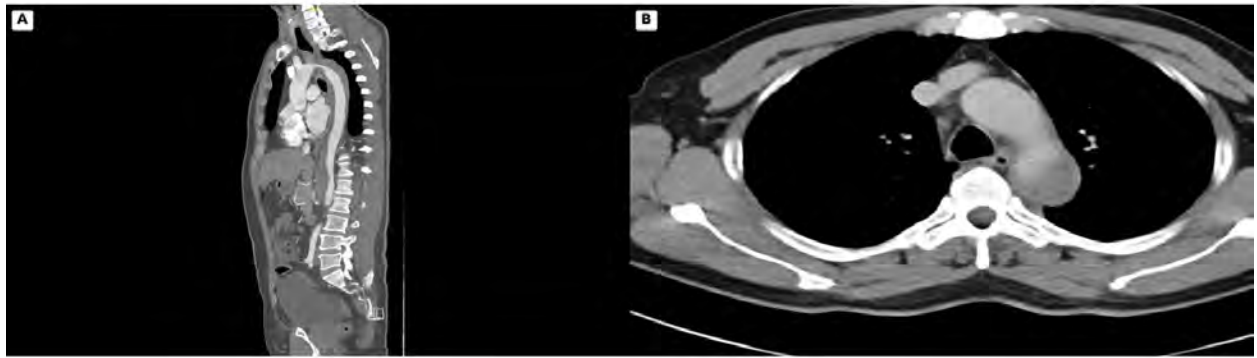


Figure 3. Preoperative computed tomographic angiography of Case 2. (A) Sagittal reconstruction demonstrates progressive type B aortic dissection involving the descending thoracic and abdominal aorta. (B) Axial image at the aortic arch and proximal descending thoracic aorta demonstrates the dissection flap and dual-lumen configuration.

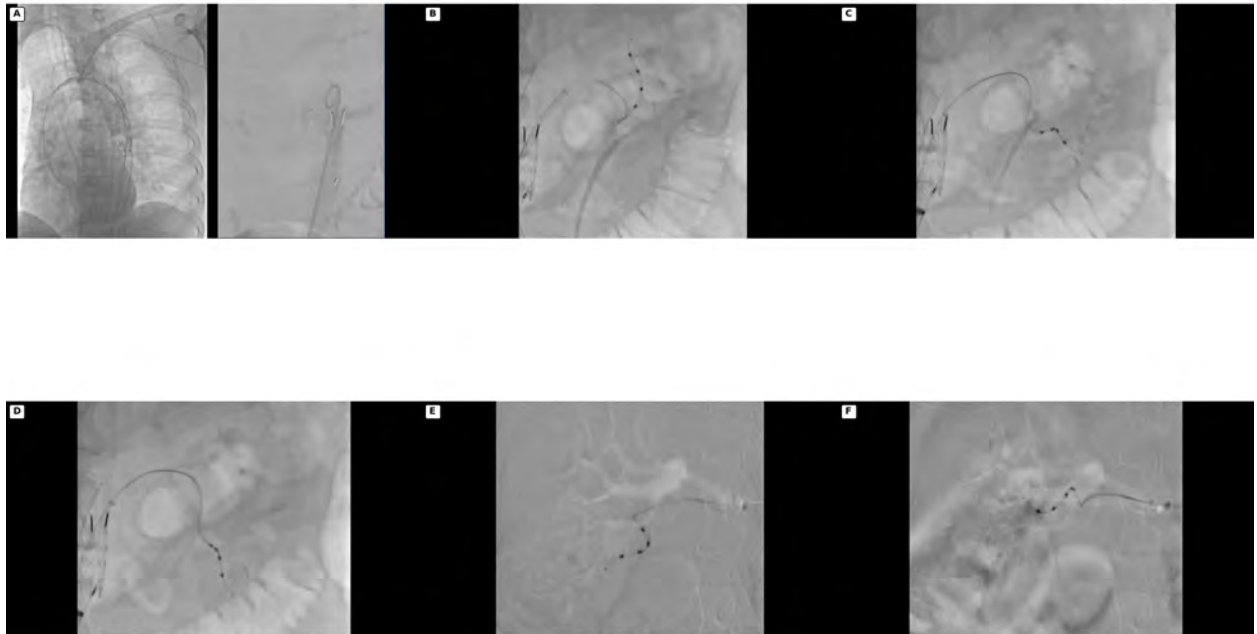


Figure 4. Endovascular aortic repair and renal denervation in Case 2. (A) Fluoroscopic images during thoracic and abdominal endovascular aortic repair. (B-D) Sequential radiofrequency ablation positions in one renal artery. (E, F) Selective angiography and multielectrode ablation of the contralateral renal artery. Final angiography confirmed preserved renal arterial flow in the images available from the presentation.

中文題目—轉移性腎細胞癌合併下腔靜脈及雙側總髂靜脈外壓性狹窄之血管內支架
治療：病例報告

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**Endovascular Stenting for Malignant Extrinsic Compression of the Inferior Vena
Cava and Bilateral Common Iliac Veins Secondary to Metastatic Renal Cell
Carcinoma: A Case Report**

Yu-Ting Huang, Chien-Sung Tsai, Hung-Yen Ke

[Department of Cardiovascular Surgery, Tri-Service General Hospital]

Purpose:

Malignant extrinsic compression of the inferior vena cava (IVC) and iliac veins is an uncommon but functionally disabling complication of peritoneal carcinomatosis, typically presenting as progressive bilateral lower extremity edema refractory to conservative therapy. We report the technical approach and short-term outcome of endovascular stent reconstruction for combined IVC and bilateral common iliac vein compression caused by recurrent, metastatic papillary renal cell carcinoma, and discuss key technical considerations and follow-up.

Materials and Methods:

A 44-year-old man had undergone left radical nephrectomy for papillary renal cell carcinoma three years earlier. One year before presentation, tumor recurrence with metastases to the omentum, peritoneum, and mesentery was diagnosed, complicated by malignant ascites. He subsequently developed progressive bilateral lower extremity swelling, and extrinsic IVC compression by peritoneal carcinomatosis was suspected; the cardiovascular surgery team was consulted. Under fluoroscopic guidance, bilateral femoral venous access was obtained (9-Fr sheath on the right, 12-Fr sheath on the left), and venography combined with intravascular ultrasound (IVUS) was performed to characterize the compression before proceeding with endovascular intervention.

Results:

Venography demonstrated a patent IVC and bilateral common iliac veins without intraluminal thrombus; however, IVUS revealed severe extrinsic luminal narrowing extending from the infradiaphragmatic IVC to both common iliac veins, findings not apparent on venography alone. Balloon angioplasty was performed using Atlas balloons (12.0×40 mm and 18.0×40 mm for the IVC and left common iliac vein; 14.0×40 mm for the bilateral common and external iliac veins). Definitive reconstruction was achieved with an 18.0×100 mm Venovo self-expanding stent placed across the IVC, and Medtronic Abre stents (14.0×100 mm left, 14.0×80 mm right) placed in the bilateral common iliac veins. Completion venography showed rapid contrast washout, confirming restoration of unobstructed venous outflow. Postoperatively, the patient's bilateral lower extremity skin turgor improved markedly, indicating prompt resolution of venous congestion.

Conclusion:

Endovascular stenting is a safe, minimally invasive, and effective strategy for relieving malignant extrinsic compression of the IVC and iliac veins, providing rapid symptomatic relief even in patients with limited oncologic prognosis. Because compressed veins may appear deceptively patent on venography alone, IVUS is essential for accurately delineating the true extent and severity of extrinsic narrowing. Selection of appropriately sized, dedicated venous self-expanding stents extending across the cavoiliac confluence allows durable decompression and restoration of venous outflow. Given the ongoing compressive tumor burden, careful clinical and imaging follow-up is warranted to monitor for in-stent restenosis or thrombosis. This case illustrates that endovascular decompression can meaningfully improve quality of life in patients with malignancy-related venous obstruction and may serve as a valuable palliative adjunct in this setting.

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巨大食道腫瘤壓迫心臟所引起的低血壓與心搏過緩之罕見病例

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An Uncommon Case of Hypotension and Bradycardia Induced by Cardiac Compression from a Giant Esophageal Tumor

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Min-Sheng General Hospital Division of Cardiovascular

Introduction

Hypotension and bradycardia are commonly in clinical practice but rarely caused by external cardiac compression. Reconstruction of esophageal malignancies after surgery may lead to abnormal cardiac complications due to anatomical changes. Tumor recurrence within the reconstructed esophageal duct may have a mass effect on adjacent cardiac structure, resulting in hemodynamic instability.

Case Report :

A 73-year-old man with a history of esophageal cancer status post reconstruction and concurrent chemoradiotherapy five months prior was admitted for progressive dysphagia and weight loss over two months. Panendoscopy revealed post-reconstruction changes with recurrent lower esophageal cancer-causing obstruction. During hospitalization, he developed sudden hypotension and bradycardia. Laboratory tests were unremarkable. Transthoracic echocardiography, limited by post-surgical anatomy, revealed junctional rhythm, preserved left ventricular systolic function, and mild-to-moderate valvular regurgitations. The right atrium and right ventricle appeared compressed by the dilated reconstructed esophagus, consistent with mass effect, with mild pulmonary hypertension. Holter monitoring showed no evidence of sick sinus syndrome or atrioventricular block. Chest CT confirmed a 3.2×7.0 cm enhancing mass at the lower part of the reconstructed tube. Hypotension partially responded to fluid resuscitation. Despite supportive care, the patient and family opted for discharge.

Discussion:

Hypotension and bradycardia are commonly caused by intrinsic cardiac conduction disorders, drug effects, or autonomic dysfunction. In this patient, Holter monitoring excluded sick sinus syndrome and high-grade AV block, while laboratory tests and clinical assessment ruled out sepsis, myocardial infarction, electrolyte disturbances, and medication-induced effects. Imaging demonstrated a 3.2×7.0 cm mass within the reconstructed esophagus compressing the right atrium and ventricle, producing impaired venous return and preload-dependent hypotension. Although hemodynamic measurements were not performed directly, the consistency between clinical presentation, imaging results, and exclusion of other causes strongly suggests that tumor-related cardiac compression is the primary mechanism. Timely identification is essential, especially for patients with altered mediastinal anatomy following esophageal surgery.

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115 年年會一般論文投稿
廣泛根除性清創與缺損導向手術重建於侵襲性主動脈周圍感染性心內膜炎

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Wide Exposure, Radical Debridement and Defect-Driven Reconstruction for Invasive Periaortic Endocarditis

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Purpose: Invasive periaortic endocarditis constitutes locally uncontrolled infection and carries prohibitive mortality when managed medically. The optimal reconstructive strategy remains unresolved: Harris (2022) and Chen (2018) reported fewer reoperations after routine root replacement, Gollmann-Tepeköylü (2022) superior survival after root repair, and Ting (2020), from this institution's 2001–2017 cohort, anatomy-guided selection. ACC/AHA (2020) states only that outcome is determined by complete debridement and reconstruction of functional anatomy rather than by the prosthesis selected. This study evaluates one strategy: wide exposure through Konno and/or Commando incisions, radical debridement, and reconstruction determined by the post-debridement defect rather than the diagnosis.

Materials and Methods: Fourteen consecutive patients operated for invasive or destructive periaortic infective endocarditis disease between July 2018 and March 2026 were reviewed retrospectively. In place of the cusp-count ladder of Ting (2020) or the one-third rule of Yang (2021), the post-debridement defect was classified on two axes: **extent** (none, less than one cusp, one to two cusps, or circumferential) and **direction** (aortomitral curtain, interventricular septum–LVOT, sinus and root wall, or cavitory fistula). Concordance required a matching component for every involved direction.

Results: Mean age was 57.4 ± 12.2 years (33–81); 10 patients were men, six had native valve and eight prosthetic or valved-conduit infection. Median EuroSCORE II was 11.5% (1.4–33.9, $n = 8$); operation was emergent in 2, urgent in 7 and elective in 5. Annular extent was circumferential in 3, extensive in 7, localized in 2 and absent in 2. Destruction extended into the aortomitral curtain in 9, the sinus and root wall in 7, the septum–LVOT in 5 and a chamber as a fistula in 5; 8 of 14 defects were multi-directional. Reconstruction comprised aortomitral continuity (Commando/hemi-Commando) repair in 9, Konno-type septal/LVOT enlargement in 5, sinus patch in 5, fistula closure in 5 and mitral replacement in 4. Patch reconstruction was used in 13 of 14 (bovine pericardium in 12), whereas root replacement was required in only 2 of 14 (14%). There was no intraoperative, 30-day (0/13) or in-hospital (0/12) mortality. Transient complete atrioventricular block occurred in 1, and no permanent pacemaker was implanted (0/11). No permanent stroke or new permanent dialysis occurred;

re-exploration for bleeding was not required, and median stay was 34 days (10–61). At a median follow-up of 34.7 months (0.3–79.4, n = 12) there was no recurrent endocarditis and no reoperation (0/11); the single death, at 39.1 months, was due to relapsed acute myeloid leukaemia, and no late cardiovascular mortality occurred. Late echocardiography demonstrated mild peri-prosthetic leak in 2, at 24 months at the aortic prosthesis following Konno-type reconstruction and at 39.6 months at the mitral prosthesis of a Commando; neither required reoperation. Two patients treated outside published extent thresholds remained event-free at 79.4 and 34.8 months, one with circumferential destruction patched to the anterior mitral leaflet and septal myocardium. Conversely, the most extensively destroyed root (circumferential, three directions) was managed with Konno and Commando incisions employed solely for exposure and anchoring, the neo-aortic annulus being built from right ventricular and left atrial wall without any patch material; this patient had the most favourable late result (34.6 months, no leak, mean gradient 8.7 mmHg). For comparison, pooled Commando data (Giambuzzi 2021, n = 540) report early mortality 16.2%, stroke 7.8% and pacemaker implantation 25.1%; LVOT reconstruction series report 30-day mortality 2.5–19.5% (Sponga 2016; El-Sayed Ahmad 2022) and freedom from recurrent endocarditis of 85% at 10 and 90% at 5 years (Meszaros 2012).

Conclusion: Wide exposure facilitates complete debridement rather than escalating resection: division of the septum (Konno) and aortomitral curtain (Commando) permits excision under direct vision and suture anchorage beyond the destroyed annulus. On this basis, 12 of 14 patients, including several with circumferential destruction, underwent reconstruction without root replacement, with no operative mortality, permanent stroke, recurrent endocarditis, permanent pacemaker or late cardiovascular death. Forteza-Gil (2025) similarly observed no difference between Commando and Root-Commando when patients were stratified by intraoperative extent. Periaortic abscess therefore does not in itself mandate root replacement, nor should it be treated by drainage or curettage without radical resection. Limitations include the retrospective single-institution design, n = 14, follow-up under four months in three patients, and documented radical debridement in one note only.

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人工血管結合輔助性動靜脈瘻管建立肘部肱動脈血液透析通路之臨床研究

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Elbow brachial artery prosthetic graft combined with an adjuvant AVF for hemodialysis access

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Purpose:

The purpose of this study is to preserve more vessels for hemodialysis (HD) access.

Materials and Methods:

This novel surgical approach was based on clinical experience regarding the longevity of an adjuvant AVF combined with a Patch-Enlarged Brachial Artery for Hemodialysis Access (ASAIO Journal 2007) and an Arterio-arterial loop graft (AALG) of the axillary artery (Arterio-arterial graft as vascular access in hemodialysis: a case report and review of literature, Int J Surg Case Rep. 2024 Aug 13;122:110165). Patients whose vascular conditions rendered an autogenous AVF impossible, and in whom a standard AVG might result in repeated acute thrombosis, were treated using this novel approach. An adjuvant AVF was constructed in the cubital fossa; a side-to-side brachial artery-to-brachial vein anastomosis was performed before the AALG was scheduled. The AVF orifice was approximately 3.5 mm in diameter. The AALG was performed after the adjuvant AVF had matured, usually one month or more later, using a 6 mm Flixene graft.

Results:

Between May 21, 2026, and June 25, 2026, four female patients (aged 70–75 years) underwent this procedure. Three patients were on a temporary central catheter (TCC), and one patient had a failing forearm AVF due to an aneurysm wall thrombus with patent collateral veins. Among them, two have already successfully utilized the graft for hemodialysis starting from the 15th postoperative day. All accesses have remained patent with no signs of infection to date.

Conclusion:

The initial outcomes are promising; however, long-term follow-up is necessary for further evaluation.

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雙植入式心室輔助器模擬全人工心臟：兩例初步經驗

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Dual HeartMate 3 as a Total Artificial Heart: Initial Two-Patient Experience

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Purpose:

Durable mechanical circulatory support for patients with severe biventricular heart failure remains challenging. SynCardia total artificial heart (TAH) and Berlin Heart EXCOR are limited by pneumatic driveline dependence and restricted geographic availability. Increasing clinical experience with continuous-flow implantable ventricular assist devices (VADs) has facilitated its wider off-label adoption. The use of two durable VADs for biventricular failure represents an alternative surgical strategy in highly selected patients. We report our initial experience of implanting two HeartMate 3 (HM3) devices in a total artificial heart configuration. Clinical indications, preceding mechanical circulatory support, surgical strategy, and early postoperative outcomes were presented.

Case summary:

The first patient was a 46-year-old man with advanced heart failure who developed refractory ventricular arrhythmia and persistent ventricular fibrillation despite staged mechanical circulatory support and antiarrhythmic therapy. Prolonged incessant ventricular arrhythmia, recurrent thrombotic complications during temporary biventricular support, and the low likelihood of myocardial recovery prompted conversion to durable support using two HM3 devices in total artificial heart configuration with ventriculectomy. Following implantation, stable biventricular mechanical support was achieved without further requirement for antiarrhythmic therapy.

The second patient was a 24-year-old man with muscular dystrophy-associated cardiomyopathy who presented with acute decompensated heart failure. Emergent HM3 implantation with temporary RVAD support was performed. Persistent right ventricular failure precluded RVAD weaning, necessitating conversion to durable biventricular support. Because of limited intrathoracic space for conventional biventricular device positioning, a second HM3 was implanted as the right-sided pump using a total artificial heart configuration. The patient is currently receiving postoperative intensive care.

Conclusions:

Our initial experience demonstrates the potential versatility of dual HM3 support in total artificial heart configuration for complex biventricular mechanical circulatory support. The

strategy was applied for distinct indications, including refractory ventricular arrhythmia and anatomical constraints on conventional device positioning. Although technically demanding and off-label, dual HM3 implantation in total artificial heart configuration may represent a feasible rescue or durable-support strategy for carefully selected patients when conventional mechanical circulatory support options are limited.

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甲狀腺腫壓迫氣道之手術

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Surgeries of Goiters which Compress the Airway

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Purpose:

To report personal experience in surgeries of large goiters which compressing the airway.

Materials and Methods:

There were 14 patients with large goiters which compressed the airway. Female patients were predominated (Female: Male=9:5). Average age was 61.1 years (range: 36 to 79 years). The main surgical approach was collar incision in 12 patients (85.7%), and an alternative approach was collar incision plus partial sternotomy in two (14.3%) patients because of goiters extending to the middle portion of the posterior mediastinum (n=1) or extending to the anterior and the posterior mediastinum (n=1). Thyroid resections included four cases of bilateral thyroidectomy, five cases of right-side thyroidectomy, and five cases of left-side

thyroidectomy respectively.

Results:

An average operation time was 103 minutes (range: 40 to 343 minutes), an average blood loss was 259.3 mL (range: 20 to 1900 mL), and an average postoperative hospital stay was 3.8 days (range: 2 to 20 days). No hospital deaths occurred. One patient had postoperative hematoma of the neck due to thrombocytopenia. In all patients, the narrowed tracheal lumen returns to normal following thyroidectomy.

Conclusion:

Large goiters easily compress the airway resulting in respiratory distress, surgeries are not difficult and patient's breaths could be return to normal.

胸腔鏡輔助下摘除食道肌瘤

吳明和

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Thoracoscopic Enucleation of Esophageal Leiomyoma

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Purpose:

To report personal experience in surgery of esophageal leiomyoma

Materials and Methods:

Four patients with esophageal leiomyoma were treated by thoracoscopic enucleation. The size of these esophageal leiomyomas varied from 2.8 cm up to 16 cm. Of these patients, male and female were each two, aged 41 up to 62 with an average of 50.3. Two cases of leiomyoma are located at the upper third of the esophagus, and each one at the middle third and lower third.

Results:

Operation time was from 65 minutes up to 123 minutes with an average of 89.5 minutes, and postoperative hospital stay was from 3 days up to 6 days with an average of 4.3 days. It is interesting that the 62-year-old female with a large leiomyoma in the middle esophagus presented with symptom of bloody sputum for several days. She underwent thoracoscopic enucleation of the 16 cm x 4 cm x 4 cm esophageal leiomyoma which presented angulation. Following surgeries of these 4 patients, a regular diet was allowed and all were discharged uneventfully before the postoperative day 6.

Conclusion:

Thoracoscopic approach is feasible to enucleate most esophageal leiomyomas especially for large ones.

115 年年會一般論文投稿稿紙
腹腔鏡橫膈膜節律器植入術協助嚴重腦血管疾病後
慢性呼吸器依賴患者脫離呼吸器：病例系列
李維釗*、雲柏仁、黃才旺#
三軍總醫院外科部胸腔外科

Laparoscopic Diaphragm Pacing to Facilitate Ventilator Weaning in Patients With Chronic Ventilator Dependence Following Severe Cerebrovascular Disease: A Case Series

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Acquired central ventilatory dysfunction following severe posterior fossa cerebrovascular disease may result in prolonged mechanical ventilator dependence despite neurological stabilization. We report our initial experience with laparoscopic diaphragm pacing to facilitate ventilator weaning in patients with chronic ventilator dependence secondary to acquired central ventilatory dysfunction.

We retrospectively reviewed two tracheostomized adults with chronic ventilator-dependent respiratory failure who underwent laparoscopic bilateral diaphragm motor-point mapping followed by implantation of a diaphragm pacing system (NeuRx). Postoperative management included individualized device programming, progressive diaphragm conditioning, respiratory rehabilitation, and structured ventilator-weaning training.

The first patient, a 37-year-old woman with central hypoventilation following posterior fossa hemorrhage and multiple cerebral infarctions, achieved nocturnal diaphragm-paced ventilation without mechanical ventilatory support by postoperative day 13 and was discharged on postoperative day 21. The second patient, a 49-year-old man with chronic ventilator dependence after rupture of a vertebral artery dissecting aneurysm complicated by subarachnoid and intraventricular hemorrhage, underwent surgical revision because of external electrode damage and was subsequently liberated from mechanical ventilation before discharge.

Laparoscopic diaphragm pacing may facilitate ventilator weaning in carefully selected patients with acquired central ventilatory dysfunction. Successful outcomes depend on preserved diaphragmatic stimulability, individualized pacing optimization, progressive diaphragm conditioning, and multidisciplinary rehabilitation. Although device-related complications may require surgical revision, diaphragm pacing represents a promising strategy for reducing long-term mechanical ventilator dependence in this challenging patient population.

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Complete Remission of Pulmonary Langerhans Cell Histiocytosis After Systemic Chemotherapy: A Case Report

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Background:

Pulmonary Langerhans cell histiocytosis (PLCH) is a rare smoking-related interstitial lung disease characterized by abnormal accumulation of CD1a- and langerin-positive Langerhans cells. We report a case of biopsy-confirmed PLCH achieving complete remission following systemic chemotherapy.

Case Presentation:

A 40-year-old female with a heavy smoking history presented with progressive exertional dyspnea and nonproductive cough. Chest computed tomography demonstrated bilateral pulmonary nodules, cavitory lesions, and irregular cysts predominantly in the upper and middle lung zones. Given the inconclusive radiologic findings and inability to exclude malignancy, video-assisted thoracoscopic surgery (VATS) lung biopsy was performed. Histopathology revealed nodular Langerhans cell infiltration with eosinophils; immunohistochemistry confirmed CD1a, S100, and langerin (CD207) positivity, establishing the diagnosis of PLCH. No extrapulmonary involvement was identified. Despite smoking cessation and observation, the patient developed persistent symptoms and radiologic progression. Six cycles of cladribine-based systemic chemotherapy combined with immunotherapy were administered and were well tolerated without severe adverse events. Follow-up computed tomography identified a residual ground-glass opacity; subsequent VATS wedge biopsy confirmed the absence of viable disease. Respiratory symptoms resolved, pulmonary function substantially improved, and no recurrence was observed during follow-up.

Conclusions:

For progressive PLCH, individualized systemic therapy may achieve durable remission, while post-treatment histologic assessment can help confirm response and guide treatment cessation.

Keywords: pulmonary Langerhans cell histiocytosis; cladribine; systemic chemotherapy; video-assisted thoracoscopic surgery; complete remission

肺腺癌晚期治療期間出現新的 EGFR 基因突變－兩位患者的案例報告

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The newly developed EGFR gene mutation during treatment of advanced lung adenocarcinoma – a case report of two patients

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Introduction

The prognosis of patients with advanced non-small cell lung cancer (NSCLC) is poor, and their 1-year survival rate after cytotoxic chemotherapy is only 29%.¹ However, the development of epidermal growth factor receptor tyrosine kinase inhibitors (EGFR-TKIs) dramatically improves the prognosis of certain patients. Patients with EGFR-mutant advanced NSCLC receiving EGFR-TKIs have a median overall survival (OS) more than twice as long as those not receiving EGFR-TKIs (24.3 vs 10.8 months).² If disease progression is found during treatment, re-evaluation of the disease including gene mutation should be considered.

Cases presentation

The first case is a 69-year-old man, who is diagnosed right upper lobe (RUL) lung adenocarcinoma, stage IA2, status post RUL lobectomy in 2019. The disease recurrence with bilateral pleural seeding and left lung tumor up to 1.5cm, at lingua was found by chest CT in July, 2023. The EGFR mutation of exon 19 deletion was detected then. Thus, Erlotinib plus Ramucirumab treatment was conducted. After the treatment, the tumor at left lingua seemed regression in size by chest CT in November, 2024. For re-staging, he underwent the surgery of video-assisted thoracic surgery (VATS) left S5 segmentectomy with mediastinal lymph node dissection. The pathology report showed the cancer stage ypT1bN0M0, stage IA2.

Nevertheless, during his follow-up at OPD (outpatient department), there was a 0.7cm lung nodule over LLL (left lower lobe) noted by chest CT in April, 2026, suspect recurrence. He underwent VATS LLL wedge resection again for tissue proof in May 2026. The pathology report showed rpT1aNxM1a, stage IVA. This time, we applied next-generation sequencing (NGS) for him. The EGFR mutation of exon 18, instead of exon 19 deletion, was detected. Currently, he is under the Afatinib treatment.

The second case is a 54-year-old woman, who is diagnosed RUL lung adenocarcinoma with ipsilateral pleural metastasis by chest CT in October, 2024. The clinical stage is cT4N0M1a, stage IVA. There is no EGFR mutation detected at first. Then, she received Pembrolizumab, Pemetrexed, Cisplatin treatment by 16 cycles. Disease progression with right pleural effusion is found since May 2025. Thus, the pleural effusion cytology was sampling and the EGFR mutation of exon 19 deletion is detected. Avastin plus Afatinib therapy is conducted since July 2025. The malignant pleural effusion seems regression by chest CT since December 2025.

Discussion

It is rare that the EGFR mutation of lung adenocarcinoma would newly develop or change during the treatment.

Clinical Pearls

Lung adenocarcinoma may develop a new mutation under treatment. Once the disease progression is noticed, we should have more awareness about the possibility.

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肺腺癌合併甲狀腺癌患者之臨床病理特徵、預後與分子機制探討：單一中心研究

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Clinicopathological characteristics, outcomes, and molecular profiles in patients with co-existing lung adenocarcinoma and thyroid cancer: A single-center surgical cohort study

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Introduction

With advances in cancer diagnostic modalities and prolonged patient survival, the cumulative risk of developing a second primary lung cancer (SPLC) in thyroid cancer survivors has drawn increasing clinical attention. Although radioactive iodine (RAI / I-131) therapy remains the standard adjuvant treatment for thyroid carcinoma, the potential correlation between cumulative radiation dose and subsequent pulmonary carcinogenesis warrants further investigation. However, among patients affected by both primary malignancies (double primary cancers) who undergo curative surgical resection for lung adenocarcinoma, comprehensive surgical cohort analyses regarding their clinicopathological characteristics, resectability outcomes, and the impact of cancer sequence on surgical prognosis and molecular features remain scarce.

Purpose:

Primary Analysis:

Compare the clinicopathological characteristics (e.g., ground-glass opacity [GGO] ratio, lymphovascular space invasion [LVSI]) and surgical outcomes (5-year disease-free survival [DFS] and overall survival [OS]) between patients with dual lung adenocarcinoma and thyroid cancer versus those with solitary lung adenocarcinoma.

Subgroup Sequence Analysis:

Stratify dual-cancer patients into a "Thyroid-first" group and a "Lung-first" group based on the diagnostic sequence to evaluate the surveillance effect and the impact of prior radioactive iodine (RAI) therapeutic dosage on pathological transition and recurrence risk.

Molecular Profiling:

Investigate the distribution of lung adenocarcinoma oncogenic driver mutations EGFR and BRAF and shared pathways between the two groups.

Materials and Methods:

Patient Cohort Selection:

Retrospectively review the database of the Department of Thoracic Surgery to identify primary lung adenocarcinoma patients who underwent curative video-assisted thoracoscopic surgery (VATS). Patients were categorized into the dual-cancer group (lung adenocarcinoma with thyroid cancer) and the control group (solitary lung adenocarcinoma).

Propensity Score Matching (PSM)

Perform 1:1 or 1:2 PSM to balance baseline characteristics between groups—including age, sex, smoking history, surgical procedure (lobectomy vs. sublobar resection), and pathological stage (p-stage)—to minimize selection bias.

Subgroup Stratification:

The dual-cancer group was further stratified into:

Subgroup A (Thyroid-first): Initial diagnosis of thyroid cancer followed by subsequent lung adenocarcinoma (to evaluate the RAI therapeutic dose and the surveillance effect of routine post-treatment imaging).

Subgroup B (Lung-first): Initial diagnosis of lung adenocarcinoma with subsequent detection of a second primary thyroid cancer during follow-up.

Statistical and Molecular Analysis:

Evaluate 5-year DFS and OS using Kaplan–Meier survival curves with log-rank tests.

Perform multivariate Cox proportional hazards regression modeling to identify independent predictors of postoperative recurrence.

Analyze EGFR and BRAF mutation statuses in resected lung adenocarcinoma specimens.

Results:

Primary Analysis (Dual-Cancer vs. Solitary Lung Adenocarcinoma):

After PSM, the dual-cancer group exhibited favorable tumor differentiation, a significantly higher proportion of ground-glass opacity (GGO ratio >50%), and smaller tumor size ($p < 0.05$).

No statistically significant differences were observed between the two groups regarding lymphovascular space invasion (LVSI) or visceral pleural invasion (VPI) rates.

Surgical Prognosis: Following curative resection, the 5-year DFS in the dual-cancer group was significantly superior to or non-inferior to that of the solitary lung adenocarcinoma group ($p < 0.05$), while 5-year OS showed no statistically significant difference.

Subgroup Sequence Analysis (Thyroid-first vs. Lung-first)

Thyroid-first Group: Benefiting from routine radiological monitoring following thyroid cancer treatment (Surveillance Effect), this subgroup presented with a significantly higher GGO ratio (>50%) and early-stage (p-Stage I) features, achieving the superior 5-year DFS following surgical resection.

Impact of RAI: Among Thyroid-first patients, exposure to high-dose RAI therapy (>100mCi) was associated with a shorter diagnostic interval for lung cancer and a slightly elevated hazard ratio (HR) for recurrence.

Multivariate Recurrence Predictors (Multivariate Cox Analysis)

A GGO ratio <50%, positive LVSI, and tumor size >2cm were identified as independent adverse prognostic factors for postoperative recurrence across the entire cohort and within the dual-cancer group ($p < 0.05$).

Molecular Profiles

The dual-cancer group maintained a high prevalence of EGFR driver mutations in lung adenocarcinoma tissue, with a subset of cases demonstrating MAPK signaling pathway alterations (such as BRAF mutations) concordant with thyroid carcinoma lineage.

Conclusion:

Patients with concomitant lung adenocarcinoma and thyroid cancer who undergo curative VATS resection achieve surgical outcomes (DFS and OS) non-inferior to those with solitary lung adenocarcinoma, confirming the clinical benefit of aggressive surgical management.

Subgroup analysis reveals that Thyroid-first patients benefit from post-treatment surveillance, leading to earlier detection of small-sized lung adenocarcinomas with high GGO components and yielding excellent post-resection disease-free survival.

A GGO ratio < 50% and positive LVSI serve as core pathological indicators for predicting postoperative recurrence.

Clinical Recommendation: For thyroid cancer survivors presenting with high-risk clinical factors (male, advanced age, underlying COPD) and a history of RAI therapy, intensive pulmonary screening via low-dose computed tomography (LDCT) is recommended to facilitate early detection and VATS resection of second primary lung cancers.

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115 年年會一般論文投稿稿紙
早期復發對於 IB 期非小細胞肺癌預後之影響
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Prognostic Impact of Early Recurrence in Stage IB Non-Small Cell Lung Cancer: A Taiwanese Cohort Study

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Purpose:

Stage IB non-small cell lung cancer (NSCLC), defined as T2aN0M0 under the AJCC 9th edition, encompasses a heterogeneous patient population. This study aimed to investigate whether early recurrence (within 24 months) versus late recurrence (> 24 months) dictates distinct post-recurrence survival (PRS) and overall survival (OS) in Taiwanese patients. Additionally, we evaluated whether different T2a subgroup drivers—tumor size (3 ~ 4 cm without invasion) versus invasiveness (<3.0 cm with visceral pleural invasion, main bronchus involvement, or atelectasis)—demonstrate divergent clinical outcomes.

Materials and Methods:

We retrospectively reviewed pathologically confirmed stage IB ($T_{2a}N_0M_0$) NSCLC patients who underwent curative-intent R0 resection between 2010 and 2023 at our institution. Recurrent cases were stratified by timing into early recurrence (≤ 24 months postoperatively) and late recurrence (> 24 months). Subgroup analyses compared Subgroup A (3.1--4.0 cm without VPI/invasion) and Subgroup B (≤ 3.0 cm with VPI/invasion). Survival outcomes, including disease-free survival (DFS), OS, and PRS, were estimated using the Kaplan-Meier method and compared via log-rank tests. Independent prognostic factors were identified using multivariable Cox proportional hazards models.

Results:

A total of 420 patients were analyzed (Subgroup A: [n = 190, 45.2%]; Subgroup B: [n = 230, 54.8%]). Over a median follow-up of 58.4 months, tumor recurrence was documented 105 (25.0%). Early recurrence occurred in 68 of recurrent patients. Patients with early recurrence exhibited significantly inferior 5-year OS (39.2% vs 73.0%, $p < 0.001$) and markedly shortened median PRS (15.8 vs. 41.5 months, $p < 0.001$) compared with those experiencing late recurrence. Multivariable analysis confirmed early recurrence as an independent predictor of dismal PRS (HR = 2.76, 95% CI: 1.68–4.53, $p < 0.001$).

Conclusion:

In Taiwanese patients with resected stage IB NSCLC, recurrence within 2 years reflects aggressive tumor biology and portends significantly worse post-recurrence survival. Furthermore, T_{2a} disease driven by invasive features (≤ 3.0 cm with VPI) carries a higher

risk of early disease failure than size-driven T_{2a} disease (3.1--4.0 cm). These findings underscore the need for risk-stratified postoperative surveillance and personalized adjuvant therapeutic strategies for stage IB patients harboring invasive pathological traits.

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單孔胸腔鏡肺解剖性切除術之學習曲線：訓練歷程探討與不同世代之比較

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Learning Curve for Single-port VATS Anatomical resection: Investigation of training process and comparison between generation

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Purpose:

Single-port video-assisted thoracoscopic surgery (VATS) anatomical resection has become an important minimally invasive approach for early-stage lung disease but remains technically demanding. This study aimed to characterize the learning process of single-port VATS anatomical resection using cumulative sum (CUSUM) analysis and to investigate differences in learning patterns between training generations.

Materials and Methods:

A retrospective study was conducted on consecutive anatomical pulmonary resections performed by a thoracic surgery trainee between October 2024 and November 2025. Anatomical resections included lobectomy, segmentectomy, and subsegmentectomy performed using a single-port VATS approach. Cases performed for non-oncologic indications or involving multiple simultaneous resections were excluded. Perioperative outcomes, including operative time, blood loss, conversion, complications, and postoperative recovery, were collected. Operative learning curves were evaluated using one-sided cumulative sum (CUSUM) analysis based on operative time. Comparative analyses between the contemporary training cohort and the pioneer generation are ongoing.

Results:

Preliminary analyses demonstrated progressive improvement in operative performance during the study period. Perioperative outcomes remained acceptable throughout the training process without compromising patient safety. Ongoing analyses are evaluating operative efficiency, learning phases, stabilization points, and differences between training generations using CUSUM analysis.

Conclusion:

Preliminary analyses demonstrated continuous improvement in operative performance throughout the study period while maintaining acceptable perioperative outcomes. CUSUM analysis identified distinct learning patterns during the training process. Comparative analyses between the pioneer and contemporary training generations are ongoing and will be completed before presentation.

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中文題目—葉克膜及導管置入策略對雙肺移植後的早期肺功能影響

作者中文姓名—周品立;林家慧;陳維勳

服務機關及單位(中文)—林口長庚紀念醫院

英文題目-- The Impact of V-A ECMO for bilateral lung transplantation and cannulation

Strategy on Early Post-Transplant Outcomes and PGD

作者英文姓名-- Pin-Li Chou; Chia-Hui Lin; Wei-Hsun Chen

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Purpose:

Veno-arterial extracorporeal membrane oxygenation (VA-ECMO) has become the preferred extracorporeal life support strategy during lung transplantation because it provides effective cardiopulmonary support while minimizing systemic inflammatory responses compared with conventional cardiopulmonary bypass. However, the optimal cannulation strategy remains controversial. Peripheral femoral cannulation is technically straightforward but may be associated with differential upper-body oxygenation and less physiological perfusion, whereas central cannulation provides antegrade systemic flow at the expense of greater surgical invasiveness. We evaluated the early postoperative outcomes of central and peripheral VA-ECMO during lung transplantation.

Materials and Methods:

This retrospective single-center study included lung transplant recipients who required intraoperative VA-ECMO support at Linkou Chang Gung Memorial Hospital. Patients were divided into a central VA-ECMO group (n = 12) and a peripheral VA-ECMO group (n = 14). Central ECMO was predominantly established using ascending aortic and femoral venous cannulation, whereas peripheral ECMO was performed through femoral vessels. Primary outcomes included grade 3 primary graft dysfunction (PGD) within 72 hours, intensive care unit (ICU) stay, hospital length of stay, and postoperative survival.

Results:

Baseline recipient characteristics were comparable between the two groups. Grade 3 PGD developed in 71% of patients receiving central VA-ECMO compared with 89% in the peripheral VA-ECMO group, suggesting a lower incidence of severe reperfusion injury with central support. Patients supported with peripheral VA-ECMO experienced a modestly longer median ICU stay (15 days) than those receiving central cannulation. However, total hospital length of stay and overall survival did not differ significantly between the two strategies.

Conclusion: Both central and peripheral VA-ECMO provided effective intraoperative circulatory support during lung transplantation with similar survival outcomes. Central VA-ECMO demonstrated a trend toward a lower incidence of severe PGD and shorter ICU stay, suggesting a potential advantage in early graft protection. Larger multicenter studies are warranted to determine the optimal ECMO cannulation strategy and to identify patients who may benefit most from central versus peripheral support.

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Endotracheal Tube-Parallel Advancement of an Ultrathin Transnasal Esophagogastroduodenoscope for Bronchoscopic-Guided Percutaneous Dilatational Tracheostomy: A Novel Airway Access Technique

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Abstract

Background: Flexible bronchoscopy can provide intratracheal visualization during percutaneous dilatational tracheostomy (PDT), but insertion through the endotracheal tube (ETT) reduces the effective ventilatory lumen. We developed an alternative technique in which an ultrathin transnasal esophagogastroduodenoscope (EGD) is advanced parallel to the ETT into the trachea, leaving the ETT lumen unoccupied. This study evaluated its feasibility and safety against a historical cohort in which PDT was performed using anatomical landmarks without endoscopic visualization.

Methods: We retrospectively reviewed 151 tracheostomy records from a single center between March 2016 and December 2025. All PDTs were analyzed: 57 EGD-guided procedures performed from August 2023 to December 2025 and 94 anatomical landmark-guided procedures performed from March 2016 to July 2023. Feasibility was defined as successful completion of PDT. Safety outcomes included procedural bleeding, repeat puncture, false-lumen creation, oxygen desaturation, tracheal tearing, granulation, and

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subsequent tracheoplasty. Continuous variables were compared using the Mann-Whitney U test and categorical variables using Fisher's exact test.

Results: All 57 EGD-guided PDTs were completed successfully (100%). Median procedure time was longer in the EGD-guided group than in the anatomical landmark group (6 [interquartile range, 5-8] vs 3 [2-5] minutes; $P<0.001$). Repeat puncture occurred in 20.4% (11/54) versus 14.3% (13/91), respectively ($P=0.362$). Any recorded acute procedural complication occurred in 12.3% versus 14.9% ($P=0.809$). Procedural bleeding occurred in 3.5% versus 7.4% ($P=0.484$), false-lumen creation in 1.8% versus 1.1% ($P=1.000$), and desaturation in 8.8% versus 6.4% ($P=0.748$). No tracheal tearing occurred in either group. Granulation requiring tracheoplasty was recorded in 3.5% versus 9.6% ($P=0.209$).

Conclusions: ETT-parallel advancement of an ultrathin EGD provided intratracheal visualization and enabled successful PDT without a detected increase in recorded complications compared with the historical anatomical landmark technique, although procedure time was longer. These findings support technical feasibility but do not constitute a direct comparison with conventional bronchoscopy. Prospective studies are required to address temporal, selection, and follow-up biases.

Keywords: percutaneous dilatational tracheostomy; ultrathin esophagogastroduodenoscope; anatomical landmarks; endoscopic guidance; airway management; procedural safety

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Risk and Characteristics of Second Primary Cancers Following Esophageal Cancer: A Retrospective Cohort Study

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Abstract

Background: Second primary cancer (SPC) is an important long-term concern among esophageal cancer (EC) survivors. This study investigated the risk factors, clinical characteristics, and survival outcomes of SPC after EC.

Methods: The 2004 to 2022 Chang Gung Research Database was retrospectively reviewed for patients aged ≥ 20 years with newly diagnosed EC as their first primary cancer. Patients with metastatic disease, previous or concurrent cancer, SPC within 6 months after EC diagnosis, follow-up less than 6 months, or survival less than 6 months were excluded. Fine–Gray subdistribution hazard models were used to identify factors associated with SPC, accounting for death as a competing risk.

Results: Among 4,081 eligible patients with EC, the median age was 57.0 years, 90.0% were male, and 54.4% had stage III–IV disease. SPC risk increased progressively over time, with a median interval of 29.5 months from EC diagnosis to SPC occurrence. The most common SPC sites were head and neck (37.9%), lung (12.8%), stomach (12.0%), and liver/intrahepatic cancers (10.1%). Surgery was associated with increased SPC risk

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(adjusted subdistribution hazard ratio [aSHR] = 1.56, 95% confidence interval [CI]: 1.27–1.93), as were unspecified tumor location (aSHR = 4.55, 95% CI: 3.26–6.36) and adenocarcinoma histology (aSHR = 1.71, 95% CI: 1.28–2.29). Female sex was associated with lower SPC risk (aSHR = 0.64, 95% CI: 0.47–0.87), as was stage III–IV disease (aSHR = 0.60, 95% CI: 0.49–0.74). Among patients with SPC, 80.5% died within 5 years after SPC diagnosis.

Conclusions: SPC is an important long-term outcome after EC and is associated with high mortality. Risk-adapted surveillance, particularly for head and neck, lung, and upper gastrointestinal cancers, may improve early detection among long-term EC survivors.

Keywords

Esophageal Cancer, Second Primary Cancer, Cancer Survivorship, Competing Risk Analysis, Prognosis, Chang Gung Research Database

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115 年年會一般論文投稿稿紙
胸腔鏡多重肺節切除術之圍手術期結果：單一術者經驗
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Perioperative Outcomes of Thoracoscopic Multiple Segmentectomy: A Single-Surgeon Experience

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Purpose:

With the increasing detection of multiple pulmonary nodules, multiple anatomical segmentectomy has become an important parenchyma-sparing surgical option. However, evidence regarding its perioperative safety remains limited. This study aimed to compare the perioperative outcomes between single and multiple thoracoscopic segmentectomy.

Materials and Methods:

We retrospectively reviewed patients who underwent thoracoscopic anatomical segmentectomy performed by a single surgeon. Patients undergoing bilateral procedures, combined lobectomy and segmentectomy, en bloc interlobar anatomical resection, or concomitant operations affecting postoperative recovery were excluded. Patients were divided into single- and multiple-segmentectomy groups. Baseline characteristics, operative variables, and postoperative outcomes were compared. Primary outcome was operative time. Secondary outcomes included blood loss, chest tube duration, length of hospital stay, prolonged air leak, postoperative complications, and perioperative mortality.

Results:

A total of 359 patients were included, including 315 patients who underwent single segmentectomy and 44 who underwent multiple segmentectomy. Compared with the single-segmentectomy group, the multiple-segmentectomy group had significantly longer operative time (142.5 vs. 100 minutes, $P<0.001$), longer chest tube duration (2 vs. 1 days, $P=0.004$), and longer postoperative hospital stay (3.5 vs. 3 days, $P=0.001$). Blood loss was slightly higher in the multiple-segmentectomy group but remained low in both groups. The incidence of prolonged air leak was higher after multiple segmentectomy (20.5% vs. 10.2%, $P=0.071$), whereas major postoperative complications (9.1% vs. 6.7%, $P=0.528$) were comparable between the two groups. No 30-day or 90-day mortality occurred in either group.

Conclusion:

Thoracoscopic multiple segmentectomy was associated with longer operative time and postoperative recovery than single segmentectomy, reflecting its greater technical complexity. Nevertheless, perioperative morbidity remained acceptable, with no increase in major complications or mortality. Multiple thoracoscopic segmentectomy is a safe and

feasible parenchyma-sparing procedure for carefully selected patients with multiple pulmonary nodules.

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雙能胸部 X 光攝影在肺癌檢測中的應用：與傳統 X 光攝影和低劑量電腦斷層掃描的比較研究

Dual energy chest radiography for lung cancer detection: a comparative study with conventional radiography and low-dose computed tomography

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Abstract

Background

Low-dose computed tomography (LDCT) is the gold standard for lung cancer screening but is limited by cost and accessibility. Conventional chest x-ray (CXR) is widely used but has limited sensitivity because of overlapping anatomical structures. Dual energy chest x-ray (DE-CXR) improves lesion conspicuity by separating bone and soft-tissue signals, but its clinical value relative to CXR and LDCT remains unclear.

Methods

A total of 200 participants who underwent both DE-CXR and LDCT were included for diagnostic performance analysis using LDCT as the reference standard. In addition, a community-based screening cohort of 742 individuals was used to compare DE-CXR with conventional CXR regarding lesion detection, diagnostic agreement, and interpretation time.

Results

DE-CXR altered diagnostic interpretation in approximately 7% of screened cases and significantly reduced interpretation time compared with conventional CXR (44.5 ± 8.1 vs. 59.0 ± 11.8 seconds, $p < 0.001$). Compared with LDCT, DE-CXR achieved an overall sensitivity of 76.15% and specificity of 67.14% for detecting clinically significant pulmonary lesions. Among patients with confirmed lung cancer, sensitivity increased to 79.41%, with the highest performance in predominantly solid lesions. Compared with conventional CXR, DE-CXR consistently demonstrated higher sensitivity, particularly for lesions containing ground-glass components though its sensitivity remained limited for early-stage lung cancers.

Conclusions

DE-CXR provides a clinically meaningful improvement over conventional CXR and represents an accessible, efficient, and scalable imaging modality for community-based lung cancer screening. Although it cannot replace LDCT for early detection of lung cancer, DE-CXR may serve as a frontline triage tool within a tiered screening strategy, particularly in resource-limited settings.

Keywords: Lung cancer, Low-dose computed tomography, Conventional chest x-ray, Dual energy chest x-ray, Screening, Early detection

機器手臂輔助複雜氣管支氣管成形術：氣道重建和肺部保留的三個典型病例

Robotic Surgery for Complex Tracheobronchoplasty:

Three Illustrative Cases of Airway Reconstruction and Lung Preservation

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Abstract

Background: Complex tracheobronchoplasty remains one of the most technically demanding procedures in thoracic surgery because of the need for meticulous airway dissection, precise reconstruction, and preservation of pulmonary function. The robotic platform has emerged as a valuable minimally invasive approach, offering enhanced visualization, wristed instrumentation, and superior intracorporeal suturing. We present three representative cases illustrating the versatility of robotic surgery in managing complex airway diseases.

Materials and result: Three patients underwent robotic-assisted airway reconstruction for distinct pathological conditions. The first patient underwent left main bronchus sleeve resection for endobronchial metastasis from colon cancer involving the left main bronchus. The second patient underwent left lower bronchoplasty following resection of an endobronchial hamartoma to preserve the remaining lung parenchyma. The third patient underwent robotic left upper lobe wedge lobectomy for early-stage lung cancer. All procedures were performed using the da Vinci robotic system with standardized hilar dissection and bronchoplastic techniques tailored to the individual pathology. All patients experienced uneventful postoperative recovery, and follow-up chest CT scan demonstrated satisfactory airway healing without clinically significant anastomotic complications.

Conclusion: These cases demonstrate that robotic surgery provides a safe, precise, and versatile platform for complex tracheobronchoplasty across a spectrum of benign and malignant airway diseases. The superior dexterity, enhanced visualization, and refined suturing capability of the robotic system facilitate technically demanding bronchoplastic procedures while preserving functional lung parenchyma. Robotic airway reconstruction represents an important advancement in minimally invasive thoracic surgery and expands the surgical options for selected patients requiring complex tracheobronchial reconstruction.

Keywords: Robotic assisted thoracoscopic surgery, Tracheobronchoplasty, lung function preservation

Endoscopic Submucosal Dissection for Synchronous and Metachronous Hypopharyngeal Neoplasia in Patients with Esophageal Cancer: A Surgeon's Experience

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Background

Patients with esophageal squamous cell carcinoma (ESCC) are at increased risk of hypopharyngeal neoplasia. We evaluated the outcomes of surgeon-performed endoscopic submucosal dissection (ESD) for these lesions.

Methods

We retrospectively reviewed 135 patients with esophageal cancer who underwent surveillance or therapeutic esophagogastroduodenoscopy over 10 years. Twenty-four patients with superficial hypopharyngeal neoplasia underwent ESD under general anesthesia. Patient characteristics, tumor sequence, technical outcomes, pathological findings, perioperative complications, and postoperative recovery were analyzed descriptively. Patient-level characteristics were calculated using 24 unique patients, whereas procedural outcomes were assessed across 26 ESD procedures.

Results

Hypopharyngeal neoplasia was identified in 24 of 135 patients (17.8%); 23 (95.8%) were men, with a median age of 64.5 years. The hypopharyngeal lesion was the second primary

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cancer in 16 patients, the third primary cancer in seven, and preceded ESCC in one. Two patients underwent repeat treatment, resulting in 26 procedures.

Median operating time was 344 minutes. En bloc and R0 resection were achieved in 24 (92.3%) and 21 procedures (80.8%), respectively. All vertical margins were negative, and pathological invasion did not exceed pT1. Blood loss was minimal or ≤ 50 mL in all procedures. Laryngeal edema and neck emphysema occurred after 19 (73.1%) and three procedures (11.5%), respectively, without requiring surgical intervention. Median hospital stay was 8.5 days.

Conclusions

Endoscopic surveillance identified hypopharyngeal neoplasia in a substantial proportion of patients with ESCC. Surgeon-performed ESD achieved favorable resection outcomes, although frequent laryngeal edema emphasizes the importance of airway protection and multidisciplinary perioperative care.

Keywords: esophageal squamous cell carcinoma; hypopharyngeal neoplasia; endoscopic submucosal dissection; second primary cancer; surveillance

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機器人輔助肺切除術中出血控制：前 100 例經驗總結
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Bleeding Control During Robotic Major Lung Resection: Lessons Learned from an Initial 100 Cases

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Purpose:

Intraoperative bleeding during robotic-assisted thoracoscopic surgery (RATS) major lung resection (lobectomy/segmentectomy) presents a unique challenge due to the lack of tactile feedback and restricted visual fields under tight exposure. We share our institutional experience and hemostatic management strategies for intraoperative vascular complications across our initial 100 consecutive RATS major pulmonary resections.

Materials and Methods:

A retrospective analysis was conducted on 100 consecutive patients who underwent RATS major lung resections performed by a single surgical team. Perioperative outcomes, incidence of major and minor vascular injuries, specific bleeding control techniques, and rates of emergency conversion to open thoracotomy or conventional video-assisted thoracoscopic surgery (VATS) were evaluated.

Results:

Of the eligible 100 patients, 35 underwent segmentectomy while 65 underwent lobectomy. Intraoperative vascular injuries occurred in 8 patients (8%), consisting of 6 pulmonary artery branch tears, 1 pulmonary vein tear, and 1 azygos vein injury. Minor bleeding in 3 of these cases was successfully controlled using direct compression and topical hemostatic agents alone. Among the remaining 5 cases involving moderate-to-severe vascular injuries, 4 were successfully managed intracorporeally using robotic-assisted suture repair, while 1 case required emergency conversion to open thoracotomy for definitive hemostatic control. Overall, the open conversion rate was 1%, with 87.5% (7/8) of all vascular events managed completely via RATS, utilizing auxiliary port placement as needed for optimal exposure and instrumentation. There were no perioperative mortalities, and the median estimated blood loss across the entire cohort was 20 mL (range: 5-1600 mL).

Conclusion:

Robotic major lung resection can be safely adopted during the initial learning curve when supported by a standardized, step-wise vascular management protocol. Early call for senior support, direct compression, robotic-assisted suture repair, and strategic auxiliary port placement allow the vast majority (87.5%) of intraoperative vascular injuries to be safely controlled without open conversion.

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肺隔離合併供血動脈自發性血栓形成：病例報告

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Pulmonary Sequestration with Spontaneous Thrombosis of the Feeding Artery: A Case Report

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Background:

Pulmonary sequestration is a rare congenital lung malformation characterized by nonfunctioning pulmonary tissue supplied by an anomalous systemic artery. Although infection, hemoptysis, and aneurysmal change are recognized complications, spontaneous thrombosis of the systemic feeding artery is exceptionally rare. Surgical resection remains the conventional treatment for symptomatic adult pulmonary sequestration, whereas transarterial embolization has emerged as a minimally invasive alternative in selected patients.

Case presentation:

A 54-year-old man was referred after an incidental left lower-lobe abnormality was identified on computed tomography. He reported intermittent nocturnal chest tightness but had no symptom of fever, cough, dyspnea, hemoptysis, or weight loss. Contrast-enhanced chest computed tomography demonstrated focal consolidation, air cysts, and emphysematous changes in the left lower lobe, with anomalous arterial supply arising from the descending thoracic aorta, consistent with intralobar pulmonary sequestration. Robot-assisted thoracoscopic left lower lobectomy was further performed. A large feeding artery, described intraoperatively as approximately 2.5×2.0 cm, contained a thrombus that occluded nearly the entire lumen. The vessel was divided with Endo-GIA, and no transfusion or intraoperative complication occurred. Histopathologic examination showed mild chronic inflammation compatible with pulmonary sequestration. The postoperative course was uneventful, and the patient was discharged on postoperative day 4.

Conclusion:

Spontaneous near-total thrombosis of a pulmonary sequestration feeding artery is an exceptionally uncommon vascular event. This case expands the scarce literature on this phenomenon and raises the possibility of nonoperative management in carefully selected patients. However, evidence is currently limited, and the long-term risks of incomplete occlusion, recanalization or recurrent infection remain unknown. Further reports with long-term follow-up are required to define which patients may safely avoid surgery.

投稿科別： ☐ 心臟血管外科 ☒ 胸腔外科	文章種類：一般論文
發表方式： ☒ 口頭報告 ☒ 海報展示（可複選）	文章屬性： ☐ 臨床研究 ☐ 基礎研究 ☒ 病例報告
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The Impact of Non-Freezing Point Controlled Hypothermia of Donor Lung Graft for Lung Transplantation

Introduction:

Primary graft dysfunction (PGD) remains the leading cause of early morbidity and mortality after lung transplantation and represents the clinical manifestation of ischemia–reperfusion injury. Conventional donor lung preservation relies on static cold storage at approximately 4°C. Recent experimental and clinical evidence suggests that controlled hypothermic preservation at 10°C better preserves mitochondrial integrity while maintaining adequate metabolic suppression, potentially reducing graft injury. This study evaluated the impact of 10°C controlled hypothermic preservation on early clinical outcomes after lung transplantation.

Methods:

We conducted a retrospective single-center cohort study including lung transplant recipients between 2016 and 2026. Patients receiving donor lungs preserved using controlled hypothermia at 10°C were compared with those undergoing conventional cold storage. Pulmonary arterial hypertension recipients and in-hospital mortality were excluded. Exact matching by diagnosis followed by 1:2 propensity score matching generated a matched cohort of 60 recipients (40 controls and 20 hypothermia). Primary outcomes included PGD grade 3, postoperative ECMO requirement, ICU stay, mechanical ventilation duration, hospital stay, and major complications. Multivariable regression analyses were performed to adjust for residual confounding.

Results:

Following propensity matching, controlled hypothermic preservation demonstrated a consistent trend toward improved early postoperative outcomes. PGD grade 3 occurred less frequently in the hypothermia group (20.0% vs. 42.5%), and no patient required postoperative ECMO compared with 12.5% in the control group. Major complications were numerically reduced (10.0% vs. 32.5%). Most importantly, ICU stay was significantly shorter in the hypothermia group (5.96 vs. 9.65 days, $p = 0.002$). Multivariable analysis confirmed that 10°C preservation independently reduced ICU length of stay ($\beta = -2.58$ days, 95% CI -4.51 to -0.65 ; $p = 0.009$).

Discussion and Conclusion:

Controlled hypothermic preservation at 10°C consistently favored improved early graft function and postoperative recovery. Although reductions in PGD and postoperative ECMO did not reach statistical significance because of the limited sample size, the observed reduction in ICU stay suggests a meaningful clinical benefit. By better preserving mitochondrial function and attenuating ischemia–reperfusion injury, non-freezing point controlled hypothermia may represent a promising donor lung preservation strategy. Larger prospective multicenter studies are warranted to validate these findings and define its role in routine lung transplantation practice.

115 年年會一般論文投稿稿紙

中文題目— 進行性食道癌之雙重支架置放經驗

作者中文姓名—黃冠叡 周品立 范馨月 吳青峰 陳維勳 吳青陽 趙盈凱 謝明儒 劉永恆 吳怡成 邱健宏

服務機關及單位(中文) – 林口長庚紀念醫院 外科部胸腔外科

英文題目— **Double Stenting in Advanced Esophageal Cancer**

作者英文姓名-- Kuan-Jui Huang Pin-Li Chou Hsin-Yueh Fang

Ching-Feng Wu Wei-Hsun Chen Ching-Yang Wu Yin-Kai Chao Ming-Ju Hsieh Yun-Hen
Liu Yi-Cheng Wu Chien-Hung Chiu

服務機關及單位(英文) -- Division of Thoracic Surgery, Chang Gung Memorial Hospital-
Linkou, College of Medicine, Chang Gung University, Taoyuan, Taiwan

Purpose:

Esophageal cancer is an aggressive malignancy with poor outcomes. Complications in advanced esophageal cancer are common due to tumor progression or treatment related and result in extremely high mortality. For these fragile patients, aggressive surgical intervention is not suitable. Esophageal stents can provide therapeutic benefits in the management of esophageal cancer. Combined esophageal and airway stenting is a potential treatment, yet no guidelines exist. In this study, we placed esophageal stents or with airway stents in advanced esophageal cancer and review our experience in treating these patients

Materials and Methods:

This is a Retrospective study; Esophageal cancer patients receiving esophageal stents or both esophageal stents and airway stents; 52 patients were collected in LinKou CGMH from Sep 2021 to Feb 2026. Patients were divided into two groups: Esophageal stenting only and Double stenting,

Baseline characteristics comparison; Continuous variables : Mann Whitney u test; Categorical variables : Chi-square test

Identify complication associated variables; Univariate and multivariate logistic regression

Results:

No significant difference between esophageal and double stenting group over baseline characteristics, pre-operative and peri-operative condition. But, in post-operative condition, double stenting group had significantly shorter hospital stay then esophageal stenting group. We also found stenosis & double stent were protective factors for severe complications. But, no statistically difference over survival time among two groups

Conclusion:

Esophageal cancer is an aggressive malignancy with poor outcomes. However, the double stenting was feasible and effective for advanced esophageal cancer. For patients without

mortality, this approach can provide better short-term outcomes.

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發表方式： ☒ 口頭報告 ☒ 海報展示（可複選 ☒ ）	文章屬性： ☒ 臨床研究 ☐ 基礎研究 ☐ 病例報告

115 年年會一般論文投稿稿紙
即時人工智慧影像導航於傳統支氣管鏡之應用：
台灣區域醫院初步經驗
楊子毅^{1,2}, 廖啓耀^{1,2}, 張志豪³, 張哲嘉³

¹林口長庚胸腔外科 ²大里仁愛胸腔外科 ³大里仁愛胸腔內科

Tzu-Yi Yang^{1,2}, Osbert Qi-Yao Leow^{1,2}, Chih-Hao Chang³, Che-Chia Chang³

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Purpose:

Transbronchial needle aspiration (TBNA) is a key diagnostic procedure for evaluating lung lesions. To enhance the diagnostic yield (DY), robotic bronchoscopy integrated with navigation systems, including C-arm fluoroscopy, cone-beam computed tomography (CBCT) and radial probe endobronchial ultrasound (r-EBUS), has been increasingly adopted. However, the substantial cost of these advanced technologies limits their availability in regional hospitals. Here, we report our experience using real-time augmented fluoroscopy, a cost-effective imaging modality, to guide conventional bronchoscopy in a regional hospital in Taiwan.

Materials and Methods:

This retrospective, single-center case series was conducted at a regional hospital in Taiwan. We enrolled consecutive patients who underwent conventional bronchoscopy guided by an artificial intelligence-driven augmented fluoroscopy system (LungVision®, Body Vision Medical Ltd., Ramat Hasharon, Israel) for the diagnosis or localization of peripheral pulmonary lesions (PPLs) between May 1 and May 31, 2026.

All procedures were performed under general anesthesia in a standard operating room with a conventional mobile C-arm. Thin-slice chest computed tomography (CT) with a slice thickness of 1 mm was obtained for all patients within two weeks prior to the procedure for virtual bronchoscopic navigation planning. During the procedure, intraoperative C-arm tomosynthesis scans were acquired. The LungVision® system processed these scans using proprietary artificial intelligence algorithms to reconstruct virtual, CBCT-like 3D images. This enabled real-time "target-in-lesion" validation, confirming the precise relationship between the bronchoscopic tool and the target lesion in three dimensions prior to sampling. Conventional bronchoscopy was performed, with or without the integration of r-EBUS-GS based on clinical indication, to facilitate target access and sampling.

Results:

A total of 10 patients with 13 pulmonary lesions were enrolled in this study. The cohort comprised five men and five women, with a mean age of 65 years. The mean lesion size was 1.7 cm. Among the 13 lesions, 5 were solid, 2 were part-solid, and 6 were ground-glass opacities (GGOs), distributed across all lung lobes. Nine lesions were located in the outer two-thirds of the lung parenchyma. Tissue biopsy was performed for 12 lesions, with a diagnostic yield of 66.7%. Lesion localization was performed for three lesions, achieving a technical success rate of 100%. There were no procedure related complications. The average of overall length of hospital stay was 2 days.

Conclusion:

Conventional bronchoscopy guided by real-time augmented fluoroscopy appears to be a safe and cost-effective approach for the evaluation of pulmonary lesions. It achieved an acceptable diagnostic yield while allowing successful lesion localization for subsequent surgical resection. Further studies with larger cohorts are needed to optimize the diagnostic yield and confirm the clinical utility of this technique.

投稿科別： ☐ 心臟血管外科 ☒ 胸腔外科	文章種類：一般論文
發表方式： ☒ 口頭報告 ☒ 海報展示（可複選 ☒ ）	文章屬性： ☒ 臨床研究 ☐ 基礎研究 ☐ 病例報告

幽門肉毒桿菌毒素注射對於食道切除病患之療效評估

蔡宇瑄 黃詩涵 劉永恆 陳維勳 趙盈凱 邱健宏

林口長庚紀念醫院 胸腔外科

Efficacy of Pyloric Botulinum toxin injection following Esophagectomy

Yu-Hsuan Tsai, Shih-Han Huang, Yun-Hen Liu, Wei-Hsun Chen, Yin-Kai Chao, Chien-Hung Chiu

Thoracic Surgery Department of Linkou Chang Gung Memorial Hospital

Purpose:

Delayed gastric emptying (DGE) is a frequent complication for patients undergo esophagectomy, which might increases the risk of aspiration pneumonia and malnutrition and can lead to prolonged hospitalization. Various strategies have been reported to prevent or manage DGE. Although review articles exist, a standard treatment guideline has yet to be established. Consequently, clinicians often manage this condition based on institutional preferences or individual surgeon experience. Potential interventions include endoscopic approaches (e.g., botulinum toxin [BT] injection, balloon dilation, and per-oral endoscopic myotomy) and intraoperative pyloric drainage (e.g., pyloroplasty, pyloromyotomy, pyloric dilation, and intraoperative BT injection).

A recently published phase III randomized controlled trial indicated that intraoperative pyloroplasty reduces the rates of postoperative pneumonia and anastomotic leaks.[4] However, the efficacy of “chemical pyloroplasty” using intraoperative BT injection remains controversial. In view of this, this study aims to evaluate the effects of intraoperative BT injection based on our institutional experience.

Materials and Methods:

This study is a retrospective analysis of a prospectively maintained database at a single center in Taiwan. All patients who underwent esophagectomy for adenocarcinoma, squamous cell carcinoma, or other malignancies of the esophagus or gastroesophageal junction between January 2020 and December 2024 were included. A total of 224 patients were enrolled. Patients were categorized into two groups based on whether they received intraoperative BT injection.

The primary outcome was the incidence of early DGE. Secondary outcomes included pneumonia rates, anastomotic leakage rates, length of hospital stay, duration of nasogastric (NG) tube placement, and daily NG drainage volumes.

Results:

Among all patients, there were no statistically significant differences in the incidence of Delayed Gastric Emptying (DGE) (4.5% vs. 6.0%, $p=0.861$), anastomotic leakage, or pneumonia.

In the subgroup of 89 patients who underwent posterior mediastinal reconstruction ($n=49$ Botox, $n=40$ non-Botox), the benefits of BT were more pronounced. The BT group had a significantly lower average daily NG tube output (107.90 ml/day vs. 181.21 ml/day,

p=0.001). Detailed daily analysis showed that the Botox group had significantly lower drainage on POD 1, 3, 4, 5, 6, and 7. For example, on POD 3, the output was 122.31 ml (Botox) compared to 226.14 ml (non-Botox) (p=0.003). In the subgroup, there were no statistically significant differences in the incidence of DGE (15% vs. 2.0%, p= 0.062), anastomotic leakage, or pneumonia.

Because only 7 DGE events occurred in the posterior mediastinal subgroup, Firth logistic regression was applied to minimize small-sample bias. In the both univariate and multivariate Firth regression analyses, BT injection was found to be a significant protective factor against DGE (OR 0.164, 95% CI 0.017-0.831, p=0.028; OR 0.183, 95% CI 0.019–0.920, p=0.039).

Conclusion:

In this study, our data suggests that while Botox does not significantly alter outcomes for all patients, it is highly effective for those undergoing posterior mediastinal reconstruction. In this specific group, Botox significantly reduces daily NG output, acts as a protective factor against DGE.

投稿科目：心臓血管外科、胸腺外科	文章種別：一般論文
著者名：山崎和生、佐藤昌二（可治療性）	著者所属：名古屋大学大学院医学部

罕見卵巢血管肉瘤合併骨髓、左側下胸壁轉移及血小板低下之病例報告 A rare case of Ovarian angiosarcoma with bone marrow, left lower chest wall, and thrombocytopenia

林素琴

義大癌治療醫院護理部專師組

前言 (Purpose)

卵巢血管肉瘤 (ovarian angiosarcoma) 為極罕見之惡性血管內皮腫瘤，具有高度侵襲性及快速轉移特性，臨床預後通常不佳。由於其發生率極低，且初期症狀缺乏特異性，診斷常於疾病晚期才被確立。卵巢血管肉瘤常見轉移部位包括肝臟、肺部及骨骼，而骨髓侵犯造成嚴重血小板低下並合併胸壁轉移之病例相當少見。本病例報告一位卵巢血管肉瘤患者，以嚴重血小板低下為初始表現，並發現骨髓及左側下胸壁轉移，藉此探討其臨床表現、診斷過程及治療結果。

病例報告 (Case Presentation)

本文報告一位 58 歲女性，過去病史包括甲狀腺癌（2015 年接受甲狀腺切除手術及碘-131 放射性碘治療）、高血壓、糖尿病及高血脂，皆規則接受藥物控制。病人近兩個月持續出現活動後呼吸喘、疲倦及全身骨骼痠痛等症狀，至本院接受進一步評估。

初始血液檢查發現嚴重血小板低下 (platelet count: $13 \times 10^3/\mu\text{L}$)，經血液科評估後安排住院接受相關檢查及治療。胸腹部電腦斷層掃描顯示卵巢腫瘤，並合併肝臟、脾臟、左側下胸壁及多處骨骼轉移。為確認腫瘤來源，進一步安排肝臟病灶切片，病理檢查及免疫組織化學染色結果證實為卵巢血管肉瘤 (ovarian angiosarcoma)。

後續骨髓檢查顯示腫瘤侵犯骨髓，造成血小板生成受抑制，最終診斷為卵巢血管肉瘤合併肝臟、脾臟、骨髓及左側下胸壁轉移。病人接受血小板輸注支持療法及全身性化學治療後，血小板數值逐漸改善，臨床症狀亦明顯緩解。治療三週後追蹤胸部 X 光顯示左側下胸壁轉移病灶略為縮小，病況穩定後出院，持續於門診接受後續治療及追蹤。

討論 (Discussion)

卵巢血管肉瘤是一種極為罕見且高度惡性的婦科腫瘤，由於腫瘤細胞具有高度血管侵犯能力，容易於診斷時即存在遠端轉移。其臨床表現多樣，包括腹部症狀、腫瘤相關症狀及轉移造成之器官功能異常。

本病例特殊之處在於病人初始以嚴重血小板低下及全身骨骼疼痛表現，經進一步檢查後發現為卵巢血管肉瘤合併骨髓轉移。骨髓侵犯可能造成正常造血組織取代，導致

血小板低下、貧血甚至全血球減少，因此在面對原因不明之嚴重血小板低下時，除考慮血液疾病外，亦應注意潛在惡性腫瘤轉移之可能。

此外，本病例亦發現左側下胸壁轉移病灶，顯示卵巢血管肉瘤具有廣泛轉移能力。胸腔影像評估對於確認疾病範圍、治療規劃及追蹤療效具有重要角色。透過影像學檢查、病理切片及免疫組織染色，可協助建立正確診斷並制定後續治療策略。

結論（Conclusion）

卵巢血管肉瘤為極罕見且侵襲性高之惡性腫瘤，若合併骨髓侵犯可能以嚴重血小板低下作為初始表現，增加診斷困難。本病例顯示，對於不明原因之嚴重血小板低下，尤其合併持續骨骼疼痛或影像發現胸壁病灶時，應提高對轉移性惡性腫瘤之警覺。早期影像評估與病理診斷，有助於確認疾病來源並提供適當治療方向。

- a. 發表科別：胸腔外科及心臟血管外科。
- b. 發表方式：☐頭報告 ☒張貼海報（可複選）
- c. 文章屬性：☐臨床研究；☐基礎研究；☒病例報告
- d. 演講者 Tel：_0934252750__；Fax：_____；E-Mail：ed104787@edah.org.tw

胸腔鏡微創手術成功治癒巨大縱膈血腫合併右前縱膈活動性出血

廖玉珍、何松融

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Large Hemomediastinum with Active Bleeding at the Right Anterior Mediastinum Successfully Treated by Video-Assisted Thoracoscopic Surgery

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Min-Sheng General Hospital Division of Chest

Introduction

Hemomediastinum is an uncommon but potentially life-threatening condition. Patients may present with nonspecific symptoms such as chest pain, dyspnea, or hemodynamic instability, making early diagnosis challenging. Rapid enlargement of mediastinal hematoma can compress major vessels and adjacent thoracic structures, resulting in respiratory compromise and circulatory deterioration. Contrast-enhanced computed tomography plays an essential role in identifying active bleeding and guiding management. Prompt surgical intervention is crucial in unstable patients.

Case Report :

A 56-year-old man with a history of hepatitis B-related liver cirrhosis and status post sigmoid colon cancer surgery. Presents to the emergency department complaining of progressive chest tightness and shortness of breath. On arrival, laboratory studies revealed hemoglobin of 5 g/dL, platelet 50000/uL, total bilirubin of 5 mg/dL. Chest computed tomography demonstrated a large Hemomediastinum with active bleeding at the right anterior mediastinum, severe compression of the left brachiocephalic vein and superior vena cava by the hematoma was also noted, accompanied by small bilateral pleural effusions and dependent lung atelectasis. Emergency massive transfusion and thoracic surgeon consultation were arranged, and video-assisted thoracoscopic surgery was successfully performed for hematoma evacuation and bleeding control. The patient's symptoms gradually improved after surgery.

Discussion:

Spontaneous or non-traumatic Hemomediastinum is rarely encountered in clinical practice and may be associated with coagulopathy, vascular injury, malignancy, or chronic liver disease. In this patient, thrombocytopenia and impaired coagulation related to liver cirrhosis likely contributed to mediastinal hemorrhage. Clinical manifestations are often vague in the early stages, leading to delayed diagnosis until compression symptoms appear. Computed tomography angiography is invaluable for detecting active bleeding, assessing mediastinal extension, and identifying compression of major vessels such as the superior vena cava. For stable patients, conservative treatment can be considered, but if they require continued attendance or have impaired cardiopulmonary function, urgent intervention is necessary. Video-assisted thoracoscopic surgery provides a minimally invasive approach for hematoma evacuation and bleeding control. Early recognition and multidisciplinary management are important for improving clinical outcomes.

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發表方式：□頭報告 ■海報展示	文章屬性：□臨床研究 □基礎研究 ■病例報告

International Journal of Surgery

Persistent Smoking After Diagnosis as an Independent Prognostic Factor in Early-Stage Esophageal Squamous Cell Carcinoma

--Manuscript Draft--

Manuscript Number:	
Article Type:	Retrospective Cohort Study
Keywords:	esophageal cancer, smoke, cigarettes, esophagectomy, esophageal squamous cell carcinoma, concurrent chemoradiotherapy
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Manuscript Region of Origin:	TAIWAN
Abstract:	Background Esophageal squamous cell carcinoma (ESCC) is characterized by aggressive behavior and poor prognosis. Although cigarette smoking is a well-established risk factor for upper gastrointestinal malignancies, the prognostic effect of smoking habits after diagnosis remains unclear. In this retrospective study, we aimed to examine the association between smoking cessation and survival outcomes in patients diagnosed with clinical stage I and II ESCC according to the 8th edition of the American Joint Committee on Cancer (AJCC) staging system. Material and Methods Data were retrospectively retrieved from patients treated between January 2001 and December 2023. The study cohort included patients with confirmed clinical stage I or II ESCC. Patients were stratified into three groups based on smoking status: "Never" smokers, "Quit" (ceased smoking after diagnosis), and "Persist" (continued smoking after diagnosis). The analysis evaluated clinical T and N stages, tumor location, histologic grade, pulmonary and non-pulmonary complications, and treatment protocols. Overall survival (OS) and disease-free survival (DFS) were assessed using the Kaplan–Meier method and multivariable Cox proportional hazards regression models. Results A total of 232 patients were included in this analysis. Patients in the "Persist" group had significantly inferior OS ($p = 0.0011$) and DFS ($p = 0.0002$) compared with the "Never" and "Quit" groups. In the multivariable analysis, persistent smoking status, primary tumor location, and treatment-related complications were identified as significant independent prognostic factors for both OS and DFS. Conclusions Persistent smoking after diagnosis is a significant independent predictor of poor outcomes in patients with early-stage ESCC. Smoking cessation is a crucial determinant of survival, and comprehensive cessation interventions should be integrated into the standard management of patients with clinical stage I or II ESCC.

March 29, 2026

Editor-in-Chief International Journal of Surgery

Subject: Submission of Original Research Manuscript

Dear Editor,

We wish to submit our original research article titled "**Persistent Smoking After Diagnosis as an Independent Prognostic Factor in Early-Stage Esophageal Squamous Cell Carcinoma**" for consideration for publication in the *International Journal of Surgery*.

Research Overview

Esophageal squamous cell carcinoma (ESCC) is characterized by aggressive behavior and high mortality rates. While tobacco use is a known risk factor, the specific impact of smoking cessation *after* a diagnosis of early-stage ESCC on surgical and oncological outcomes remains under-investigated.

This retrospective study analyzed a cohort of **232 patients** (clinical stage I–II) treated at a high-volume medical center in Taiwan between 2001 and 2023. We stratified patients into "Never," "Quit" (after diagnosis), and "Persist" smoking groups.

Key Findings

- **Prognostic Impact:** Persistent smoking after diagnosis is a significant independent predictor of poor outcomes.
- **Survival Rates:** Patients who continued smoking had significantly inferior overall survival (OS, $p = 0.0003$) and disease-free survival (DFS, $p < 0.0001$) compared to those who quit or never smoked.
- **Post-Progression Survival (PPS):** Notably, the median PPS was nearly twice as long in the "Quit" group compared to the "Persist" group (**14.4 vs. 8.9 months**), suggesting that cessation enhances the patient's ability to respond to salvage therapies.
- **Surgical Relevance:** Complications were identified as an independent prognostic factor for OS, highlighting the systemic negative effects of active smoking on surgical recovery and microvascular function.

Significance to the Journal

Our findings reinforce that smoking cessation is a critical determinant of survival in early-stage ESCC and should be integrated into the standard surgical management protocol. This study provides robust data that will be of significant interest to surgeons and oncologists focused on improving patient-centered outcomes in upper gastrointestinal malignancies.

Declarations

- **Originality:** This manuscript is original and has not been published elsewhere, nor is it under consideration by another journal.
- **Conflicts of Interest:** All authors declare no conflicts of interest.
- **Ethical Approval:** This study was approved by the Institutional Review Board of our hospital (IRB No: 202600360B0).
- **Funding:** No external funding or sponsorship was received for this study.

Thank you for your time and for considering our work.

Sincerely,

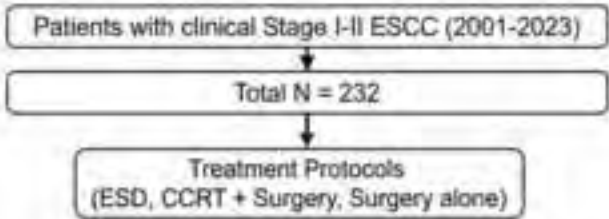
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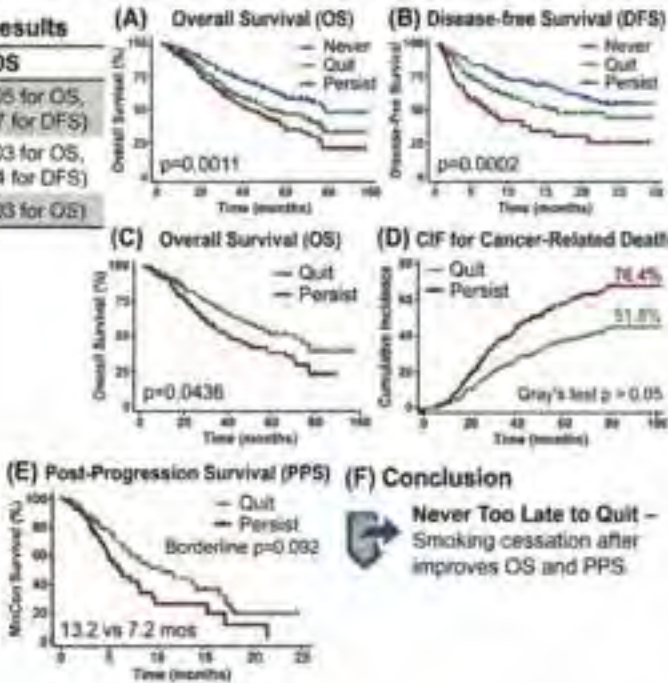
Persistent Smoking After Diagnosis as an Independent Prognostic Factor in Early-Stage Esophageal Squamous Cell Carcinoma



Prognostic Indicators

Multivariable Analysis Results	
OS	
Persistent Smoking	($p=0.0205$ for OS, $p=0.0007$ for DFS)
Tumor Location	($p=0.0003$ for OS, $p=0.0214$ for DFS)
All Complications	($p=0.0303$ for OS)

Survival Analysis & Mortality Risks



Persistent Smoking After Diagnosis as an Independent Prognostic Factor in Early-Stage Esophageal Squamous Cell Carcinoma

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Persistent Smoking After Diagnosis as an Independent Prognostic Factor in Early-Stage Esophageal Squamous Cell Carcinoma

Abstract

Background

Esophageal squamous cell carcinoma (ESCC) is characterized by aggressive behavior and poor prognosis. Although cigarette smoking is a well-established risk factor for upper gastrointestinal malignancies, the prognostic effect of smoking habits after diagnosis remains unclear. In this retrospective study, we aimed to examine the association between smoking cessation and survival outcomes in patients diagnosed with clinical stage I and II ESCC according to the 8th edition of the American Joint Committee on Cancer (AJCC) staging system.

Material and Methods

Data were retrospectively retrieved from patients treated between January 2001 and December 2023. The study cohort included patients with confirmed clinical stage I or II ESCC. Patients were stratified into three groups based on smoking status: "Never" smokers, "Quit" (ceased smoking after diagnosis), and "Persist" (continued smoking after diagnosis). The analysis evaluated clinical T and N stages, tumor location, histologic grade, pulmonary and non-pulmonary complications, and treatment protocols. Overall survival (OS) and disease-free survival (DFS) were assessed using the Kaplan–Meier method and multivariable Cox proportional hazards regression models.

Results

A total of 232 patients were included in this analysis. Patients in the "Persist" group had significantly inferior OS ($p = 0.0011$) and DFS ($p = 0.0002$) compared with the "Never" and "Quit" groups. In the multivariable analysis, persistent smoking status, primary tumor location, and treatment-related complications were identified as significant independent prognostic factors for both OS and DFS.

Conclusions

Persistent smoking after diagnosis is a significant independent predictor of poor outcomes in patients with early-stage ESCC. Smoking cessation is a crucial determinant of survival, and comprehensive cessation interventions should be integrated into the standard management of patients with clinical stage I or II ESCC.

Keywords: esophageal cancer, smoke, cigarettes, esophagectomy, esophageal squamous cell carcinoma, concurrent chemoradiotherapy

Introduction

Esophageal cancer remains a major global health burden and is characterized by aggressive biological behavior and poor prognosis. It is the seventh most common cancer worldwide and the sixth leading cause of cancer-related mortality ¹. Histologically, esophageal squamous cell carcinoma (ESCC) is the predominant subtype in East Asia, including Taiwan, in contrast to the predominance of adenocarcinoma in Western populations ². While advances in multimodal therapies, including endoscopic submucosal dissection (ESD), minimally invasive esophagectomy, and concurrent chemoradiotherapy (CCRT), have improved outcomes for early-stage disease, long-term survival rates remain suboptimal, even for patients with clinical stage I or II disease ³. Tobacco smoking is a well-established risk factor for ESCC ⁴. The relationship between cumulative tobacco exposure and the incidence of esophageal malignancies is well documented. Nevertheless, the effect of smoking habits *after* cancer diagnosis on oncological outcomes has been less frequently investigated in this specific population. In other malignancies, such as lung and head and neck cancers, continued smoking during treatment has been associated with increased toxicity, poorer response to radiotherapy, and reduced overall survival (OS) ^{5,6}.

However, there is a paucity of data specifically examining the prognostic role of smoking cessation following the diagnosis of early-stage ESCC. It remains unclear whether “immediate smoking cessation” offers a tangible survival benefit compared with persistent smoking, or whether the biological damage is already irreversible at the time of diagnosis. Furthermore, the association between post-diagnosis smoking status and treatment-related complications, both pulmonary and non-pulmonary, remains incompletely characterized.

In this study, we aimed to retrospectively analyze the clinical outcomes of patients with clinical stages I or II ESCC treated at a high-volume medical center in Taiwan.

Specifically, we investigated the effect of smoking status, categorized as never smokers, those who quit after diagnosis, and persistent smokers, on OS, disease-free survival (DFS), and treatment-related complications.

Materials and Methods

Patient Population

We retrospectively reviewed the medical records of patients diagnosed with clinical stage I or II ESCC, according to the 8th edition of the American Joint Committee on Cancer

(AJCC) staging system, who underwent treatment at the XXX XXX XXX Hospital between January 1, 2001, and December 31, 2023. Patients with biopsy-proven ESCC who completed the prescribed treatment course were eligible for inclusion. Exclusion criteria were as follows: (1) incomplete medical records, (2) receipt of treatment at other institutions, (3) treatment with radiotherapy alone, (4) loss to follow-up, (5) receipt of only conservative or hospice care after diagnosis, and (6) non-squamous pathologies (e.g., small cell carcinoma, adenocarcinoma, sarcoma, or neuroendocrine carcinoma).

All patients underwent a standardized staging protocol comprising chest computed tomography (CT) with and without contrast, endoscopic ultrasound, and whole-body positron emission tomography (PET) scans. Clinical staging was performed using these modalities. In cases of conflicting diagnostic results, a multidisciplinary team (MDT) comprising gastroenterologists, radiologists, surgeons, and oncologists was convened to reach consensus on the clinical stage. Tumor staging was determined in strict accordance with the 8th edition of the AJCC Staging Manual.

This study was approved by the Institutional Review Board of XXX XXX XXX Hospital (IRB No: 202600360B0).

Treatment Plan

Following staging confirmation, treatment strategies were determined through MDT consensus and family consultations. ESD was performed by experienced gastroenterologists to treat eligible early-stage lesions.

For patients undergoing chemoradiotherapy, the chemotherapy regimen consisted of two cycles of cisplatin (75 mg/m²; 4-hour infusion) and 5-fluorouracil (1000 mg/m²; continuous infusion on days 1–4) administered every 4 weeks. Radiotherapy was delivered at a total dose of 5000 cGy in daily fractions over 5 weeks. Three-dimensional conformal radiotherapy (3D-CRT) utilizing a four-field technique or intensity-modulated radiotherapy with 6- or 10-MV photons was employed. The gross target volume was defined as gross tumors and lymph nodes visualized on CT or PET. The clinical target volume (CTV) encompassed the esophagus, mediastinal lymph nodes, bilateral cervical regions, and supraclavicular lymph nodes. The planning target volume was generated by adding a 0.5–1.0 cm margin to the CTV in all directions. Treatment response was assessed 3–4 weeks after irradiation using neck-to-abdomen CT, endoscopic examination, and/or PET/CT.

Surgical resection (esophagectomy) was performed using the McKeown procedure. To ensure consistency, the surgeries were performed by four dedicated surgeons under

standardized operating room configurations, team compositions, and instrumentation. Routine lymph node dissection targeting the subcarinal, paraesophageal, bilateral recurrent laryngeal nerve, and celiac and perigastric lymph nodes was performed. Resected specimens, including the esophagus and regional lymph nodes, underwent comprehensive pathological assessment for tumor characteristics, invasion depth, lymphovascular invasion, resection margins, and pathological stage (p-stage), according to the 8th edition of the AJCC 8th staging system.

Complications were graded according to the Clavien–Dindo classification ⁷ and categorized into two groups: (1) **pulmonary complications**, defined as respiratory system–related events such as pneumonia, empyema, subcutaneous emphysema, and respiratory failure; and (2) **non-pulmonary complications** (referred to as "All Complications" in the analysis), encompassing vocal cord palsy, anastomotic leakage, gastric conduit dysfunction, and other non-respiratory adverse events.

OS and DFS

Survival outcomes were compared across the smoking status groups. OS was defined as the interval from the date of initial diagnosis to the date of last contact or death from any cause. Patients who were alive were censored at the last follow-up. DFS was defined as the interval from the date of curative surgery or ESD to the date of documented recurrence, development of head and neck cancer, or death. Patients who survived without recurrence were censored at the last follow-up.

Fine–Gray Subdistribution Hazard Model and Post-Progression Survival (PPS)

To evaluate cancer-specific mortality while accounting for the presence of competing risks (i.e., death from non-cancer causes), we employed the Fine–Gray subdistribution hazard model. Cumulative incidence functions (CIFs) were constructed to estimate the probability of death categorized as cancer-related and non-cancer-related causes.

Differences between the smoking cessation ("Quit") and persistent smoking ("Persist") groups were assessed using Gray's tests ⁸.

PPS was analyzed to investigate survival outcomes following tumor recurrence ⁹. PPS was defined as the time interval from the date of documented disease progression or recurrence to the date of death from any cause or the last follow-up. Survival curves for PPS were estimated using the Kaplan–Meier method, and differences between groups

were compared using the log-rank test.

Statistical Analysis

Data analysis was performed using MedCalc® Statistical Software version 20 (MedCalc Software Ltd, Ostend, Belgium; 2021). Categorical variables were compared across groups using the chi-square test. Univariate survival analysis was conducted using the Kaplan–Meier method, and differences in survival rates were assessed using the log-rank test. Prognostic factors were evaluated using the Cox proportional hazards regression model (enter method). All statistical tests were two-sided, and a p -value <0.05 was considered statistically significant.

Cumulative incidences of cancer-related and non-cancer-related mortality were estimated using the CIF. To compare the differences in CIFs between the 'Quit' and 'Persist' smoking groups, Gray's test was performed. All competing risk analyses, including the calculation of subdistribution hazard ratios and Gray's test p -values, were conducted using R software (version 4.5.2; R Foundation for Statistical Computing, Vienna, Austria) with the 'cmprsk' package. Statistical computations were performed using the Rpy2 interface within a Python-based cloud-computing environment.

Results

Patient Characteristics

A total of 232 patients were enrolled in the study, and their baseline characteristics are summarized in Table 1. The cohort had a mean age of 55.7 years (median, 54.9; range, 29–80 years). Most patients were male, with only eight females (3.3%). All patients had pathologically confirmed squamous cell carcinoma. The clinical T-staging distribution was as follows: T1a (29.7%), T1b (26.3%), T2 (22.4%), and T3 (21.6%). Most patients (87.9%) presented with clinically negative lymph node status (N0). The primary tumor location was in the upper third of the esophagus in 66 patients (28.4%), the middle third in 91 (39.2%), and the lower third in 75 (32.3%). Pathological assessment revealed moderate differentiation in 158 patients (68.1%).

Regarding treatment modalities, 136 patients (58.6%) underwent upfront esophagectomy, while 21 (9.1 %) underwent ESD. Forty-nine patients (21.1%) received neoadjuvant CCRT followed by esophagectomy, and 26 patients (11.2%) received adjuvant CCRT following esophagectomy. Regarding postoperative outcomes, 196 patients (84.5%) remained free of pulmonary complications, and 160 patients (69.0%) had no non-pulmonary

complications.

Patients were stratified into three groups based on smoking habits: (1) **"Never"** (patients who reported never using cigarettes); (2) **"Quit"** (patients who previously smoked but ceased smoking *after* the diagnosis of esophageal cancer); and (3) **"Persist"** (patients who continued smoking *after* diagnosis). The groups differed significantly in terms of age, sex, and treatment protocol (Table 2).

OS and DFS

Table 3 summarizes the associations between OS, DFS, and clinicopathological parameters. In the univariate analysis, primary tumor location ($p = 0.0074$), pathological tumor grade ($p = 0.0093$), treatment protocol ($p = 0.0074$), and smoking status ($p = 0.0003$) were significantly associated with OS. Kaplan–Meier survival curves stratified by smoking status are shown in Figure 1A.

Regarding DFS, treatment protocol ($p = 0.026$), and smoking status ($p < 0.0001$) were identified as significant prognostic factors. The Kaplan–Meier survival curves stratified by pathological lymph node status are presented in Figure 1B.

Multivariable Analysis

Multivariable analysis was performed using the Cox proportional hazards regression (enter method). For OS, clinical T stage ($p = 0.0306$), primary tumor location ($p = 0.0017$), pulmonary complications ($p = 0.0499$), non-pulmonary complications ($p = 0.0295$), and smoking status ($p = 0.0422$) were identified as independent prognostic factors.

Regarding DFS, smoking status ($p = 0.0008$), and clinical T stage ($p = 0.0189$) remained statistically significant independent predictors. All multivariable analyses are presented in Table 4.

Fine–Gray Subdistribution Hazard Model and PPS

Survival analysis revealed that both OS and DFS differed significantly according to smoking status, with the “Never” group showing significant differences compared with the other groups. We further compared the “Quit” and “Persist” groups and found a significant OS favoring the “Quit” group ($p = 0.0436$; Figure 2A). DFS did not significantly differ between the groups ($p = 0.1818$; Figure 2B). This discrepancy could not fully explain the observed difference in OS between the two groups. Thus, we applied the Fine–Gray subdistribution hazard model.

In the competing risk analysis, the Fine–Gray subdistribution hazard model revealed that patients who continued smoking had a higher cumulative incidence of cancer-specific mortality than those who quit smoking (76.4% vs. 51.8% at the end of follow-up).

Gray's test was performed to compare the CIFs between the two groups ("Quit Smoke" and "Persist Smoke") for the different event types (cancer-related and non-cancer-related mortality). Given that both p-values (0.280 and 0.321) exceeded the conventional significance level of 0.05, no statistically significant differences were observed in the cumulative incidence of these mortality types between the "Quit Smoke" and "Persist Smoke" groups (Figure 3).

To further explore this discrepancy, we analyzed 153 patients who experienced disease recurrence. The median PPS was nearly twice as long in the "Quit Smoke" group as in the "Persist Smoke" group (14.4 vs. 8.9 months). Although the difference showed a borderline statistical trend ($p = 0.092$), the substantial prolongation of survival after recurrence suggests that the OS difference associated with smoking cessation may be driven by longer survival following disease progression (Tables 5 and Figure 4).

Discussion

In the present study, we demonstrated that smoking status was a robust independent prognostic factor for both OS and DFS in patients with clinical stage I or ESCC. A nuanced analysis of the survival trajectories revealed that the statistical significance of these findings was primarily driven by the superior clinical outcomes of never smokers, rather than a marked divergence between those who quit after diagnosis and those who continued smoking.

Impact of Field Cancerization

Our data highlight the stark contrast between never smokers and patients with a history of tobacco use. Never smokers achieved excellent 5-year OS and DFS rates of 80% and 74%, respectively. Conversely, both the "Quit" and "Persist" groups exhibited significantly poorer survival, with 5-year OS rates of 59% and 49%, respectively, and DFS rates of 45% and 38%, respectively. This survival pattern suggests that the biological damage associated with tobacco, characterized by "field cancerization," is largely established prior to diagnosis. Chronic exposure to carcinogens induces widespread genetic and epigenetic alterations across the esophageal mucosa, predisposing the tissue to multifocal malignancies and aggressive phenotypes¹⁰. Our findings support the hypothesis that,

while cessation at the time of diagnosis prevents further toxic insult, it may not reverse the cumulative somatic mutations or the systemic proinflammatory milieu that develops over decades.

Clinical Paradox and Biological Mechanisms

Notably, the "Persist" group was significantly younger (mean age, 54.2 years) than the "Never" (58.4 years) and "Quit" (57.1 years) groups. Despite their younger age and presumably greater physiological reserves, these patients experienced worse outcomes. This paradox underscores the deleterious effects of active smoking.

The biological mechanisms driving these poor outcomes are likely multifactorial:

(1) Tumor promotion: Nicotine and tobacco-specific carcinogens promote angiogenesis and inhibit apoptosis, potentially facilitating micrometastasis even after curative-intent therapy ¹¹.

(2) Hypoxia-induced resistance: Smoking induces tissue hypoxia, rendering tumors more resistant to ionizing radiation and cytotoxic chemotherapy. This mechanism likely explains the lower DFS and higher recurrence rates observed in persistent smokers, particularly among those undergoing CCRT ¹².

Benefits of Smoking Cessation

While the survival trajectory of the "Quit" group was closer to that of the "Persist" group than to "Never" smokers, smoking cessation was still associated with measurable survival advantages. Although DFS did not show significant improvement in the Fine–Gray subdistribution hazard model, the "Quit" group demonstrated nearly double the median PPS. This suggests that while smoking cessation after diagnosis may not prevent recurrence due to established "field cancerization," it may enhance the patient's ability to tolerate or respond to salvage therapies following disease progression.

Surgical Complications and Systemic Effects

In addition to oncological outcomes, smoking status also influences perioperative morbidity. Multivariable analysis identified "all complications" as an independent prognostic factor for OS ($p = 0.0303$). Specifically, smoking impairs microvascular function and tissue oxygenation, both of which are critical for anastomotic healing and the prevention of vocal cord palsy ¹³. These "non-pulmonary complications" represent a systemic "double hit," in which impaired healing and surgical morbidity further compromise the survival prospects of patients with a history of smoking.

Limitations

This study has several limitations. First, smoking status was self-reported, which may

introduce recall bias or the possibility that the "Quit" group included patients who merely reduced their cigarette consumption. Second, the lack of detailed information on cumulative pack-years precluded a dose-response analysis. Finally, the retrospective nature of the study may have limited our ability to control for all potential confounding variables.

Conclusions

In conclusion, while never smokers exhibit the most favorable prognosis, a history of smoking remains a key barrier to long-term survival in patients with ESCC. Compared with persistent smoking, smoking cessation after diagnosis was associated with a modest survival advantage and substantially improved post-progression outcomes. These findings reinforce that while it is "never too late to quit" to avoid the poorest outcomes, primary prevention remains the most effective strategy for achieving the superior survival observed in never smokers.

Abbreviations: AJCC, American Joint Committee on Cancer

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Figure Legends

Figure 1. (A) Overall survival according to smoking status in patients with clinical stage I–II esophageal squamous cell carcinoma. **(B)** Disease-free survival according to smoking status in patients with clinical stage I–II esophageal squamous cell carcinoma.

Figure 2. (A) Overall survival according to smoking status (“Quit” vs. “Persist”) in patients with clinical stage I–II esophageal squamous cell carcinoma. **(B)** Disease-free survival according to smoking status (“Quit” vs. “Persist”) in patients with clinical stage I–II esophageal squamous cell carcinoma.

Figure 3. Cumulative incidence function for cancer-related death after diagnosis in patients with clinical stage I–II esophageal squamous cell carcinoma.

Figure 4. Post-progression survival in comparing the “Quit” and “Persist” groups in patients with clinical stage I–II esophageal squamous cell carcinoma.

Table 1. Clinicopathologic factors of 232 patients with clinical stage I–II esophageal squamous cell carcinoma according to the 8th edition of the American Joint Committee on Cancer staging system

Factors		No. of patients (percentage)
Age (years) (range: 29–80, mean: 55.72, median: 54.9)		
Sex	Male	224 (96.7%)
	Female	8 (3.3%)
Clinical T stage		
	T1a	69 (29.7%)
	T1b	61 (26.3%)
	T2	52 (22.4%)
	T3	50 (21.6%)
Clinical N stage		
	N0	204 (87.9%)
	N1	28 (12.1%)
Primary tumor location		
	Upper	66 (28.4%)
	Middle	91 (39.2%)
	Lower	75 (32.3%)
Pathological tumor grade		
	0 (Tis)	7 (3.0%)
	1	13 (5.6%)
	2	158 (68.1%)
	3	35 (15.1%)
	Miss	19 (8.2%)
Treatment		
	Esophagectomy	136 (58.6%)
	Endoscopic submucosa dissection	21 (9.1%)
	CCRT + esophagectomy	49 (21.1%)
	Esophagectomy + CCRT	26 (11.2%)
Pulmonary complications (Clavien–Dindo)		
	0	196 (84.5%)
	I	3 (1.3%)
	II	7 (3.0%)
	III	16 (6.9%)
	IV	10 (4.3%)
All complications (Clavien–Dindo)		
	0	160 (69.0%)
	I	8 (3.4%)
	II	30 (12.9%)

Smoke group	III	21 (9.1%)
	IV	13 (5.6%)
	Never	35 (15.1%)
	Quit	72 (31.0%)
	Persist	125 (53.9%)

Abbreviations: CCRT, concurrent chemoradiotherapy

Table 2. Comparison of clinicopathological characteristics according to smoking status in patients with clinical stage I–II esophageal squamous cell carcinoma based on the 8th edition of the American Joint Committee on Cancer staging system

Parameters		Smoke Group			
		Never (35)	Quit (72)	Persist (125)	<i>p</i> -value
Age (years) (Mean $\pm$ standard deviation)		58.4 $\pm$ 10.9	57.0 $\pm$ 8.9	54.2 $\pm$ 8.3	0.022*
Sex	Male	31	72	121	0.0096*
	Female	4	0	4	
Clinical T stage	T1a	12	25	32	0.50
	T1b	10	17	34	
	T2	4	18	30	
	T3	9	12	29	
Clinical N stage	N0	32	65	107	0.49
	N1	3	7	18	
Primary tumor location	Upper	11	19	36	0.24
	Middle	8	30	53	
	Lower	16	23	36	
Pathological tumor grade	0(Tis)	1	2	4	0.61
	1	2	6	5	
	2	22	49	87	
	3	4	11	20	
	Miss	6	4	9	
Treatment	OP	19	51	66	0.0051*
	ESD	8	4	9	
	CCRT+OP	7	9	33	
	OP+CCRT	1	8	17	
Pulmonary complications	0	33	59	104	0.86
	I	0	1	2	
	II	0	2	5	
	III	1	6	9	
	IV	1	4	5	
All complications	0	31	48	81	0.17
	I	2	1	5	

II	0	11	19
III	1	8	12
IV	1	4	8

* Statistically significant. Statistical analyses were performed using the χ^2 test or t-test.

Table 3: Results of univariate analysis for overall survivals in 232 patients with clinical stage I–II esophageal squamous cell carcinoma according to the 8th edition of the American Joint Committee on Cancer staging system

Factors	Number of patients	Overall survival			Disease-free survival			
		3-year OS (%)	5-year OS (%)	<i>p</i>	3-year DFS (%)	5-year DFS (%)	<i>p</i>	
Clinical T stage								
T1a	69	88%	71%	0.10	68%	56%	0.06	
T1b	61	71%	58%		60%	52%		
T2	52	61%	50%		42%	29%		
T3	50	59%	49%		46%	40%		
Clinical N stage								
N0	204	73%	58%	0.84	57%	46%	0.70	
N1	28	63%	58%		45%	38%		
Primary tumor location								
Upper	66	59%	46%	0.0074*	45%	37%	0.08	
Middle	91	75%	60%		50%	40%		
Lower	75	78%	66%		70%	60%		
Pathologic tumor grade								
0	7	83%	63%	0.0093*	86%	57%	0.08	
1	13	53%	18%		45%	18%		
2	158	71%	60%		55%	46%		
3	35	74%	58%		46%	43%		
Miss	19	78%	67%		68%	58%		
Treatment								
Esophagectomy	136	74%	60%	0.0074*	58%	48%	0.026*	
ESD	21	95%	70%		81%	65%		
CCRT + esophagectomy	49	54%	45%		36%	29%		
Esophagectomy + CCRT	26	68%	63%		54%	49%		
Pulmonary Complication								
0	196	72%	58%	0.10	55%	45%	0.36	
I	3	100%	100%		100%	100%		
II	7	57%	43%		57%	43%		

III	16	69%	63%		52%	49%	
IV	10	60%	50%		46%	40%	
All complications							
0	160	76%	62%	0.098	56%	45%	0.55
I	8	75%	56%		75%	60%	
II	30	57%	47%		50%	43%	
III	21	62%	51%		57%	41%	
IV	13	62%	46%		54%	39%	
Smoke group							
Never	35	83%	80%	0.0003*	74%	74%	<0.0001*
Quit	72	78%	63%		60%	48%	
Persist	125	64%	49%		47%	36%	

*Statistically significant.

Abbreviations: OS, overall survival; DFS, disease-free survival; CCRT, concurrent chemoradiotherapy

Table 4. Results of multiple variable analysis (Cox proportional-hazards regression) of prognostic factors for (a) overall survival in patients diagnosed with AJCC 8th clinical stage I and II esophageal squamous cell carcinoma, (b) disease-free survival in patients diagnosed with AJCC 8th clinical stage I and II esophageal squamous cell carcinoma

(a)

Covariate	b	Std. Error	Exp (b)	95% CI of Exp (b)	p-value
Clinical T stage	0.1826	0.08442	1.2003	1.0172 to 1.4163	0.0306*
Clinical N stage	0.01672	0.2929	1.0169	0.5727 to 1.8054	0.9545
Primary Tumor Location	-0.3709	0.1179	0.6901	0.5477 to 0.8695	0.0017*
Pathologic Tumor Grade	-0.2224	0.1265	0.8006	0.6248 to 1.0258	0.0787
Treatment	0.04564	0.08659	1.0467	0.8833 to 1.2403	0.5981
Pulmonary Complication	-0.2102	0.1091	0.8073	0.6519 to 0.9999	0.0499*
All Complication	0.2139	0.09830	1.2386	1.0215 to 1.5017	0.0295*
Smoke	0.7220	0.3555	2.0586	1.0256 to 4.1319	0.0422*

(b)

Covariate	b	Std. Error	Exp (b)	95% CI of Exp (b)	p-value
Clinical T stage	0.1795	0.07645	1.1966	1.0301 to 1.3900	0.0189*
Clinical N stage	0.06600	0.2630	1.0682	0.6379 to 1.7888	0.8019
Primary Tumor Location	-0.1786	0.1013	0.8364	0.6858 to 1.0202	0.0780
Pathologic Tumor Grade	-0.1792	0.1122	0.8359	0.6709 to 1.0416	0.1103
Treatment	0.02082	0.07686	1.0210	0.8783 to 1.1870	0.7865
Pulmonary Complication	-0.1742	0.09787	0.8401	0.6935 to 1.0178	0.0751
All Complication	0.1100	0.08781	1.1163	0.9398 to 1.3260	0.2101
Smoke	1.0448	0.3115	2.8428	1.5437 to 5.2352	0.0008*

Table 5. Results of post progression survival analysis comparing the “Quit” and “Persist” groups

Factor	Mean (months)	Std. Error	95% CI for mean	Median (months)	95% CI for median
Quit	46.6	8.9	29.114–64.033	14.4	6.333–20.533
Persist	34.9	6.8	21.523–48.340	8.9	3.167–14.900
Overall	41.6	6.1	29.588–53.561	11.2	6.200–15.800

Abbreviations: Std. Error, standard error; CI, confidence interval.

Figure 1A

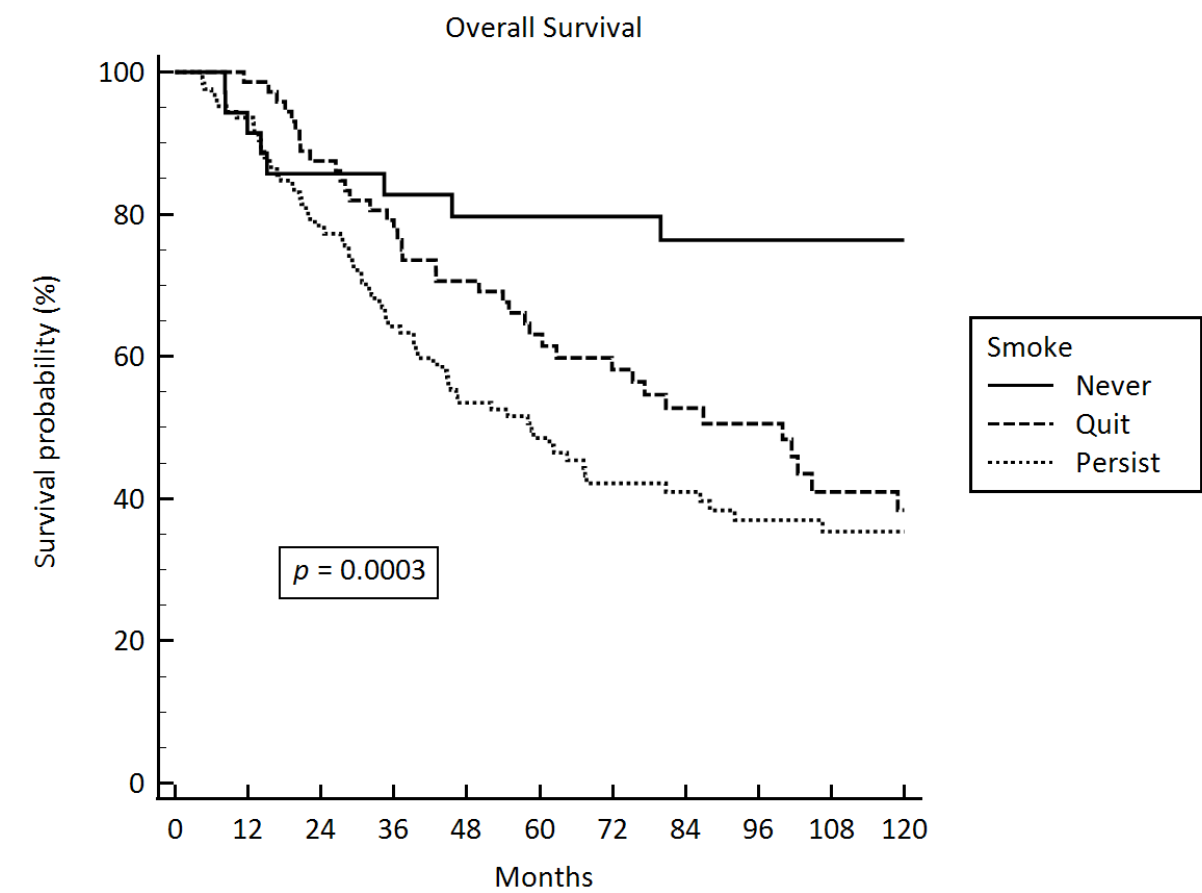


Figure 1B

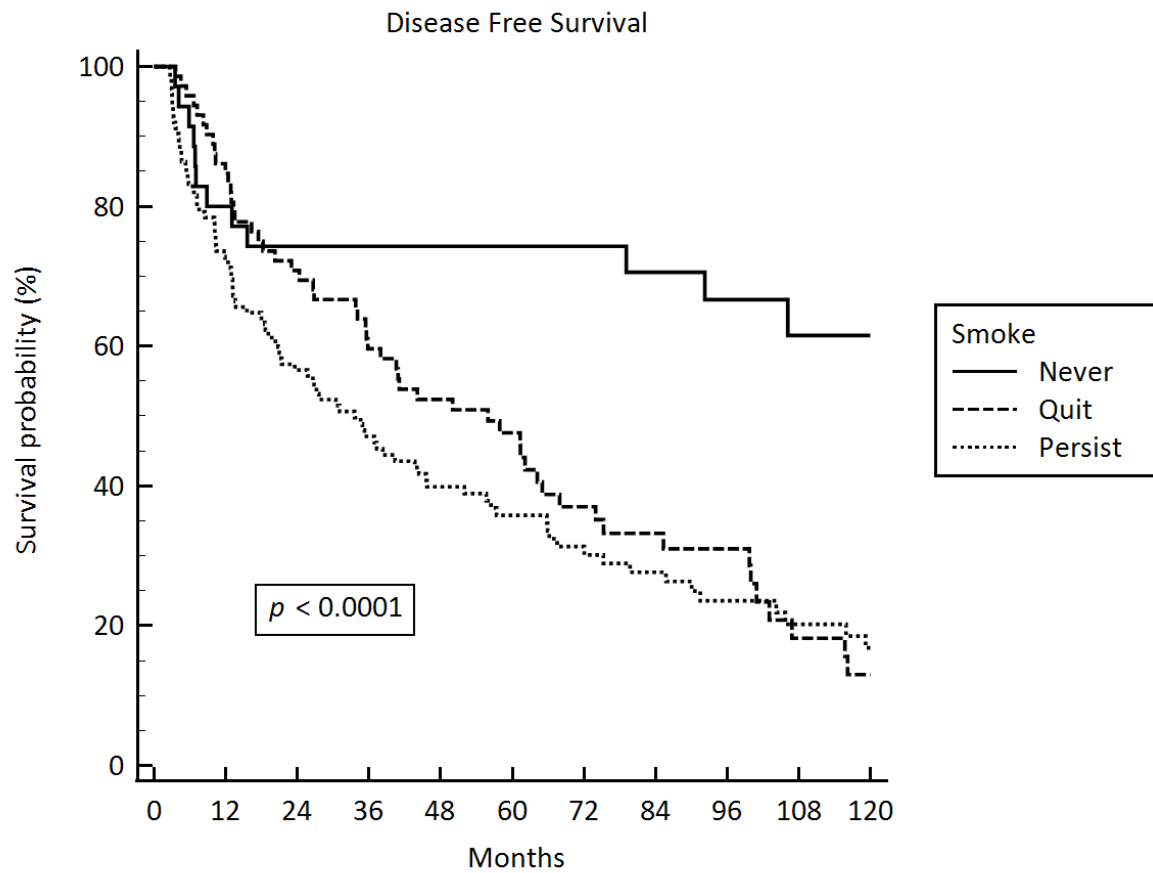


Figure 2A

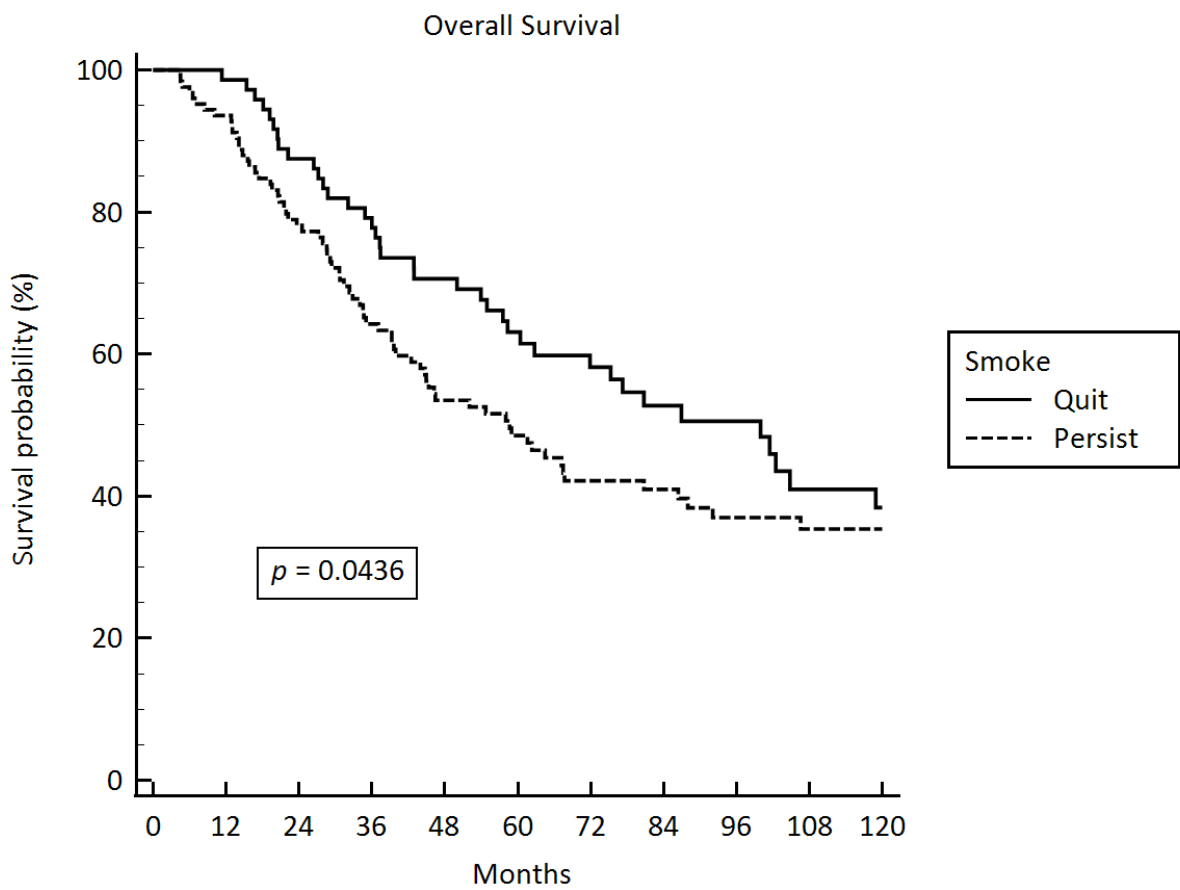


Figure 2B

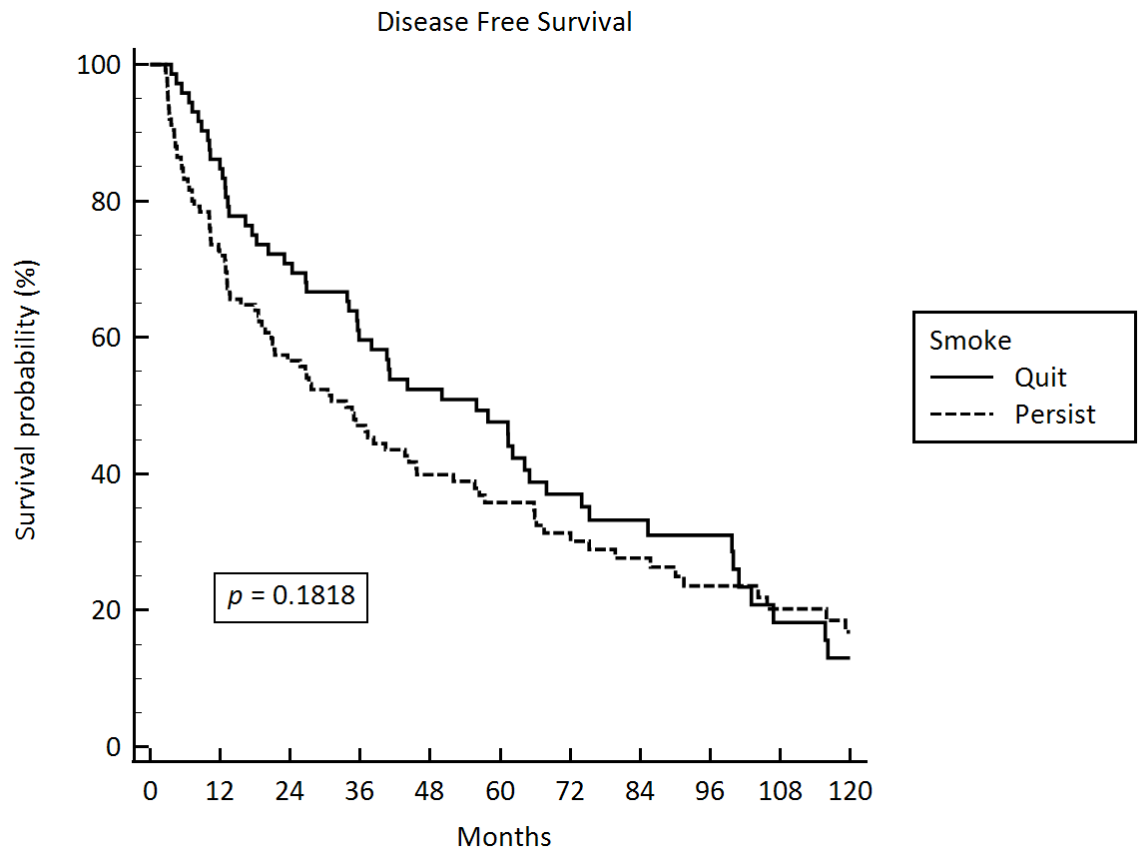


Figure 3

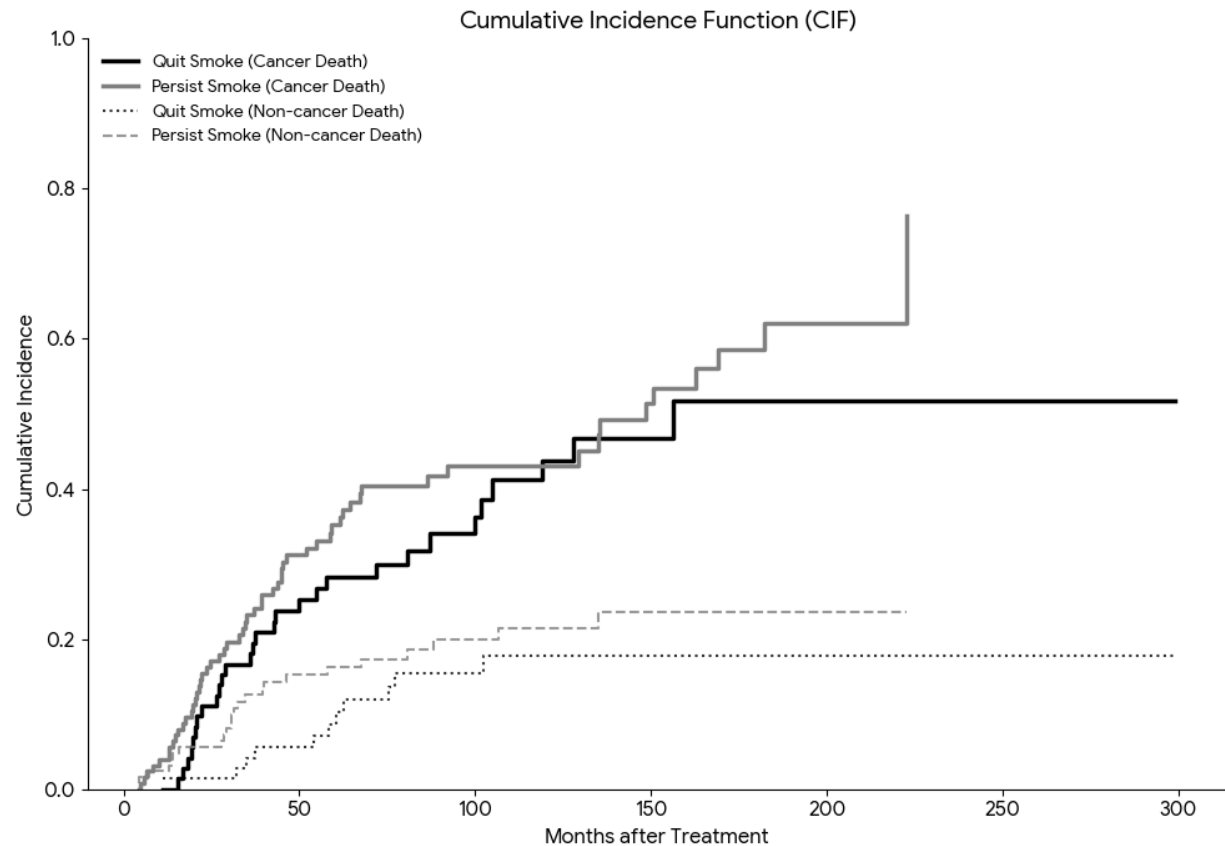
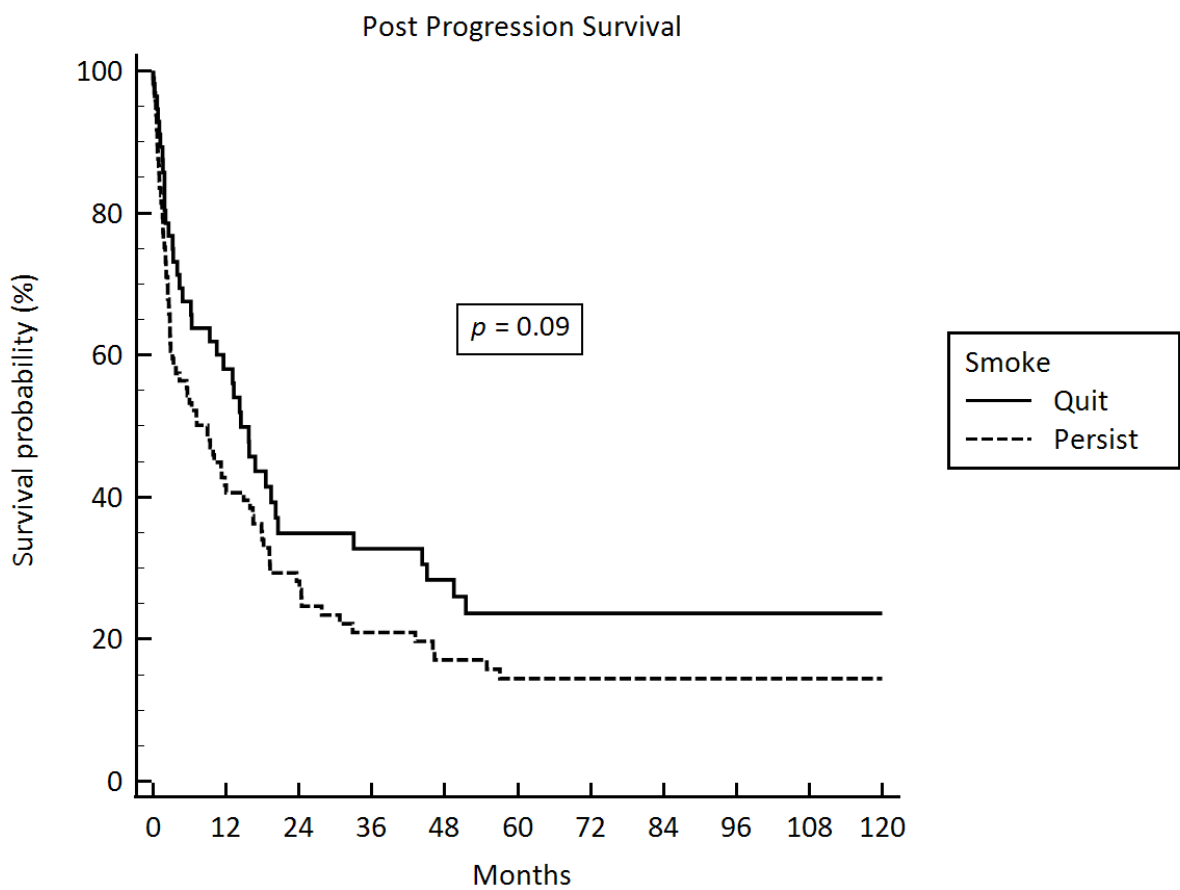


Figure 4



Availability of data and materials: All data generated or analyzed during this study are included in this published article.

The STROCSS Guideline		
Item no.	Item description	Page Number
1	Title. The words “cohort” and the area of focus should appear in the title (e.g. disease, exposure/intervention or outcome). Whether the study is retrospective or prospective should also be stated.	Title_submission Page 1
2a	Abstract - Introduction What is the background and scientific rationale for the research question.	Submission, Page 1
2b	Abstract - Methods - Describe the study design (cohort design, retrospective or prospective, single or multi-centre, etc), what was done to each group, how, when was it done and by whom.	Submission, Page 1
2c	Abstract - Results What was found. Give the results for the main outcomes.	Submission, Page 1
2d	Abstract - Conclusion - What have we learned and what does it mean. Where should future research go.	Submission, Page 1
3	Explain the scientific background and rationale for the cohort study. What are objectives, research questions and the hypotheses.	Submission, Page 3
4a	Registration and ethics State the research registry number in accordance with the declaration of Helsinki - "Every research study involving human subjects must be registered in a publicly accessible database before recruitment of the first subject" (this can be obtained from; ResearchRegistry.com or ClinicalTrials.gov or ISRCTN). Even retrospective studies should be registered prior to submission.	Submission, Page 4
4b	Ethical Approval - State whether ethical approval was needed and if so, what the relevant judgement reference from the IRB or local ethics committee was? If ethical approval was not needed, state why.	Submission, Page 4
4c	Protocol - Was a research protocol developed apriori? Where can it be accessed. Was it published in a journal e.g. IJS Protocols, BMJ Open, etc, if so, provide the reference.	NA
5a	Study design - State the research is a cohort study and whether prospective or retrospective in design, whether single or multi-centre.	Submission, Page 3-4
5b	Setting - Describe the setting(s) and nature of the institution in which the patient was managed; academic, community or private practice setting? Location(s), and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Submission, Page 3-4
5c	Cohort Groups - State the number of groups in the study. What interventions will each group receive?	Submission, Page 3-4
5d	Sub-group – Analysis. Any planned sub-group analyses are specified / Describe any methods used to examine subgroups and interactions.	Submission, Page 3-5

6a	Participants - State any eligibility (inclusion/exclusion) criteria and the sources and methods of selection of participants. Describe length and methods of follow-up.	Submission, Page 4
6b	Recruitment - State the methods of how patients or participants were recruited to each group, over what time periods.	Submission, Page 4
6c	Sample size calculation Whether there was calculation of margin of error or a prior analysis to determine study population, or mention of how appropriate study sample was determined.	Submission, Page 3-4
7a	Pre-intervention considerations - e.g. Patient optimisation: measures taken prior to surgery or other intervention e.g. treating hypothermia/hypovolaemia/hypotension in burns patients, ICU care for sepsis, dealing with anticoagulation/other medications and so on.	Submission, Page 3-4
7b	Types of intervention(s) deployed - To include reasoning behind treatment offered (pharmacological, surgical, physiotherapy, psychological, preventive) and concurrent treatments (antibiotics, analgesia, anti-emetics, nil by mouth, VTE prophylaxis, etc). Medical devices should have manufacturer and model specifically mentioned.	Submission, Page 3-4
7c	Peri-intervention considerations - Administration of intervention (what, where, when and how was it done, including details for surgery; anaesthesia, patient position, use of tourniquet and other relevant equipment, preparation used, sutures, devices, surgical stage (1 or 2 stage, etc) and operative time. Pharmacological therapies should include formulation, dosage, strength, route and duration). Authors are encouraged to use figures, diagrams, photos, video and other multimedia to explain their intervention.	Submission, Page 3-5
7d	Who performed the procedure(s) - Operator experience for each group (position on the learning curve for the technique if established, specialisation and prior relevant training).	Submission, Page 4
7e	Quality control - What measures were taken to reduce inter or intra-operator variation. What measures were taken to ensure quality and consistency in the delivery of the intervention e.g. independent observers, lymph node counts, etc	Submission, Page 3-4
7f	Post-intervention considerations - e.g. post-operative instructions and place of care. Important follow-up measures - diagnostic and other test results. Future surveillance requirements - e.g. imaging surveillance of endovascular aneurysm repair (EVAR) or clinical exam/ultrasound of regional lymph nodes for skin cancer.	Submission, Page 3-5
8	Outcomes - What primary and secondary (if any) outcomes will be assessed and how are they defined. Definitions should be clear and precise. Appropriate references to validation of outcome measures used should be provided if they exist.	Submission, Page 3-5
9	Statistical methods - Clearly outlined statistical tests used to compare the outcomes between an intervention group and a comparison group, state whether pre-existing differences and known confounders were controlled. The statistical package used should be mentioned.	Submission, Page 5-6
10a	Participants recruited with a flow diagram - Report numbers involved in each group and use a flow diagram to show recruitment, non-participation, cross-over, withdrawal from the study with reasons.	Submission, Page 3-4

10b	Comparison between groups including a table - Provide a table comparing the demographic, clinical/prognostic features (co-morbidities, tumour staging, smoking status, etc) and relevant socioeconomic characteristics of each group and whether numerical differences are significant (using p-values and/or confidence intervals as appropriate). Were the groups matched and if so, how.	Submission, Page 6-7
10c	Changes - Any changes in the interventions during the course of the study (how has it evolved, been altered or tinkered with, what learning occurred, etc) together with rationale and a diagram if appropriate. Degree of novelty for a surgical technique/device should be mentioned and a comment on learning curves should be made for new techniques/devices.	Submission, Page 3-5
11a	Outcomes and follow-up - Clinician assessed and patient-reported outcomes (when appropriate) should be stated for each group (size of effect with raw numbers and percentages) with inclusion of the time periods at which assessed. Relevant photographs/radiological images should be provided e.g. 12-month follow-up. Make it clear which confounders were adjusted for and which were not.	Submission, Page 6-7
11b	Intervention adherence/compliance and tolerability - How was this assessed. Describe loss to follow-up (express as a percentage and a fraction) or cross-over between group and any explanations for them.	Submission, Page 6-7
11c	Complications and adverse or unanticipated events - Described in detail and ideally categorised in accordance with the Clavien-Dindo Classification. How they were prevented, mitigated, diagnosed and managed. Blood loss, wound complications, re-exploration/revision surgery, 30-day post-op and long-term morbidity/mortality may need to be specified.	Submission, Page 6-7
12	Summarise key results	Submission, Page 8
13	Discussion of the relevance of the findings and rationale for conclusions - Relevant literature, implications for clinical practice guidelines, how have the indications for a new technique/device been refined and how do outcomes compare with established therapies and the prevailing gold standard should one exist and any relevant hypothesis generation. The rationale for any conclusions.	Submission, Page 7
14	Strengths and limitations of the study	Submission, Page 7-8
15	State what needs to be done next, further research with what study design(s).	Submission, Page 7-8
16	State the key conclusions from the study and key directions for future research	Submission, Page 7-8
17a	State any conflicts of interest	Title_submission Page 1

17b	State any sources of funding	Title_submission Page 1
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