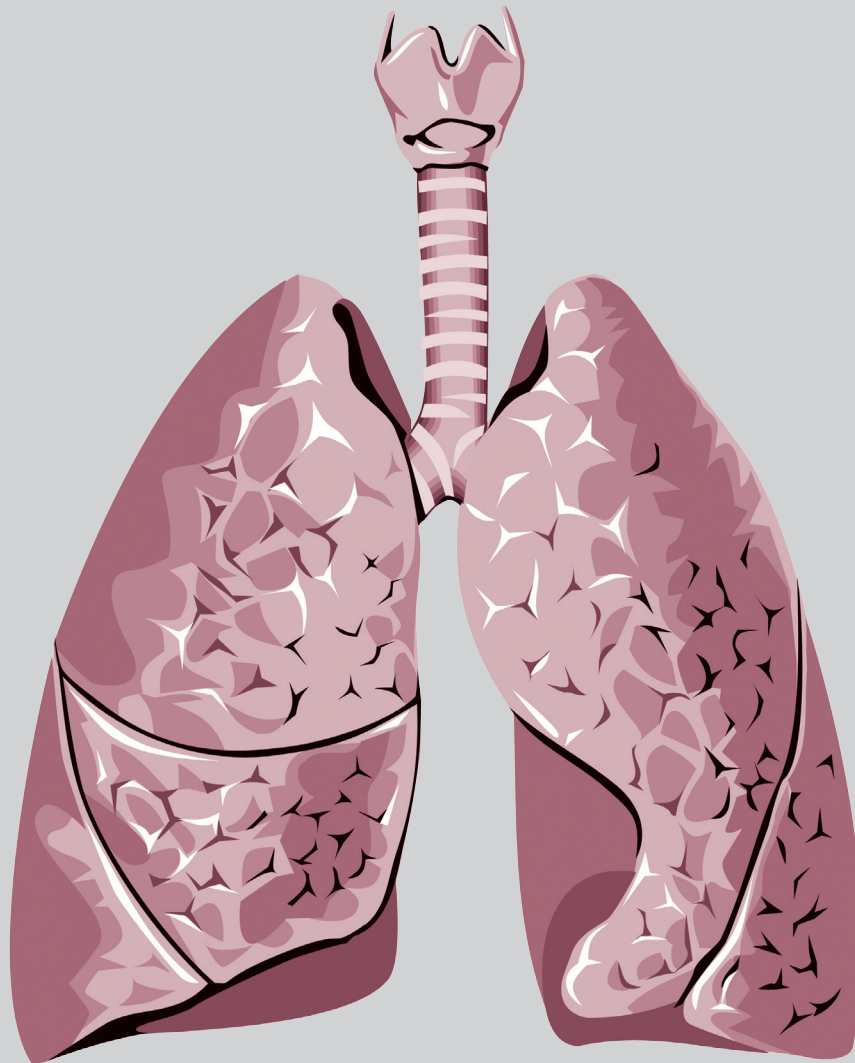


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CONTENTS

Review Articles

- Progression of Ventilator-Induced Lung Injury in COVID-19 Resulting Acute Respiratory Distress Syndrome and Therapeutic Strategies** 60~70
Chung-Sheng Shi, Shih-Hsing Yang, Chieh-Mo Lin, Chin-Kuo Lin, and Tzu-Hsiung Huang

Original Articles

- Feasibility of Re-biopsy by Endobronchial Ultrasound-guided Transbronchial Needle Aspiration (EBUS-TBNA) in Patients with Previously Treated Lung Cancer** 71~80
Kai-Lun Yu, Han-Ching, Yang, Jen-Chung Ko, Chao-Chi Ho, Jin-Yuan Shih
- Comparison of Effectiveness between Proportional Assist Ventilation and Pressure Support Ventilation for Weaning Adult Patients with Prolonged Mechanical Ventilation: A Randomized Controlled Trial** 81~94
Pi-Hua Lin, Chiu-Fan Chen, David Lin Lee
- Disseminated Intravascular Coagulation in Sepsis is Associated with Specific Infection and Organ Dysfunction** 95~105
Yao-Wen Kuo, Kuei-Pin Chung, Hou-Tai Chang, and Chong-Jen Yu
- Meta-analysis of relations between EGFR mutations, risk of brain metastasis and survival in NSCLC patients** 106~122
Ching-Han Lai, Sheng-Yuan Wang, Szu-Chun Yang, Yi-Lin Wu, Fu-Chang Hu, Po-Lan Su, Jeng-Shiuan Tsai, Chien-Chung Lin

Case Reports

- Pulmonary Tuberculosis with Mediastinal Involvement Mimicking Lung Cancer on Chest Images: A Case Report** 123~128
Ming-Hung Chang, Shian-Chin Ko
- Marked Improvement in Pulmonary Function after Nintedanib Treatment in a Patient of Idiopathic Pulmonary Fibrosis with Rapid Deterioration** 129~134
Yen-Kun Ko, Chih-Yi Liu, Po-Ju Chen, Ming-Hong Yen
- Pulmonary Adenocarcinoma Presented as a Simple Cystic Lung Lesion** 135~138
Po-Pin Cheng, Luga Lee, Jen-Jyh Lee, Bee-Song Chang, Chih-Bin Lin
- Disseminated Mycobacterium abscessus Infection in a Patient with Invasive Thymoma: A Case Report** 139~146
Fan-Yi Chuang, Jia-Yi Feng, Yu-Chung Wu, Wei-Juin Su

Progression of Ventilator-Induced Lung Injury in COVID-19-Related Acute Respiratory Distress Syndrome, and Therapeutic Strategies

Chung-Sheng Shi^{1,2,*}, Shih-Hsing Yang^{3,*}, Chieh-Mo Lin^{1,4,5}, Chin-Kuo Lin^{1,4},
Tzu-Hsiung Huang^{1,6,#}

Introduction: A common and obvious complication of progressive COVID-19 is acute hypoxemic respiratory insufficiency or failure, leading to acute respiratory distress syndrome (ARDS) and requiring oxygen therapy and mechanical ventilation. However, the pathological changes in ARDS resulting from COVID-19 are different from those of typical ARDS, and mechanically ventilated patients with COVID-19-related ARDS exhibit a higher mortality rate than do typical ARDS patients.

Objective: To review published articles on this topic with the objective of determining how to minimize the progression of patient self-inflicted lung injury or ventilator-induced lung injury (VILI) and improving the survival rate of mechanically ventilated patients with COVID-19-related ARDS.

Data Source: A literature search was undertaken in the PubMed database on all related studies up to August 2020. There were no restrictions on publication date, study design or language.

Study Selection: Included studies involved those that investigated the pathological changes of COVID-19-related ARDS and that proposed strategies to prevent and treat VILI in patients with COVID-19-related ARDS. Thirty-two relevant articles were selected for final review.

Results: We summarized the current research on the pathophysiology of COVID-19-related ARDS and the suggested therapeutic strategies to deal with the progression of patient self-inflicted lung injury or VILI.

Conclusion: According to the pathogenesis of mechanically ventilated patients with COVID-19-related ARDS, lung-protective ventilation strategies and early pharmacologic intervention may be considered not only as supportive therapy but also as preventive therapy.

(Thorac Med 2021; 36: 60-70)

Key words: COVID-19; acute respiratory distress syndrome; ventilator-induced lung injury; mechanical ventilation

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Feasibility of Re-biopsy by Endobronchial Ultrasound-guided Transbronchial Needle Aspiration (EBUS-TBNA) in Patients with Previously Treated Lung Cancer

Kai-Lun Yu^{1,2}, Han-Ching, Yang¹, Jen-Chung Ko¹, Chao-Chi Ho³,
Jin-Yuan Shih³

Background: Re-biopsy is paramount for further treatment of lung cancer patients with recurrent or progressive disease. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is an important method for tissue sampling of mediastinal lesions. However, the role of EBUS-TBNA in re-biopsy of lung cancer is not clear. In this study, we investigated the feasibility of re-biopsy by EBUS-TBNA of pretreated lung cancer patients.

Methods: Consecutive patients with pretreated lung cancer with suspected progression or recurrence that underwent EBUS-TBNA between October 2015 and December 2019 were enrolled. The diagnostic yield, specimen adequacy, and complications were assessed.

Results: A total of 72 lesions from 45 patients with suspected lung cancer recurrence (n=11) or progression (n=34) were sampled by EBUS-TBNA. The diagnostic yield and specimen adequacy rate was 73.3% (33/45) and 95.6% (43/45), respectively. There was no major complication, but 7 (15.6%) minor complications were noted in these patients. Twenty-one patients had EGFR testing results from both the initial diagnosis and from re-biopsy specimens. The acquired T790M mutation was identified in 5 (38.5%) of 13 patients with EGFR-mutant lung adenocarcinoma.

Conclusion: EBUS-TBNA is a feasible and safe method of re-biopsy for pretreated lung cancer patients. (*Thorac Med* 2021; 36: 71-80)

Key words: endobronchial ultrasound-guided transbronchial biopsy, re-biopsy, lung cancer

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Comparison of Effectiveness of Proportional Assist Ventilation and Pressure Support Ventilation for Weaning Adult Patients from Prolonged Mechanical Ventilation: A Randomized Controlled Trial

Pi-Hua Lin¹, Chiu-Fan Chen^{2,3}, David Lin Lee^{2,4}

Background: Proportional assist ventilation with load-adjustable gain factors (PAV+) is a promising mode with better patient synchrony and weaning advantages. This study aimed to compare the effectiveness of PAV+ and pressure support ventilation (PSV) for weaning adult patients from prolonged mechanical ventilation (PMV).

Methods: Patients with PMV were recruited for this prospective trial. Patients were randomly assigned to receive PAV+ or PSV as a weaning mode. Weaning outcomes and mortality were evaluated.

Results: A total of 36 patients completed the study (18 in the PAV+ group and 18 in the PSV group). The peak inspiratory pressure and tidal volume initially were significantly lower in the PAV+ group than in the PSV group. Both peak inspiratory pressure and tidal volume decreased during the weaning process in both groups, and the PAV+ group showed a smaller tidal volume change. Outcome analysis showed that the PAV+ group possibly had better results in the 28-day weaning success rate, weaning duration, and hospital mortality than the PSV group, but significance was not achieved.

Conclusion: This study proved the effectiveness of the PAV+ mode for weaning patients with PMV. PAV+ may be a potential mode for weaning patients with PMV in the future. (*Thorac Med* 2021; 36: 81-94)

Key words: pressure support ventilation, prolonged mechanical ventilation, proportional assist ventilation, respiratory failure, weaning

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Disseminated Intravascular Coagulation in Sepsis is Associated with Specific Infection and Organ Dysfunction

Yao-Wen Kuo¹, Kuei-Pin Chung², Hou-Tai Chang³⁻⁵, Chong-Jen Yu⁶⁻⁸

Introduction: The failure of randomized controlled trials to demonstrate the efficacy of treatments targeting disseminated intravascular coagulation (DIC) in sepsis may imply that DIC develops under specific clinical contexts in patients with sepsis. However, the clinical features associated with DIC development in sepsis are not well understood yet.

Methods: We conducted a prospective study and enrolled 126 patients with sepsis admitted to medical intensive care units (ICUs) in 2 medical centers. DIC was determined based on the Japanese Association for Acute Medicine (JAAM) or the International Society on Thrombosis and Haemostasis (ISTH) scoring systems.

Results: Using the JAAM score, we identified 39 patients (31%) with DIC at ICU admission. Multivariate analysis indicated that clinical features significantly associated with increased risk of JAAM DIC included hypotension (odds ratio [OR] 8.037, 95% confidence interval [CI] 1.496–43.175, $P=0.015$) and infections other than pneumonia, particularly intra-abdominal infections (OR 8.952, 95% CI 1.765–43.395, $P=0.008$). Meanwhile, 10 patients (7.9%) were diagnosed with overt DIC according to the ISTH score, and multivariate analysis indicated that congestive heart failure (OR 9.192, 95% CI 1.665–50.761, $P=0.011$) and hyperbilirubinemia (OR 6.525, 95% CI 1.311–32.481, $P=0.022$) were significantly associated with increased risk of overt DIC.

Conclusion: Our results suggest that, rather than being a common phenomenon in sepsis, DIC may be a unique complication under certain clinical conditions. The exact mechanisms that explain the association between these clinical features and DIC are unknown, and warrant further investigation. (*Thorac Med* 2021; 36: 95-105)

Key words: critical illness, coagulation, sepsis, septic shock, outcome

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Meta-Analysis of Relationship Between EGFR Mutations, Risk of Brain Metastasis and Survival in NSCLC Patients

Ching-Han Lai^{1,6}, Sheng-Yuan Wang^{1,6}, Szu-Chun Yang¹, Yi-Lin Wu²
Fu-Chang Hu^{3,4}, Po-Lan Su¹, Jeng-Shiuan Tsai^{1,5}, Chien-Chung Lin^{1,5}

Introduction: To investigate whether epidermal growth factor receptor (EGFR) mutations are associated with the risk of developing brain metastasis (BM) or with overall survival after BM in non-small cell lung cancer (NSCLC) patients.

Methods: We systematically performed meta-analyses and meta-regression to examine the associations. Seventeen studies involving 8,010 NSCLC patients were included for analysis.

Results: Meta-analysis of 12 studies (5,962 patients) yielded a pooled odds ratio of 1.70 (95% confidence interval (CI): 1.47–1.96, $p < 0.001$), and meta-regression indicated that patients with EGFR mutations had a higher risk of BM at initial diagnosis. Meta-analysis of 11 studies (3,170 patients) yielded a pooled odds ratio of 2.20 (95% CI: 1.76–2.75, $p < 0.001$), and meta-regression indicated that patients with EGFR mutations also had a higher risk of subsequent BM. Finally, meta-analysis of 5 studies yielded a pooled hazard ratio of 0.29 (95% CI: 0.22–0.39, $p < 0.001$), indicating EGFR mutations are associated with longer overall survival in NSCLC patients with BM.

Conclusion: Although EGFR mutations increased the risk of BM in NSCLC patients, they also predicted longer overall survival in those with BM. (*Thorac Med* 2021; 36: 106-122)

Key words: EGFR mutation, brain metastasis, overall survival, NSCLC, meta-analysis, meta-regression

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⁶These authors contributed equally to this work. Acronyms: BM, brain metastasis; CT, computed tomography; EGFR, epidermal growth factor receptor; GAM, generalized additive model; GOF, goodness of fit; MRI, magnetic resonance image; NA, not applicable; NSCLC, non-small cell lung cancer; OS, overall survival; TKI, tyrosine kinase inhibitor. Address reprint requests to: Dr. Jeng-Shiuan Tsai, Department of Internal Medicine, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, No.138 Sheng-Li Road, Tainan 704, Taiwan

Pulmonary Tuberculosis with Mediastinal Involvement Mimicking Lung Cancer on Chest Images: A Case Report

Ming-Hung Chang¹, Shian-Chin Ko²

Although the incidence of tuberculosis is declining, it is still the most common notifiable infectious disease in Taiwan. Tuberculosis is known as a great imitator. Atypical clinical presentations will mislead us and delay the diagnosis. Here, we present the case of a patient with pulmonary tuberculosis and huge mediastinal lymphadenopathy, who was initially diagnosed as having advanced lung cancer. Histologic and microbiologic evidence led to the final accurate diagnosis. We should maintain a high index of clinical suspicion for tuberculosis in areas of high prevalence, such as Taiwan. Biopsy and culture remain the gold standard for the definitive diagnosis of tuberculosis. (*Thorac Med* 2021; 36: 123-128)

Key words: pulmonary tuberculosis, mediastinal lymphadenopathy, chest imaging

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Marked Improvement in Pulmonary Function after Nintedanib Treatment in a Patient with Rapid Progressive Fibrosing Interstitial Lung Disease

Yen-Kun Ko¹, Chih-Yi Liu², Po-Ju Chen³, Ming-Hong Yen⁴

A 62-year-old male, a smoker with rapid progressive fibrosing interstitial lung disease, developed exertional dyspnea and dry cough lasting for 1 year, with a decreased forced vital capacity (FVC) of 300 mL during the last 6 months. High-resolution computed tomography (HRCT) and the surgical lung biopsy pathology report showed a fibrosing pattern that lay somewhere between that of usual interstitial pneumonia and that of non-specific interstitial pneumonia. Twenty-one months after starting nintedanib therapy, the predicted FVC value increased 20% and the ground-glass opacity and consolidation on HRCT improved. The FVC value was subsequently maintained above baseline for 28 months. We concluded that the rapid improvement of the patient indicated a super-responder to nintedanib therapy. (*Thorac Med* 2021; 36: 129-134)

Key words: progressive fibrosing interstitial lung disease, pulmonary function test, high-resolution computed tomography, nintedanib

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Pulmonary Adenocarcinoma Presenting as a Simple Cystic Lung Lesion: A Case Report

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A pulmonary cyst is defined as a round, thin-walled (often less than 2 mm thick) parenchymal lucency that may contain air, fluid or a solid. A pulmonary cyst should be differentiated from a pulmonary cavity because the 2 entities often have very different etiologies. The differential diagnoses of lung cyst observed on HRCT or chest CT can range from isolated lung diseases to multisystem diseases. Primary lung cancer presenting as a cystic airspace lung lesion is relatively rare, and is often misdiagnosed or the diagnosis is delayed due to the poorly understood pathogenesis and sometimes subtle image changes. It is imperative that the underlying reason be sought when pulmonary cysts are identified on CT. We present the case of a 54-year-old male with a pulmonary cystic lung lesion at the upper segment of the right lower lobe that was eventually proved to be adenocarcinoma. (*Thorac Med* 2021; 36: 135-138)

Key words: pulmonary cyst, adenocarcinoma of the lung

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Disseminated Mycobacterium abscessus Infection in a Patient with Invasive Thymoma: A Case Report

Fan-Yi Chuang¹, Jia-Yi Feng^{1,2}, Yu-Chung Wu^{2,3}, Wei-Juin Su^{1,2}

Nontuberculous mycobacteria (NTM) can be isolated from a variety of environmental sources. These free-living organisms have potential to cause a variety of infections, such as lung disease, soft tissue infection, and disseminated disease. Treatment for NTM can include anti-mycobacterial therapy and surgical management. Here, we present a case of dyspnea after recent median sternotomy, with disseminated NTM infection. (*Thorac Med* 2021; 36: 139-146)

Key words: nontuberculous mycobacteria (NTM), *M. abscessus subspecies massiliense*, disseminated infection, invasive thymoma

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