

Review article: Protective effects of bacillus Calmette-Guérin vaccination against COVID-19

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Abstract: Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had a major impact worldwide. Although researchers have made every effort to find ways to avoid its spread and to find the best way to treat the disease, there are still no effective options up to now. From the current point of view, vaccination seems to be a good way to prevent the spread of COVID-19. However, studies on the use of vaccination for COVID-19 are still on-going, and the safety of the vaccines is still questioned. It is interesting that epidemiological studies have shown that countries with bacillus Calmette-Guérin (BCG) vaccination programs have less spreading of COVID-19, less severity of infections, and a higher recovery rate. The striking association between BCG vaccination and COVID-19 supports the possible protective effects of BCG vaccine against COVID-19. Experimental studies suggest that BCG vaccine enhances trained immunity with cellular and molecular mechanisms against various viral infections, including single-strand RNA viruses. SARS-CoV-2 is a single-strand RNA virus. Therefore, we reviewed studies on immunity against various viral infections using BCG vaccination. Well-designed clinical studies are still necessary to define the effects of BCG vaccine relative to COVID-19 in the future. (*Thorac Med* 2021; 36: 207-215)

Key words: bacillus Calmette-Guérin, coronavirus disease 2019, pandemic, vaccination policy

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Risk Factors for Readmission among Sepsis Survivors

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Introduction: Readmission within 90 days after hospital discharge is common among sepsis patients, and is second only to readmission among congestive heart failure patients. Readmission results in a reduced quality of life, increased patient mortality, and higher medical costs. Although several studies have been conducted to identify the reasons and risk factors for sepsis readmissions, only a few have focused on critically ill patients, and these studies have reported heterogeneous results.

Methods: This was a single-center, prospective cohort study with 129 patients.

Results: Of the 129 sepsis survivors, 62 had a readmission within 90 days of index discharge. The patients who were readmitted within 90 days were significantly older than those who were not, with a mean age of 75.97 versus 67.96 years, $p < 0.05$. Infection (79.03%) was the primary cause of readmission, and among these patients, 75.5% were readmitted for the same infection source as during the index hospitalization. There was a higher percentage of infection with drug-resistant Gram-negative bacilli (odds ratio [OR] 15.840, 95% CI [1.993–125.885]) in the readmission group.

Conclusion: About half of the survivors with sepsis had re-hospitalization within 90 days after discharge from their index admission. Factors that contributed to the higher odds of re-hospitalization were older age and infection with drug-resistant Gram-negative bacilli. The majority of these unplanned readmissions were due to infection. By reducing the rate of infection by drug-resistant Gram-negative organisms, the 90-day readmission rate among sepsis survivors might be reduced. (*Thorac Med* 2021; 36: 216-224)

Key words: sepsis, critical care, readmissions, prevention

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Value of Aspergillus Galactomannan Antigen Assay from Endobronchial Ultrasonography-guided Bronchial Washing Fluid for Diagnosis of Invasive Pulmonary Aspergillosis

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Introduction: Invasive pulmonary aspergillosis (IPA) is a frequent and increasingly common cause of morbidity and mortality in immunocompromised patients. To improve the outcome of these often fatal infections, early diagnosis of IPA is of utmost importance. The primary aim of this study was to establish the value of the Aspergillus galactomannan (GM) antigen assay from endobronchial ultrasonography (EBUS)-guided bronchial washing (BW) fluid for the diagnosis of IPA.

Methods: The diagnostic yields of EBUS for patients with suspected IPA between December 2012 and December 2017 were retrospectively analyzed.

Results: A total of 106 patients with suspected IPA were enrolled in the study. The mean age was 52.9±17.1 years and the most common underlying disease was hematological malignancy (n=36, 34%). Among these patients, 29 were diagnosed as having proven aspergillosis and 6 as having probable IPA infection. At a cut-off index value of 0.5, GM detection in BW fluid had a sensitivity of 97.14% and specificity of 78.57%. The positive predictive value (PPV) and negative predictive value (NPV) were 69.39% and 98.21%. Applying a cut-off index of 1.0, as is proposed for adults, resulted in a sensitivity, specificity, PPV and NPV, respectively, of 96.97%, 95.89%, 91.43% and 98.59%.

Conclusion: The Aspergillus GM antigen assay from EBUS-guided BW fluid is a useful diagnostic tool for pulmonary aspergillosis. It offered a high sensitivity, specificity, PPV and NPV at a cut-off index value of 1.0. This technique can be particularly helpful in avoiding delayed treatment for immunocompromised patients who are suspected of having pulmonary aspergillosis. (*Thorac Med* 2021; 36: 225-235)

Key words: invasive pulmonary aspergillosis (IPA), endobronchial ultrasonography (EBUS), bronchial washing (BW), galactomannan (GM)

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Association of B-type Natriuretic Peptide and Exercise Capacity with Cheyne-Stokes Respiration in Heart Failure Patients - a Pilot Prospective Study in Taiwan

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Background: Cheyne-Stokes respiration (CSR) frequently occurs in patients with heart failure (HF). We aimed to evaluate the association between plasma B-type natriuretic peptide (BNP) levels in HF patients with the presence of CSR, and assess functional exercise capacity in HF patients with and without CSR.

Methods: From June 2018 to June 2019, we enrolled 39 patients from a cardiac outpatient clinic who had an ejection fraction <50% and stable HF conditions. All the participants underwent echocardiography, portable sleep monitoring, and blood tests. Twenty-two of the 39 patients received an overnight polysomnography and 19 of the 39 patients underwent a cardiopulmonary exercise test to assess exercise capacity and ventilator response.

Results: Of the 39 enrolled participants, 12 (30.7%) had CSR, and 27 (69.2%) had no significant CSR using a portable monitoring device. BNP levels were significantly higher in the HF patients with CSR than in those without CSR (median: 270.8 pg/ml vs 120.6 pg/ml; P= 0.03). However, there were no significant differences in the parameters of the cardiopulmonary exercise test in HF patients with or without CSR in our study.

Conclusion: Plasma BNP level is significantly associated with the presence of CSR in HF patients. The plasma BNP level can be considered as a parameter to evaluate for detecting central sleep apnea in HF patients. However, we failed to identify whether exercise capacity and ventilator response were associated with CSR in HF patients. (*Thorac Med* 2021; 36: 236-245)

Key words: Cheyne Stokes respiration, heart failure, B-type natriuretic peptide, exercise capacity, cardiopulmonary exercise test

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Activity Endurance of Patients with Chronic Obstructive Pulmonary Disease after Attending Pulmonary Rehabilitation

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Introduction: Chronic obstructive pulmonary disease (COPD) is a major public health problem and a leading cause of morbidity and mortality worldwide. Long-term exposure to ambient particulate matter 2.5 μm (PM_{2.5}) is associated with an increased risk of COPD incidence. Studies have shown that pulmonary rehabilitation (PR) can improve the exercise tolerance and quality of life of patients with COPD. Little is known about the effect of PR on patients with COPD in Taiwan. The purpose of this study was to investigate the activity endurance of COPD patients after undergoing PR training.

Methods: This was an observational study in the thoracic medical clinic of a teaching hospital in southern Taiwan. Sixty-six patients aged 42-90 years (71.45±11.74) and diagnosed with COPD groups B, C, or D, who had completed 6 training sessions, were enrolled. Measurements included a 6-minute walk test (6MWT), a modified Borg scale (mBorg), a modified Medical Research Council dyspnea scale (mMRC), a COPD Assessment Test (CAT), and pulse oximeter oxygen saturation (SpO₂). Measurements were taken to assess the degree of dyspnea while the patients were performing rehabilitation exercises. The collected data were analyzed using the Statistical Package for the Social Sciences 22.0 (SPSS 22.0) for Windows software.

Results: The results of the study revealed that the variables affecting the 6MWT were the mMRC score, the CAT, home exercise habits and home exercise frequency ($p<0.05$). The results of hierarchical regression showed that the 6MWT was affected by age, the mMRC score, and BMI, and the 6MWT % predicted (6MWT %pred) was affected by the mMRC score and age. The changes in vital signs during the 6 training sessions indicated that the severity of COPD had an impact on the mBorg score, while the changes in diastolic blood pressure in patients with severe COPD had a significant influence.

Conclusion: The mMRC score and age were the main factors affecting activity endurance, the 6MWT and the 6MWT %pred for COPD patients undergoing PR. During PR training, monitoring changes in the diastolic blood pressure of patients with mild to severe COPD is an important measure. (*Thorac Med* 2021; 36: 246-260)

Key words: pulmonary rehabilitation; activity endurance; COPD

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Bronchoscopic Cryotherapy for Removal of an Intubation-related Tooth in the Trachea---a Case Report

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A 54-year-old man was admitted due to acute respiratory failure. Secretion obstruction occurred in the endotracheal tube, and re-intubation was performed. A tooth was found to be missing after intubation, and the follow-up chest X-ray revealed a foreign body stuck in the left main bronchus. Emergency bronchoscopy was performed and a tooth was removed using bronchoscopic cryotherapy. (*Thorac Med* 2021; 36: 261-265)

Key words: pulmonary alveolar microlithiasis; SLC34A2 gene; sodium-phosphate co-transporter

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Tracheal Schwannoma with Central Airway Obstruction Rescued by Flexible Bronchoscopy

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A 68-year-old male patient, presented to our hospital because of progressive shortness of breath for 4 months. A primary tracheal tumor with central airway obstruction was noted. The tumor was finally diagnosed as a tracheal schwannoma. It was treated with flexible bronchoscopic tumor excision and stent implantation, and later was surgically resected. (*Thorac Med* 2021; 36: 266-271)

Key words: Tracheal tumor, Flexible bronchoscopy

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Delayed Presentation of Airway Injury after Blunt Trauma: Case Report and Literature Review

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Trauma-induced airway injury is catastrophic and results in early mortality. Injuries that are not immediately life-threatening and are missed at initial presentation may later become symptomatic and require medical attention. Delayed diagnoses of traumatic tracheobronchial injuries with damaged distal lung might occur, although early injuries can often be repaired without sacrifice of the distal lung parenchyma. We herein report the case of a 56-year-old female with delayed total occlusion of the left main bronchus due to an accident in which she fell. She recovered very well during an 8-month follow-up after receiving sleeve resections of the left main bronchus. (*Thorac Med* 2021; 36: 272-276)

Key words: Delayed presentation, airway injury

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Lobular Capillary Hemangioma of the Right Bronchus Intermedius with Multilobar Atelectasis—A Case Report and Literature Review

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Lobular capillary hemangioma (LCH), also called pyogenic granuloma, is a benign vascular tumor often observed in the cutaneous and oral mucosa and nasal cavity. The precise etiology of LCH is unknown. LCH can present rarely in the gastrointestinal tract and even less frequently in the tracheobronchial tree, according to the literature. The tumor size of most tracheobronchial LCH ranges from several millimeters to a few centimeters. Imaging findings from chest radiography or computed tomography are nonspecific for the diagnosis of tracheobronchial LCH. Flexible bronchoscopy is indicated for early detection of these small lesions, which may be treated endoscopically with a good prognosis. Here, we report a patient living with a tracheostomy who presented with fever and right middle and lower lobar atelectasis. Bronchoscopic biopsy confirmed the diagnosis of tracheobronchial LCH with total occlusion of the right bronchus intermedius. The patient recovered well after conservative treatment. (*Thorac Med* 2021; 36: 277-284)

Key words: lobular capillary hemangioma, pyogenic granuloma, right bronchus intermedius, multilobar atelectasis

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