Pulmonary tuberculosis increases the risk of pulmonary thromboembolism: a nationwide population-based cohort study

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Dear Sirs,

Increasing interest in the relationship between infection and pulmonary thromboembolism (PE) has reported (1–3). However, the incidence of PE in tuberculosis (TB) patients remains unclear. Therefore, we conducted a nationwide retrospective cohort study to explore the relationship between TB and PE in Taiwan. This nationwide population-based cohort study is the first to examine whether TB increases the risk of PE in an Asian population.

A population-based cohort study was conducted by using data from the Taiwan National Health Insurance Research Database (NHIRD) that is managed by the National Health Research Institutes (NHRI). This study was approved by the Ethics Review Board at China Medical University (CMU-REC-101–012). We identified a study cohort consisting of patients newly diagnosed with TB (ICD-9-CM 011–012) aged ≥20 years from 2000 to 2010 in the NHIRD. The TB diagnosis date was defined as the index date. For each TB case, participants from all potential confounding factors for this study and determined that respiratory infection indicated a 2.5-fold adjusted odds ratio for PE (4). Clayton et al. did not focus on specific bacterial agents that caused PE. Dentan et al. used the Premier Hospitalization Database in the United States and observed that adults with TB had a 1.55-fold greater risk of venous thromboembolism than those without TB (5). However, the TB incidence rate is 3.2 cases per 105 people in the United States, which is lower than 55 cases per 105 people in Taiwan (6,7). TB incidence and PE prevalence discrepancies exist among racial differences (8).

Mycobacterium tuberculosis infections result in chronic granulomatous inflammation, which may be associated with haemostatic changes and a hypercoagulable status (9). Chronic infection and inflammation may modulate thrombotic responses by upregulating the activation procoagulants, downregulating that of anticoagulants, and suppressing fibrinolysis (10).

Heart failure exhibited an independent risk factor of PE development. The increased risk of PE observed with heart failure may be attributed to reduced flow caused by low cardiac output and abnormalities of haemostasis, platelet function, and endothelial function (11). Cancer also showed an independent risk factor of developing PE in our study. Cancer and its treatments have been well-recognised risk factors for venous thromboembolism (12).

The strength of this study is that it provides a nationwide population-based cohort study that revealed the effects of TB on the increased risk of subsequent PE events. However, some limitations must be considered when interpreting the results. First, the NHIRD does not provide detailed information, such as records of cigarette smoking, alcohol consumption, body mass index, physical activity levels, socioeconomic status, and family history, which are all potential confounding factors for this study.

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study. However, these factors may be randomly distributed in these two large cohorts. Second, the outcome measured was symptomatic PE; therefore, the incidence of PE may have been underestimated. Third, the healthcare claims data might contain a potential misclassification bias of primary outcomes even though the auditing mechanism of the Bureau of National Health Insurance can help minimize diagnostic uncertainty and misclassification (13). The lack of drug data, such as that on contraceptive, anticoagulant, and antiplatelet drugs, may also have influenced the primary outcomes of this study.

In summary, this study shows that TB patients exhibit an elevated risk of PE development. Despite effective treatments and available cures, TB remains an endemic disease and a major health problem in Taiwan. To holistically care for TB patients, the government and clinicians should not only focus on successful treatment but also strive to reduce PE risk factors.

In the original article by Ruffatti et al., "Treatment strategies and pregnancy outcomes in antiphospholipid syndrome patients with thrombosis and triple antiphospholipid positivity. A European multicenter retrospective study" (Thromb Haemost 2014; 112: 727-725)

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Conception and design: Wei-Sheng Chung, Chia-Hung Kao; Administrative support: Cheng-Li Lin; Collection and assembly of data: All authors; Data analysis and interpretation: Wei-Sheng Chung, Cheng-Li Lin, Chia-Hung Kao; Manuscript writing: All authors; Final approval of manuscript: All authors.

Conflicts of interest
None declared.

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