Population-based prevalence of bronchiectasis and associated comorbidities in South Korea

To the Editor:

Bronchiectasis is a chronic respiratory disease characterised by abnormal dilatation of bronchi, which presents clinically with cough, sputum production and recurrent infection [1]. Although bronchiectasis had been regarded as an "orphan" disease [2], recent studies have shown that the prevalence of bronchiectasis is increasing and this disease causes a significant burden on public health, including increased healthcare costs, hospital admission and mortality [3–5].

Data on the prevalence of bronchiectasis and bronchiectasis-related comorbidities are relevant, since comorbidities are important factors for predicting the risk of mortality in patients with bronchiectasis [6]. However, epidemiological data on the prevalence of bronchiectasis remain limited, especially in Asian populations. Furthermore, only a few studies have included a comprehensive evaluation of the prevalence of bronchiectasis-related comorbidities among Asians [1, 7]. Thus, in the present study, the overall prevalence of bronchiectasis and associated comorbidities were investigated using a representative sample of national health insurance claims data in South Korea.

To identify patients with bronchiectasis and investigate their comorbidities, data were used from the 2012–2017 Health Insurance Review and Assessment Service, National Patient Sample (HIRA-NPS), which is nationally representative and open to the public for research purposes [8]. The HIRA-NPS data are cross-sectional and composed of health insurance claim records during the year. The database includes approximately 1 400 000 individuals each year drawn by 3% stratified random sampling by age and sex from the entire population who had claims records during the year. It also provides information on healthcare costs, composed of payer's amounts and patient's out-of-pocket costs. South Korea has a government-run mandatory national health security system; 97% of the population is enrolled in the National Health Insurance and 3% in Medical Aid programmes [9].

Data were extracted using the International Classification of Diseases 10th revision (ICD-10) diagnosis code J47 (bronchiectasis). Subjects with cystic fibrosis (ICD-10 diagnosis code E84) were excluded (n=6). Bronchiectasis-associated comorbidities were also defined using the ICD-10 codes: angina pectoris (I20.x), asthma (J45.x–J46.x), atrial fibrillation (I48.x), chronic obstructive pulmonary disease (COPD) (J42.x–J44.x, except for J43.0 (unilateral emphysema)), cerebrovascular disease (G45.x–G46.x, I60.x–I69.x or H34.0), depression (F32.x–F34.x), diabetes mellitus (E10.x–E14.x), gastro-oesophageal reflux disease (K21.x), hypertension (I10.x–I15.x), heart failure (I43.x, I50.x, I09.9, I11.0, I25.5, I13.0, I13.2, I42.0, I42.5–I42.9 or P29.0), inflammatory bowel disease (K50.x–K51.x), malignancy (C00.x–C97.x), myocardial infarction (I21.x, I22.x or I25.2), nontuberculous mycobacterial infection (A31.x), osteoporosis (M80.x–M81.x), peripheral vascular disease (I70.x–I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8 or Z95.9), liver disease (K70.3, K71.7, K73.x, K74.3–K74.6, K72.1, K72.9, K76.6 or K76.7) and rheumatological disease (M05.x, M06.x, M31.5, M32.x, M33.x, M34.x, M35.1, M35.3 or M36.0).

Acute exacerbation of bronchiectasis requiring an emergency room visit or hospitalisation was defined as when a bronchiectasis patient visited the emergency room or was hospitalised under the following conditions: 1) main diagnostic code for bronchiectasis and antibiotic administration; or 2) diagnostic codes J12.x–J17.x (pneumonia), J20.x (acute bronchitis), J21.x (acute bronchiolitis), R06.0 (dyspnoea),

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J80 (acute respiratory distress syndrome), R09.3 (abnormal sputum), or R04.2 (blood-tinged sputum) and antibiotic administration. Healthcare costs for a given disease and the cause of in-hospital mortality were determined based on the main ICD-10 code at the time of hospitalisation. Because this study was based on anonymous health claims data, institutional review board approval and patient consent were not required.

Among the 6 626 435 subjects aged ⩾20 years from the 2012–2017 HIRA-NPS database, this study included 30 732 patients diagnosed with bronchiectasis. The mean±SD age was 63.8±13.1 years. During the study period, the estimated overall prevalence of bronchiectasis was 464 cases per 100 000 population in South Korea (95% CI 459–467), which is higher than the 67 cases per 100 000 population observed in Germany [10] and 138 cases per 100 000 population recorded in the USA [11]. The estimated prevalence of bronchiectasis in South Korea each year was 464 cases per 100 000 population in 2012, 441 in 2013, 455 in 2014, 474 in 2015, 468 in 2016, and 480 in 2017. Among patients with bronchiectasis, 44.7% were male and 55.3% were female. Approximately 82.0% of the patients received outpatient care, and 18.0% received both inpatient care and outpatient care. The prevalence of bronchiectasis increased as age increased (figure 1a).

The average healthcare cost per person per year was EUR 218 in bronchiectasis patients. Overall, 88.9% of bronchiectasis patients received antibiotics (any type). The average number of prescriptions for any type of antibiotics per patient per year was 1.4 and the average medical cost for prescribing antibiotics per patient per year was EUR 117. Acute exacerbations requiring an emergency room visit or hospitalisation occurred in 7.0% of bronchiectasis patients. The overall in-hospital mortality was 2.9% (878 out of 30 732), of which 1.4% (12 out of 878) died of bronchiectasis itself.

In terms of comorbidities (figure 1b), asthma was diagnosed in 17.2% of subjects with bronchiectasis and, of those, COPD was diagnosed in 19.3% of subjects (the ratio of COPD was calculated among the subjects ⩾40 years of age). This was relatively lower than the prevalence in other studies evaluating Western populations: in a UK study, the prevalence of asthma and COPD was 42.5% and 36.1%, respectively [12]; in a German study, the prevalence of COPD was 58% [10]; in a study in the USA, the prevalence of asthma and COPD was 29% and 20%, respectively [13]. Pulmonary tuberculosis and nontuberculous mycobacterial infection were each diagnosed in 2.4% of South Korean patients with bronchiectasis. Other common bronchiectasis-related comorbidities included hypertension (25.7%), gastro-oesophageal reflux disease (19.4%), diabetes mellitus (13.2%) and malignancy (8.2%). The prevalence of cardiovascular diseases such as myocardial infarction, angina pectoris and cerebrovascular disease was less than 8%, which was lower than the rate reported in a European population study [6].

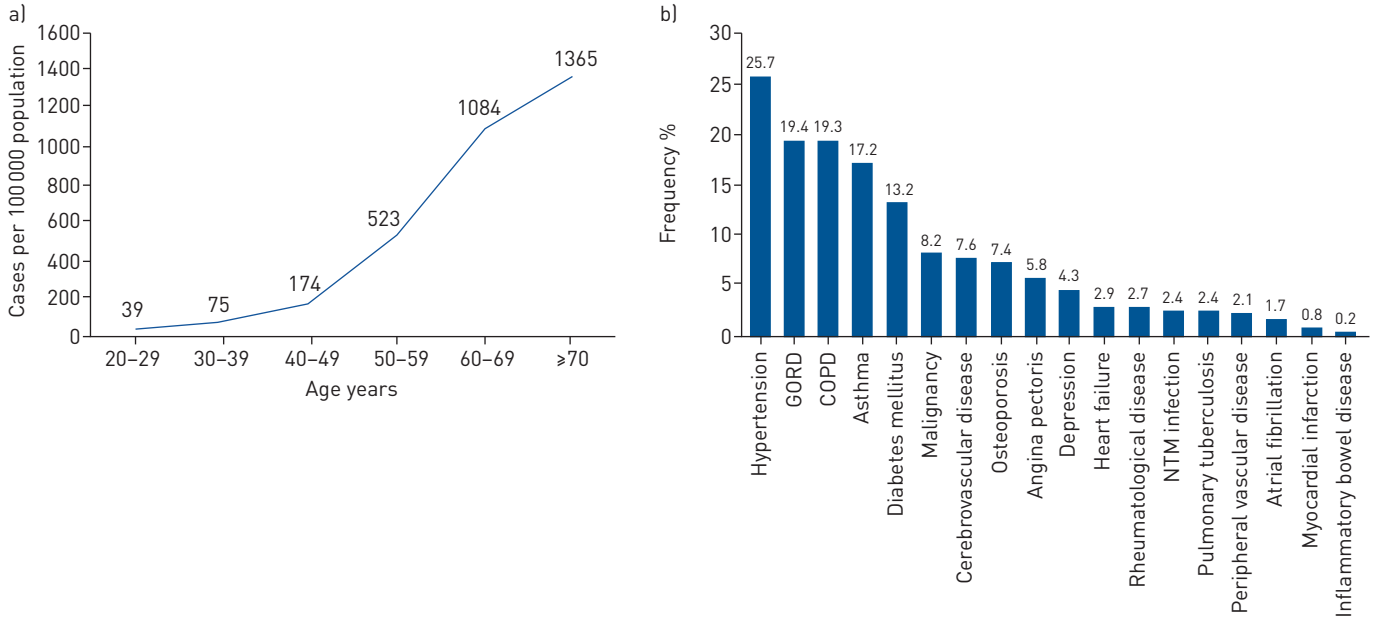

FIGURE 1 a) Prevalence of bronchiectasis based on age group in South Korea. b) Frequency of bronchiectasis-associated comorbidities. GORD: gastro-oesophageal reflux disease; COPD: chronic obstructive pulmonary disease; NTM: nontuberculous mycobacterium. The prevalence of COPD was calculated among the subjects ⩾40 years of age. Bronchiectasis-associated comorbidities were defined using ICD-10 diagnosis codes (see main text).

The average healthcare cost per person per year was highest in bronchiectasis patients with malignancy (EUR 4190), followed by myocardial infarction (EUR 2142), cerebrovascular disease (EUR 1515) and tuberculosis (EUR 1055). The average number of emergency room visits per person per year was highest in bronchiectasis patients with myocardial infarction (0.27), followed by those with malignancy (0.22), cerebrovascular disease (0.12) or congestive heart failure (0.10). The average number of admissions per person per year was highest in bronchiectasis patients with malignancy (1.07), myocardial infarction (0.39), pneumonia (0.37) and tuberculosis (0.34). The common causes of in-hospital death included malignancy (13.7%), pneumonia (4.0%), cerebrovascular disease (3.3%) and COPD (3.3%).

The reason for the relatively lower prevalence of cardiovascular diseases in South Korean bronchiectasis patients compared with Western bronchiectasis patients remains unclear. Differences in ethnicity, socioeconomic status, lifestyle and cardiovascular disease-related comorbidity profiles (*e.g.* the lower COPD prevalence in this study) might explain this phenomenon. However, it should be emphasised that the cardiovascular disease burden in this study was substantial; specifically, it was associated with increased healthcare costs and was one of the leading causes of emergency room visits, hospitalisation and mortality. Thus, the management of cardiovascular conditions should be emphasised despite their relatively lower prevalence in South Korean bronchiectasis patients than in Western patients.

The present study had several limitations that should be acknowledged. First, the prevalence of subjects with bronchiectasis was estimated using ICD-10 diagnosis codes from health insurance claims data; therefore, the data are subject to potential errors. Secondly, we could not estimate overall mortality in patients with bronchiectasis, since the HIRA-NPS database only provides in-hospital mortality data. Thirdly, the prevalence of pulmonary comorbidities such as COPD or asthma might have been underestimated if attending physicians failed to list diagnostic codes for concomitant pulmonary comorbidities. Fourthly, medical history data were not available in the South Korean HIRA-NPS database for pulmonary tuberculosis, although it is an important cause of bronchiectasis in the Asian population.

In conclusion, the estimated prevalence of bronchiectasis is 464 cases per 100 000 population in South Korea, implying that bronchiectasis is not a rare disease. The common comorbidities were COPD, asthma, hypertension, gastro-oesophageal reflux disease and diabetes mellitus. The prevalence of cardiovascular diseases was relatively low. A well-designed prospective cohort study, such as the collaboration of the recently organised Korean Multicentre Bronchiectasis Audit and Research Collaboration (KMBARC), Asian Obstructive Lung Disease Bronchiectasis (ANOLD-BE), and European Multicentre Bronchiectasis Audit and Research Collaboration (EMBARC), is necessary to determine ethnic differences in the epidemiology of bronchiectasis.

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