Validation of obesity coding among newly-treated nonvalvular atrial fibrillation patients using an integrated electronic medical record and claims database

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Topic(s):
Cardiovascular Epidemiology

Citation:
The funding for the research project was provided by Pfizer Inc.

Background
Obesity is prevalent among patients with non-valvular atrial fibrillation (NVAF). Administrative claims databases offer the opportunity to evaluate obesity and morbid obesity in this patient population. However, there is limited information about the use and accuracy of diagnosis codes in claims data to identify obesity and morbid obesity among patients with NVAF.

Purpose
To evaluate the use and accuracy of diagnosis codes in claims data for identifying obesity and morbid obesity among newly-treated NVAF patients using a large geographically-diverse US database.

Methods
This retrospective study used Optum’s de-identified integrated electronic medical record (EMR) and claims database (1/1/2013-3/31/2018). Adult (=18 years) patients with =1 claim for an oral anticoagulant (OAC) from 1/1/2014-9/30/2017 were identified (treatment date as index date). Patients were required to have =1 atrial fibrillation diagnosis prior to the index date and were excluded if they had evidence of OAC use or valvular disease during the 12 months prior to the index date. Patients were required to have =12 months of continuous enrollment prior to and =6 months after the index date as well as =1 BMI measurement in the EMR data during the 6 months before or after the index date. Based on the World Health Organization’s definition, patients were classified as obese if their BMI was ≥30 kg/m2 and morbidly obese if their BMI was ≥40 kg/m2. Sensitivity, specificity, and positive predictive value (PPV) were calculated to assess the accuracy of diagnosis codes for obesity (ICD-9 diagnosis codes: 278.00, 278.01, 278.03, V85.30-V85.39, V85.41-V85.45; ICD-10 diagnosis codes: E66.01, E66.09, E66.2, E66.8, E66.9, Z68.30-Z68.39, Z68.41-Z68.45) and morbid obesity (ICD-9 diagnosis codes: 278.01, V85.41-V85.45; ICD-10 diagnosis codes: E66.01, E66.2, Z68.41-Z68.45) commonly used in claims database research.

Results
There were 7,501 patients included in the newly-treated NVAF cohort (mean±SD age=72.4 [±10.7] years, 55% male, 90% white, and mean±SD Quan-Charlson Comorbidity Index =2.10[±2.08]). Forty-six percent of these patients had BMI=30 kg/m2, of whom about one-quarter (11% of the overall sample) had a BMI=40 kg/m2. In contrast, 25% and 10% of patients had a diagnosis code for obesity or morbid obesity, respectively. For obesity diagnosis codes, sensitivity, specificity, and PPV were 49% (95% CI: 47%-50%), 95% (95%-96%), and 90% (88%-91%), respectively. For morbid obesity diagnosis codes, sensitivity, specificity, and PPV were 63% (59%-63%), 96% (96%-97%) and 68% (64%-71%), respectively.
Conclusion
Among newly-treated NVAF patients, obesity diagnosis codes in the claims database had high PPV, high specificity, and modest sensitivity. Morbid obesity diagnosis codes also had high specificity but modest PPV and sensitivity. These findings have implications for both case selection and control for obesity as a confounder in observational studies using a claims database.