Diagnosing Barrett's esophagus: reliability of clinical and pathologic diagnoses

Douglas A. Corley, MD, PhD, Ai Kubo, PhD, Jolanda DeBoer, MBA, Gregory J. Rumore, MD

Oakland, California, USA

Background: The accuracy of a Barrett's esophagus diagnosis is not well studied.

Objective: Our purpose was to evaluate the accuracy of a clinical Barrett's esophagus diagnosis and the reproducibility of an esophageal intestinal metaplasia diagnosis.

Methods: All patients with a Barrett's esophagus diagnosis between 1994 and 2005 were identified by use of International Classification of Disease (ICD) and Systematized Nomenclature of Medicine (SNOMED) coding. Subsets received manual record review (endoscopy/pathology reports), slide review by a referral pathologist (interrater reliability), and 2 blinded reviews by the same pathologist (intrarater reliability).

Setting: An integrated health services delivery system.

Main Outcome Measurements: Accuracy of electronic clinical diagnosis and reproducibility of esophageal intestinal metaplasia diagnosis.

Results: A total of 2470 patients coded with Barrett's esophagus underwent record review; a subgroup (616) received manual pathology slide review. Review confirmed a Barrett's esophagus diagnosis for 1533 (61.9%) patients: 437 of 798 subjects (54.8%) with a SNOMED diagnosis alone, 153 of 671 subjects (26.8%) with an ICD diagnosis alone, and 940 of 1101 subjects (85%) who had both a SNOMED and an ICD diagnosis. The same metaplasia diagnosis occurred with 88.3% of subjects (original vs referral pathologist, interrater reliability; $\kappa = .42$, 95% CI, 0.34-0.48). The referral pathologist made the same metaplasia diagnosis twice for a given patient for 88.6% of subjects (intrarater reliability, 2 reviews by same pathologist; $\kappa = 0.65$, 95% CI, 0.35-0.93).

Limitations: The accuracy of a Barrett's esophagus diagnosis likely represents the minimum number, given the strict criteria.

Conclusions: A community pathologist's diagnosis of esophageal intestinal metaplasia is likely to be confirmed by a referral pathologist. Electronic diagnoses of Barrett's esophagus overestimate the prevalence, although they are usually confirmed in patients with both a SNOMED and ICD diagnosis of Barrett's esophagus. (Gastrointest Endosc 2009;69:1004-10.)

The importance of accurate methods for the assignment of clinical diagnoses cannot be overemphasized; the management of patient conditions, the identification of patients for clinical research, health care financial compensation, and the assignment of human resources all depend at least partially on recorded diagnoses. Pathology classifications are required for many clinical diagnoses, yet few studies examine whether these assignments are reproducible for many GI diseases. Similarly, electronic diagnoses, such as those found in large administrative data sets (eg, health plans and Veterans Affairs hospitals), the U.S. Medicare program, and endoscopic databases, provide abundant opportunities for identifying patients for clinical care (eg, recalling patients who need cancer screening or surveillance for high-risk conditions) and for research studies, but little is known about the overall accuracy of many common GI diagnoses, including

Abbreviations: H&E, hematoxylin and eosin; ICD, International Classification of Disease; KPNC, Kaiser Permanente, Northern California; SNOMED, systematized nomenclature of medicine coding.

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Barrett's esophagus. The validation of pathologic and clinical diagnoses for this condition would inform clinicians, researchers, and policy makers whether these codes can be used alone for decision making or whether additional verification is required.

Prior studies have evaluated interobserver variation for the diagnosis of dysplasia in Barrett's esophagus[1-3]; however, a literature search by our group did not identify any studies that directly evaluated the accuracy of a coded diagnosis of Barrett's esophagus itself. Similarly, another search identified only a single study of 5 patients that evaluated the reproducibility of a histologic diagnosis of esophageal intestinal metaplasia (using search terms for Barrett's esophagus combined with the terms classification, interobserver, or intraobserver),[4] although the presence of intestinal metaplasia is required for a Barrett's esophagus diagnosis by most criteria.[4-6]

We thus evaluated the accuracy of diagnostic codes for Barrett's esophagus by contrasting codes from electronic databases with diagnoses from a detailed medical record review. We also evaluated the reproducibility of a pathologic diagnosis of Barrett's esophagus (defined here as the presence of esophageal intestinal metaplasia) between 2 pathologists and between a single pathologist on 2 different occasions.

Capsule Summary

What is already known on this topic

- Validation of both the pathologic and clinical diagnosis of Barrett's esophagus (BE) would inform clinicians, researchers, and policy makers whether electronic diagnostic codes can be used alone for decision making.

What this study adds to our knowledge

- In a record review of 2470 patients coded for BE, electronic diagnosis overestimated the prevalence of the disease.

METHODS

We conducted a study within the Kaiser Permanente, Northern California (KPNC) population, an integrated health services delivery organization. KPNC contains approximately 3.3 million members (approximately one third of the insured population in the region). Research within this setting encompasses practice patterns across a broad geographic area that includes 17 medical centers plus additional free-standing offices and endoscopy units; its membership demographics closely approximate the underlying census population of Northern California.[7] We identified all persons who received a Barrett's esophagus diagnosis between 1994 and 2005 according to the *International Classification of Disease,* 9th revision (ICD-9), codes 530.2 and 530.85, which at KPNC were uniquely coded on reporting sheets as ''Barrett's esophagitis'' at the time of an outpatient visit, and the Systematized Nomenclature of Medicine (SNOMED) code M73330 (Barrett's esophagus). SNOMED codes are commonly used by pathology departments for assigning specific diagnoses. This search identified 5953 persons with an electronic diagnosis of Barrett's esophagus: 1803 (30.3%) with only a SNOMED diagnosis, 1630 (27.4%) with only an ICD-9 diagnosis, and 2520 (42.3%) with both a SNOMED and an ICD-9 diagnosis. From the written and electronic medical records, we retrieved EGD and relevant pathology reports from a subset of 2470 subjects (not the entire group due to resource limitations) for manual verification of the Barrett's esophagus diagnosis. These included all subjects with a new electronic diagnosis of Barrett's esophagus between October 2002 and September 2005 (these patients were then used as part of a case-control study) and serial subjects (both new and prevalent diagnoses) extending before and after these dates within funding limitations. Reviews were performed by a board-certified gastroenterologist (D. A. C.) for 1221 subjects and by professional medical record data abstractors (trained by the gastroenterologist and approximately a 10% subset reviewed by the gastroenterologist) for 1249 subjects; the verification rates for both groups were comparable and are presented together. The reviewer recorded whether each subject met the criteria for diagnosis, and if they did not meet the diagnosis why they were excluded or whether there was insufficient information to make an assignment. Subjects were confirmed to have a diagnosis of Barrett's esophagus if the endoscopist clearly described a visible length of columnar-type epithelium proximal to the gastroesophageal junction/gastric folds, this area was biopsied, and the pathologist reported specialized intestinal epithelium.[5] A diagnosis was not confirmed if the endoscopy did not clearly describe the above findings, no biopsy was taken, the pathology reports did not describe intestinal metaplasia, or if, to minimize misclassification, the report described biopsy specimens only from an irregular squamocolumnar junction (ie, an ''irregular z-line'').

We evaluated the reproducibility of pathologic interpretations between 2 pathologists (interrater reliability) by retrieving the pathology slides for a subset of 616 subjects (approximately 91% of those attempted). The esophageal biopsy slides were from serially diagnosed persons with a new electronic diagnosis of Barrett's esophagus between October 2002 and September 2005. Among persons with endoscopic findings consistent with Barrett's esophagus, all persons with a community pathologist's written diagnosis of intestinal metaplasia and a subset of patients with an initial diagnosis of nonintestinal metaplasia were included. Selection of the latter was at regular time intervals but not truly random given the effort to balance subjects with and