Practice variation in PEG tube placement: trends and predictors among providers in the United States

Lukejohn W. Day, MD,[1] Michelle Nazareth, MD,[2] Justin L. Sewell, MD, MPH,[1] J. Lucas Williams, MPH,[3] David A. Lieberman, MD[3]

San Francisco, California, USA

Background: Enteral access placement is performed among a variety of providers and specialties, yet there is a dearth of literature on trends and factors related to enteral access placement in the United States.

Objective: To examine trends in the incidence of enteral access procedures performed by gastroenterologists in the United States.

Design: Retrospective review of upper endoscopic procedures that involved PEG tube placement between 2000 and 2010.

Setting: Endoscopy sites participating in the Clinical Outcomes Research Initiative (CORI).

Patients: Patients undergoing upper endoscopy.

Interventions: PEG tube placement.

Main Outcome Measurements: Number of PEG tubes placed.

Results: Overall PEG tube placement by a provider from 2000 to 2010 was 1.7% (number of PEG tubes performed/number of upper endoscopies performed), with the majority of them being performed by gastroenterologists. Very young and very old, non-white racial background (Hispanic: odds ratio [OR] 1.21; 95% CI, 1.13-1.28; black: OR 2.24; 95% CI, 2.12-2.36), and men (OR 1.44; 95% CI, 1.39-1.50) were patient characteristics associated with greater PEG tube placement. In terms of practice setting, PEG tube placement occurred more frequently in community and/or health maintenance organization environments and on the East Coast. With respect to provider characteristics, male providers were less likely than female providers to perform a PEG tube insertion (OR 0.67; 95% CI, 0.64-0.71), and there was a trend that as providers were further out of medical school they were less likely to perform a PEG tube procedure. Interestingly, surgeons (OR 6.69; 95% CI, 6.18-7.24) and other providers (non-pediatric/non-general practice) (OR 3.22; 95% CI, 2.63-3.94) were more likely to perform PEG tube procedures than were gastroenterologists.

Limitations: Participation in CORI is voluntary and may not capture data on non-gastroenterologist providers.

Conclusion: Significant practice variation was noted in PEG tube placement in the United States with respect to patient and provider characteristics, geographic region, and endoscopy settings. (Gastrointest Endosc 2015;82:37-45.)

(footnotes appear on last page of article)

Enteral access procedures (typically in the form of PEG) allow the short-term and long-term option of providing nutrients and medications into the GI tract for patients who cannot maintain adequate oral intake.[1]

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Such procedures are performed most frequently by gastroenterologists[2] but can be performed by other providers such as surgeons and interventional radiologists,[3] and training in enteral access placement is integral to the education of residents and fellows in all of these specialties.[4]

There is a lack of current data on enteral access placement, and in particular PEG tube placement, in the United States, with significant gaps in the literature. To date, only one study has examined trends with respect to enteral access placement. The National Trends in Gastrointestinal

Access Procedures Database reported that enteral access placement increased by 1.4% from 1997 to 2000 for Medicare beneficiaries. In this study, gastroenterologists most often performed these procedures (48.6%), followed by surgeons (25.1%) and radiologists (7.4%), but several interesting temporal trends were noted. Over the study time period, enteral access procedures performed by radiologists dramatically increased by 29.6%, whereas enteral access procedures performed by gastroenterologists increased minimally by 6.9%, with a decrease in surgeons performing these procedures by 4.9%.[2] To date, this limited, decades-old study is the only one focusing on the topic of enteral access placement in the United States with no subsequent interval follow-up conducted. Given that the U.S. population is living longer, with more chronic medical problems that may necessitate the need for PEG tube placement, more current data on the incidence and associated predictors of this procedure clearly are needed.

Consequently, our primary study aim was to examine trends in the incidence of enteral access procedures (specifically PEG tubes) performed by gastroenterologists in the United States over the past 11 years (2000-2010). Our secondary aim was to assess provider, endoscopy setting, and patient-related factors associated with PEG tube placement in the United States.

METHODS

Study design

We conducted a retrospective electronic medical record review of upper endoscopic procedures that involved PEG tube placement between 2000 and 2010 in the United States by using the National Endoscopic Database (NED).

Data source

Data for the study were abstracted from the Clinical Outcomes Research Initiative (CORI) by using NED. CORI was developed to study the outcomes of GI endoscopic procedures across the United States.[5] The CORI project began in 1995 under the auspices of the American Society for Gastrointestinal Endoscopy. Physicians participating in the CORI consortium produce GI endoscopy reports by using a specialized electronic health record. Data from the reports are automatically sent electronically to a central data repository, where they are pooled with data from other consortium participants in the NED. The data transmitted from the local site to the NED do not contain most patient or provider identifiers and qualify as a limited data set under 45 Code of Federal Regulations §164.514(e)(2). The data are then tested for completeness and accuracy and merged with data from all the other participating practices and stored in the NED. Practice sites include hospitals, private practices, ambulatory care centers, universities, and veterans affairs (VA) hospitals. The NED contains close to 2.7 million reports. Captured data include procedure type, patient and endoscopist demographics, procedure indication, sedation used during the procedure, pathology, and adverse events. In 2011, the NED received over 134,275 reports from 70 practice sites in 24 states, with approximately 400 participating endoscopists.

Data abstraction

Clinical and demographic data for patients and providers as well as procedure and/or endoscopy site data were abstracted from the electronic medical records in the NED for all patients who underwent upper endoscopy from 2000 to 2010. For the study, 4 key data groups were abstracted. First, patient data abstracted included age, sex, and race. Second, procedure data were recorded and included procedure indication procedure setting (inpatient, outpatient, emergency), and GI fellow involvement in procedures. Third, endoscopy site data included geographic location and endoscopy site type (academic, community/health maintenance organization [HMO], VA/military). Last, provider sex, race, specialty (gastroenterology, pediatric gastroenterology, surgery, general practice/pediatrics, other), and years since graduating from medical school were documented. Upper endoscopic procedures were stratified into 2 groups, based on whether a patient had received a PEG tube or not.

Statistical analysis

Baseline demographics on patients, providers, procedure, and endoscopy sites were calculated as means for continuous data and proportions for nominal data. The primary outcome variable for the study was PEG tube placement. For analyses involving the incidence calculation and regression analysis for PEG tube placement, only data from stable endoscopy sites were used (eg, endoscopy sites that contributed upper endoscopy data to the study cohort for both years 2000 and 2010). Incidence calculations represented the number of PEG tube procedures performed by a specific type of provider/total number of upper endoscopies performed by a specific type of provider during a specified time period. The incidence rate and annual percentage change of PEG tube procedures performed in the United States from 2000 to 2010 were calculated. These results were then stratified by provider type, endoscopy site, geographic region, fellow participation, and years since provider graduated from medical school.

We then attempted to identify predictors that may be associated with PEG tube placement in the United States. First, a univariate analysis was performed to determine predictors that influenced the placement of a PEG tube from 2000 to 2010. Individual predictors assessed included patient, procedure, endoscopy site, and provider characteristics. Patient characteristics that were analyzed included age, sex, and race. Procedure indications of anorexia, early satiety, feeding refusal, malabsorption, nausea and/or

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