Enteral Access Procedures: An 18-Year Analysis of Changing Patterns of Utilization in the Medicare Population

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ABSTRACT

Purpose: To evaluate national trends in enteral access and maintenance procedures for Medicare beneficiaries with regard to utilization rates, specialty group roles, and sites of service.

Materials and Methods: Using Medicare Physician Supplier Procedure Summary Master Files for the period 1994–2012, claims for gastrostomy and gastrojejunostomy access and maintenance procedures were identified. Longitudinal utilization rates were calculated using annual enrollment data. Procedure volumes by site of service and medical specialty were analyzed.

Results: Between 1994 and 2012, de novo enteral access procedure utilization decreased from 61.6 to 42.3 per 10,000 Medicare Part B beneficiaries (−31%). Gastroenterologists and surgeons performed > 80% of procedures (unchanged over study period) with 97% in the hospital setting. Over time, relative use of an endoscopic approach (62% in 1994; 82% in 2012) increased as percutaneous (21% to 12%) and open surgical (17% to 5%) procedures declined. Existing enteral access maintenance services increased 29% (from 20.1 to 25.9 per 10,000 beneficiaries). Radiologists (from 13% to 31%) surpassed gastroenterologists (from 36% to 21%) as dominant providers of maintenance procedures. Emergency physicians (from 8% to 23%) and nonphysician providers (from 0% to 6%) have seen rapid growth as maintenance services providers as these services have transitioned increasingly to the emergency department setting (from 18% to 32%).

Conclusions: Among Medicare beneficiaries, de novo enteral access procedures have declined in the last 2 decades as existing access maintenance services have increased. The latter are increasingly performed by radiologists, emergency physicians, and nonphysician providers.

ABBREVIATIONS

CMS = Centers for Medicare and Medicaid Services, CPT = Current Procedural Terminology, PSPS = Physician Supplier Procedure Summary

Prior studies on enteral access procedures have suggested an overall increase in the usage and practice variation of these procedures (1,2). The data from these studies mirror findings from an analysis of Medicare beneficiaries during the period 1997–2000, the last time enteral access placement and maintenance procedures were systematically studied from a large, national database for all provider specialties (3). Since this time, shifts in techniques, utilization, and specialty provider roles in Medicare beneficiaries have been observed for other types of procedures amenable to minimally invasive techniques (4,5). However, no similar analysis of enteral access procedures and their providers has been performed more recently.

Nutritional needs requiring enteral access are expected to increase as modern medicine has improved the ability to treat chronic medical illnesses, particularly in the

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context of a rapidly expanding aging population in the United States (1,6). However, there are no data on how multiple providers in variable practice environments are providing care for patients requiring enteral nutrition and access maintenance (7,8). The purpose of this study is to evaluate national trends in enteral access procedures for Medicare Part B beneficiaries with regard to utilization rates, specialty group roles, and sites of service. These data should help radiologists and other providers work with health systems to develop integrated practice units and alternative payment models for cost-effective care of conditions requiring enteral access (9–11).

MATERIALS AND METHODS

This study used aggregated Medicare claims data from Centers for Medicare and Medicaid Services (CMS) designated public use files and was granted exempt status by the institutional review board of the American College of Radiology. The study used claims data from the CMS Medicare Physician Supplier Procedure Summary (PSPS) Master Files for the years 1994–2012. The PSPS database contains retrospectively compiled Part B Medicare billing claims submitted by physicians and other providers in the United States. Data fields include Current Procedural Terminology (CPT) codes, provider specialty, site of service, and number of procedures for which claims were submitted and paid. This methodology for tracking national trends is based on previously described models for studying utilization of imaging-guided procedures (12,13).

Data entries were independently analyzed by self-designated health care provider type and place of service (**Table 1**). Some categories are self-descriptive and contain only claims from 1 specialty code (eg, emergency medicine or gastroenterology). The "Other" location type includes sites such as psychiatric facilities, military centers, rural health clinics, and other independent facilities not classified within the other groups listed in **Table 1**.

CPT codes are available and categorized for enteral access by de novo placement and existing access maintenance procedures. CPT codes for enteral access procedures were substantially changed in 2008 as a result of the creation of new (and revision of old) CPT codes in an effort to increase the clarity of and details within service reports. Longitudinal service trends were evaluated by linking together groups of newer CPT codes (implemented in 2008) to older CPT codes (**Table 2**) by 2 radiologists with > 2 decades of combined national experience in CPT code development (R.D., C.H.).

Procedural utilization was calculated by dividing the total claims frequency by Medicare Part B enrollment data management, and initial analyses were performed using SAS version 9.4 (SAS Institute Inc, Cary, North Carolina). Additional analyses were performed using Excel 2010 (Microsoft Corporation, Redmond, Washington).

Table 1. Categories by Provider and Location Type

By provider types
Radiology
Diagnostic radiology
Interventional radiology
Nuclear medicine
Surgery
Cardiothoracic surgery
Colorectal surgery
General surgery
Neurosurgery
Obstetrics/gynecology
Orthopedic surgery
Otolaryngology
Plastic surgery
Surgical oncology
Urology
Vascular surgery
Primary care
Family practice
Internal medicine
Pediatric medicine
Geriatric medicine
Nonphysician providers
Nurse practitioner
Physician assistant
Certified clinical nurse specialist
Emergency medicine
Gastroenterology
By location types
Private office (place of service code 11)
Ambulatory surgical center (place of service code 24)
Hospital-based outpatient center (place of service code 22)
Inpatient (place of service code 21)
Emergency department (place of service code 23)
Skilled nursing facility (place of service code 31)
Rehabilitation facility (place of service codes 61, 62)
Other

RESULTS

Overall Utilization

During the years 1994–2012, de novo enteral access procedures decreased from 199,088 to 139,535 (−29.9%) per year for Medicare Part B beneficiaries. However, corresponding procedures for maintenance (defined as either access repair or replacement) increased from 64,843 to 85,315 (+31.6%) per year. During this time period, the number of enrollees in the Part B fee-for-service program remained relatively unchanged from 32,305,000 beneficiaries in 1994 to 32,974,000 beneficiaries in 2012 (14). After adjustment for annual changes in enrollment, de novo enteral access decreased from 61.6