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Feeding Tubes and Health Costs Post Insertion In Nursing Home Residents With Advanced Dementia

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Abstract

Context—The best evidence suggests feeding tubes are ineffective in persons with advanced dementia. Little is known about their health care costs.

Objectives—To estimate Medicare costs attributable to inpatient care among nursing home (NH) residents with advanced dementia during the year following the placement of a percutaneous endoscopic gastrostomy (PEG) tube during an index hospitalization.

Methods—Medicare claims (1999–2009) and Minimum Data Set data (1999–2009) were used to estimate Medicare costs attributable to inpatient care among NH residents with advanced dementia during the year following placement of a PEG tube and compared with those who did not get a PEG tube. The study used a 3:1 propensity-matched cohort design.

Results—Matched residents with (*n*=1924, 68.9% female, 28.8% African American, average age 83.1 years) and without (weighted *n* = 1924, unique *n* = 4337) PEG insertion showed comparable sociodemographic characteristics, similar rates of feeding tube risk factors, and similar mortality (51.9% 180-day mortality among those with a feeding tube vs. 49.8% among those without a feeding tube, *P*=0.11). One-year hospital costs were $2224 higher in NH residents with a feeding tube ($10,191 vs. $7,967, 95% CI of difference = $1514, $2933), with those with a feeding tube likely to spend more time in an intensive care unit (1.92 days vs. 1.29 days, 95% CI of difference = 0.34, 0.92 days).

Conclusion—In an analysis controlling for selection bias, PEG tube insertion is associated with a small but significant increase in annual inpatient health care costs, as well as in hospital and intensive care unit days, post insertion.

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Disclosures

The authors declare no conflicts of interest.

Keywords

Feeding tubes; advanced dementia; health care costs

Introduction

Advanced dementia is characterized by a progressive decline in various cognitive and functional abilities. About 86% of those dying from dementia develop eating problems, requiring families to make stressful decisions regarding feeding tube insertion (1). Currently, there is a striking variation in feeding tube insertion practices across the U.S. (2, 3). The best available evidence suggests lack of efficacy of percutaneous endoscopic gastrostomy (PEG) feeding tubes in prolonging survival or preventing aspiration pneumonia among persons with advanced dementia (4–6). A recent study suggests that PEG feeding tubes may actually be causing potential harm by increasing risk of pressure ulcers (7).

Given this evidence, surprisingly few studies have quantified health care costs of feeding tube insertion and subsequent hospitalizations. One study conservatively estimated the annual cost of PEG tube feeding as $31,832. However, the study included persons without advanced dementia (8). Another study compared six-month costs of tube feeding by comparing a small number of nursing home (NH) residents with advanced dementia, for whom either tube feeding or hand feeding was utilized (9). Neither of these studies accounted for the potential for selection bias.

The goal of our study was to describe the use and Medicare costs of inpatient acute care among NH residents with advanced dementia during the year following the placement of a PEG tube during an index hospitalization. Using a propensity-matched cohort design, we compared the utilization and cost incurred by these patients to those who did not undergo PEG tube insertion during a similar index hospitalization

Methods

Sample

The sample was drawn from a national repository of the Minimum Data Set (MDS), merged with claims from Medicare Parts A and B from 1999 to 2009. The sample comprised nursing home residents with advanced cognitive impairment, as indicated by a recent transition from an MDS Cognitive Performance Score (CPS) of 4 or 5 to 6 based on a quarterly and/or annual MDS assessment. We included those NH residents who received and did not receive PEG feeding tube insertion during an index hospitalization within one year of that baseline CPS score and survived to hospital discharge.

Study Variables

Using Medicare claims data, we examined four outcomes over the subsequent year following the index hospitalization: inpatient costs, number of hospitalizations, number of hospital days, and number of days in an intensive care unit (ICU).

Statistical Analysis

The main independent variable was whether or not the NH resident with advanced dementia had a PEG feeding tube inserted during the index hospitalization.We used a 3:1 propensity-score match with replacement to help address the potential selection bias of those who chose to insert or forgo PEG feeding tubes. For each hospitalization following conversion to CPS 6 (baseline), propensity scores were calculated with logistic regression models. Regression covariates were chosen based on former studies' findings on factors that predict likelihood of receiving PEG feeding tubes (2, 10, 11).

Results

Sample Description

A total of 19,350 NH residents experienced an index hospitalization after conversion to a CPS of 6. Of these, 1924 persons underwent PEG feeding tube insertion during the hospitalization. A 3:1 propensity-score match with replacement yielded 4337 unique NH residents without PEG feeding tube insertion. Table 1 summarizes the baseline characteristics of NH residents with and without feeding tube insertion, providing evidence of a successful propensity match in that those with and without a feeding tube were similar in sociodemographic characteristics, medical conditions, advance care planning, and risk factors for feeding tube insertion. The activities of daily living (ADL) score was higher for those with feeding tube insertion (26.5 vs. 26.3, $P = 0.003$); however, this difference of 0.2 was along a 0 to 28 ADL score scale. The 180-day mortality was similar between the two cohorts (51.9% with PEG vs. 49.8% without PEG, $P = 0.11$); 30-day mortality was slightly higher among those without feeding tube insertion (21.6 vs. 19.4, $P = 0.03$). These results suggest a successful propensity score match.

Inpatient Health Care Cost and Utilization Associated With PEG Feeding Tube Insertion

NH residents with PEG tube insertion showed an increase in one-year inpatient costs of $2224 in comparison with their counterparts without PEG tube insertion ($10,191 vs. $7,967, 95% CI of difference = $1514, $2933) (Table 2). Feeding tube insertion also was associated with 0.05 more hospitalizations (1.02 vs. 0.97, 95% CI of difference = −0.01, 0.11), 1.71 more hospital days (8.73 days vs. 7.02 days, 95% CI of difference = 1.06, 2.36 days), and 0.63 more ICU days (1.92 days vs. 1.29 days, 95% CI of difference = 0.34, 0.92 days).

Health Care Utilization in Decedent Subsample

Table 2 also reports hospital cost and utilization among the 1261 unique persons with feeding tube insertion who died within one year of hospitalization. Differences in cost and in utilization between the cohorts with and without PEG insertion were greater in this subsample. NH residents with feeding tube insertion incurred one-year inpatient costs of $3037, greater than those without feeding tube insertion ($10,607 vs. $7570, 95% CI of difference = $2161, $2913). In addition, those with a feeding tube insertion experienced 0.10 more hospitalizations (1.01 vs. 0.91, 95% CI of difference = 0.03, 0.18), 2.29 more hospital

days (9.08 days vs. 6.79 days, 95% CI of difference = 1.45, 3.13 days), and 1.08 more ICU days (2.27 days vs. 1.19 days, 95% CI of difference = 0.69, 1.47 days).

Discussion

In the last three months of life, 40.7% of persons with advanced dementia undergo at least one burdensome intervention, including feeding tube insertion (1). Numerous studies concur that PEG feeding tubes are ineffective in prolonging survival (5–7). In fact, feeding tubes may potentially be harming patients (8). Given these results, increased health care utilization and cost incurred to Medicare by PEG feeding tube insertion among persons with advanced dementia are especially concerning. Controlling for potential selection bias, our results suggest that PEG feeding tube insertion in advanced cognitive impairment is associated with greater health care costs and hospital utilization. These differences were more pronounced among those who died within one year following feeding tube insertion (12, 13).

To date, there have been a small number of studies that examine health care utilization and costs for PEG insertion in advanced cognitive impairment. In a study by Mitchell and colleagues, tube feeding for NH residents with advanced dementia was found to incur a greater cost to Medicare than hand feeding, largely because of costs related to initial tube insertion and emergency room visits or hospitalizations that followed complications (9). However, this study did not account for selection bias. In another study, Givens and colleagues found feeding tuberelated complications were the most important reasons for transfer of advance dementia patients to the emergency room who were not admitted to the hospital (12) and a feeding tube was associated with greater Medicare costs. Our study used a propensity-matched cohort design to control for potential selection bias among NH residents choosing to receive or forgo PEG feeding tubes. In comparison with their non-intubated counterparts, those with PEG insertion accrued $2224 more in 2009 dollars for 12-month inpatient costs following index hospitalization.

Certain limitations should be considered in the interpretation of the study results. Our study was limited to fee-for-service Medicare beneficiaries. Other than presence of an advance directive and orders to limit life-sustaining treatment, information on patient preferences was lacking.

Given the lack of evidence for efficacy of feeding tubes in persons with advanced dementia, we found a small but significant increase in health care cost and utilization with feeding tube insertion. This finding persisted after controlling for selection bias. In a 2003 study, Shega and colleagues showed that many physicians hold inaccurate beliefs regarding the risks and benefits of PEG feeding tube insertion in advanced dementia. Of the 416 surveyed physicians, 74.6% believed PEG to reduce aspiration pneumonia; 74.6% believed PEG to improve pressure ulcers; and 61.4% believed PEG to have survival benefits (14). Our study's results add a strong financial incentive to ensure that physicians are knowledgeable about the indications and risks of PEG feeding tube insertion among older adults with advanced dementia.

Despite the suggested inefficacy of PEG tubes in prolonging survival in advanced dementia, there is nonetheless a striking geographic and hospital variation in feeding tube insertion practices across the U.S. (3, 11). This variation may in part be attributable to lack of effective and informed communication, as some studies raise important concerns regarding informed and shared decision making about feeding tube insertion in advanced dementia (10). Therefore, our study suggests potential financial savings for Medicare with the improvement of informed consent based on full discussion of the risks and benefits of PEG feeding tube insertion among NH residents with advanced cognitive impairment.

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Table 1

Baseline Characteristics of Hospitalized Nursing Home Residents With and Without Feeding Tubes Inserted During Hospitalization

Characteristic	Without Feeding Tube	With Feeding Tube	*P*-value
Weighted Persons, *n*	1924	1924	
Unique Persons, *n*	4337	1924	
Age, years, mean (SD)	83.2 (7.5)	83.1 (7.3)	0.38
Married	26.2	26.3	0.95
Female	69.5	68.9	0.61
Race			
White	61.2	60.6	0.67
African American	27.5	28.8	0.23
Hispanic	8.9	8.3	0.37
Completed High School	53.6	52.9	0.61
Advance Care Planning			
DPOA	21.4	22.1	0.53
Living Will	7.2	7.6	0.50
DNR Order	33.7	34.5	0.50
DNH Order	0.9	0.8	0.71
Orders to Forgo Artificial Hydration and Nutrition	3.2	3.2	0.91
Medical History			
Diabetes	26.8	27.2	0.73
CAD	12.1	12.8	0.38
CHF	15.2	14.7	0.62
COPD	10.2	10.1	0.91
Cancer	3.8	3.7	0.94
Hip Fracture	6.5	6.1	0.57
Risk Factors for Feeding Tube Insertion			
Weight Loss	26.5	26.4	0.90
Swallowing Problems	43.0	42.7	0.78
Chewing Problems	55.0	54.6	0.77
Mechanically Altered Diet	45.6	45.3	0.82
ADL Score, mean (SD)	26.3 (2.6)	26.5 (2.4)	0.003
Mortality			
30-day	21.6	19.4	0.03
180-day	49.8	51.9	0.11

DPOA = durable power of attorney; DNR = do not resuscitate; DNH = do not hospitalize; CAD = coronary artery disease; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ADL = activities of daily living.

Table 2

Health Care Cost and Utilization

One-Year Outcomes, Starting Post-Hospital Discharge	Without Feeding Tube	With Feeding Tube	Difference	95%C.I.
Entire Study Sample	*N* = 1924	*N* = 1924		
Inpatient Costs	$7967.21	$10,190.60	$2223.39	$1513.58, $2933.21
Hospitalizations	0.97	1.02	0.05	−0.01, 0.11
Hospital Days	7.02	8.73	1.71	1.06, 2.36
ICU Days	1.29	1.92	0.63	0.34, 0.92
Subsample of Those Who Died Within One Year of Hospital Discharge	*N* = 2736	*N* =1261		
Inpatient Costs	$7570.17	$10,607.16	$3036.99	$2161.03, $3912.95
Hospitalizations	0.91	1.01	0.10	0.03, 0.18
Hospital Days	6.79	9.08	2.29	1.45, 3.13
ICU Days	1.19	2.27	1.08	0.69, 1.47

ICU = intensive care unit.