LETTER TO THE EDITOR

Analysis of nationwide trends and outcomes of percutaneous endoscopic gastrostomy (PEG) tube placement in hospitalized patients with cancer over a 13-year period

Malnutrition in patients with cancer is a widely recognized problem. It has been shown to effect the response to surgery/chemotherapy and is associated with a poor performance status and a shortened survival.[1 2] The extent of malnutrition can be classified as mild, moderate and severe based on several validated clinical scores.[3] There is a lack of consensus and several societies have provided differing guidelines.[4] Hence, the decision to provide enteral feeding in patients with cancer is complex and is based on several factors. The most important factor that needs to be considered is the therapeutic benefit and improvement in quality of life (QOL) for patients with cancer. Mucosal toxicity associated with the treatment of head and neck malignancies has been shown to contribute to a significant loss of body weight. The nutritional benefit and improvement of QOL by providing enteral nutrition during chemotherapy or concurrent chemoradiation therapy for head and neck cancers have been studied.[5 6] Nutritional support by enteral feeding also appears to be associated with better outcomes in specific situations for aerodigestive malignancies.[7] In the presence of mechanical obstruction, percutaneous endoscopic gastrostomy (PEG) tube may also be used for venting purposes. Enteral feeding by PEG tube placement has been used in many non-cancer diseases such as stroke, vegetative state and amyotrophic lateral sclerosis.[8]

The outcomes of PEG tube placement in patients with cancer have not been studied and compared with patients without cancer over an extended period on a national basis. We have analyzed a database with nationwide representation for outcomes in these patients over a 13-year period and discovered interesting trends in prevalence, complications and mortality.

Data regarding patients with and without cancer who underwent PEG tube placement was extracted from the Nationwide Inpatient Sample (NIS) from 2000 to 2012 using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes. NIS variables were used to identify in-hospital mortality and discharge dispositions. We also examined the admissions related to complications from PEG tube placement. X^2 test and Wilcoxon rank test were used to compare categorical and continuous variables, respectively.

Hospitalized patients (2,325,603) underwent PEG tube placement from 2000 to 2012. Of these, 465 049 (20%) were patients with cancer. Of all cancer-related admissions, 0.86% received PEG tube placement. The rate of PEG tube placement in patients with cancer has gradually increased from 2000 to 2012 ($p=0.007$). The number of hospital admissions with PEG tube-related complications have increased from 6696 in 2000 to 9640 in 2012 ($p<0.001$). The trend of PEG tube placement and the rate of complications are shown in figure 1. The in-hospital mortality in patients without cancer who received PEG tube was higher than in those who did not get PEG tube (9.85% vs 8.05%, $p<0.001$). This difference was not noted in patients with cancer. Patients with cancer who underwent PEG tube placement were discharged to nursing homes less often than patients without cancer patients (47% vs 80%, $p<0.001$).

The rates of PEG tube placement in patients with cancer and related complications have both increased in the last decade. This is despite the increased cost (~10 times more) associated with PEG tube-based enteral feeding compared with nasogastric tube feeding.[9] Also, an improvement in QOL due to enteral feeding by PEG tube in patients with cancer has not been shown conclusively.[10 11] The administrative nature of the database makes it difficult to correlate the type and stage of the cancer, nutritional needs, and changes in QOL after PEG tube placement during the hospitalization. The in-hospital mortality of patients without cancer who received PEG tube placement was higher, and these patients were discharged to nursing homes more often than patients with cancer who received PEG tube placement. Overall, it appears that there is a generalized trend of increased use of enteral feeding by PEG tubes despite increased complications. While the trend lines in figure 1 are upward, it is evident that the rates have plateaued between 2007 and 2012. As more NIS data becomes available, especially between 2012 and 2016, this trend may start to decline. The limitations of the study include the administrative nature of the database. While it is possible that some of the PEG tube insertions are related to venting purposes, it is assumed that a majority of the PEG tubes are placed in the context of providing enteral

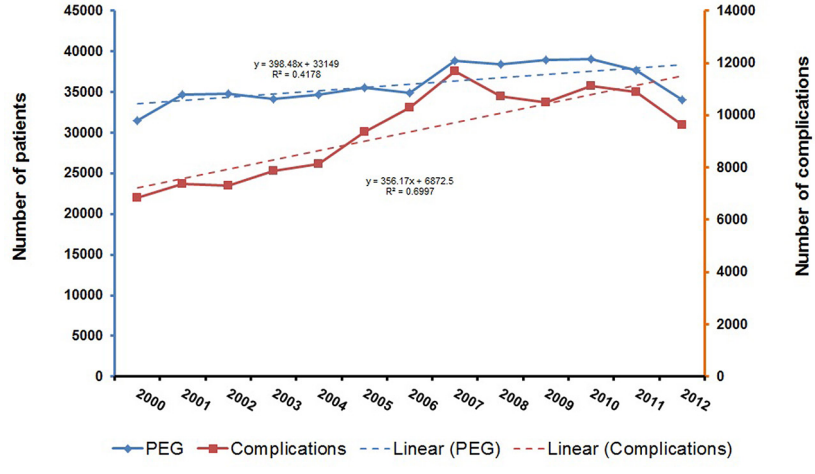

Figure 1 Trend in PEG tube placement and associated complications from 2000 to 2012.

nutrition. It will also be helpful to use the Elixhauser comorbidity index to control for comorbidities after specific ICD codes becomes available under the ICD 10 system in future studies.

In summary, our report is the first nationwide study spanning over 13 years which shows that the rate of PEG tube placement in patients with cancer has been increasing without any effect on mortality. Any improvement in the QOL must be weighed against the observed rise in rate of complications. Hence, the decision to place PEG tube in patients with cancer should be individualized taking into consideration the availability of support systems, prognosis of the underlying malignancy, effect of PEG tube-related complications, and the desired QOL.

Achuta Kumar Guddati,[1] Gagan Kumar,[2] Iuliana Shapira[1]

[1]Division of Hematology and Oncology, SUNY, Downstate Medical Center, Brooklyn, New York, USA
[2]Division of Critical Care, Northeast Georgia Health System, Gainesville, USA

Correspondence to
Dr Achuta Kumar Guddati, Division of Hematology and Oncology, SUNY Downstate Medical Center, 450, Clarkson Avenue, Brooklyn, NY 11203, USA; drgakumar@yahoo.com, kumar.guddati@downstate.edu

Contributors All the authors equally contributed to the data acquisition, data analysis and manuscript writing.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement The study is based on a publicly available Federal database.

To cite Guddati AK, Kumar G, Shapira I. *J Investig Med* 2018;**66**:e1–e2.

Accepted 03 August 2017
Published Online First 31 August 2017

J Investig Med 2018;**66**:e1–e2.
doi:10.1136/jim-2017-000520

REFERENCES

1 Jagoe RT, Goodship TH, Gibson GJ. The influence of nutritional status on complications after operations for lung cancer. *Ann Thorac Surg* 2001;71:936–43.
2 Salas S, Deville JL, Giorgi R, *et al*. Nutritional factors as predictors of response to radio-chemotherapy and survival in unresectable squamous head and neck carcinoma. *Radiother Oncol* 2008;87:195–200.
3 White JV, Guenter P, Jensen G, *et al*. Consensus statement of the academy of nutrition and dietetics/american society for parenteral and enteral nutrition: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *J Acad Nutr Diet* 2012;112:730–8.
4 Preiser JC, Schneider SM. ESPEN disease-specific guideline framework. *Clin Nutr* 2011;30:549–52.
5 Lee JH, Machtay M, Unger LD, *et al*. Prophylactic gastrostomy tubes in patients undergoing intensive irradiation for cancer of the head and neck. *Arch Otolaryngol Head Neck Surg* 1998;124:871–5.
6 Assenat E, Thezenas S, Flori N, *et al*. Prophylactic percutaneous endoscopic gastrostomy in patients with advanced head and neck tumors treated by combined chemoradiotherapy. *J Pain Symptom Manage* 2011;42:548–56.
7 Beer KT, Krause KB, Zuercher T, *et al*. Early percutaneous endoscopic gastrostomy insertion maintains nutritional state in patients with aerodigestive tract cancer. *Nutr Cancer* 2005;52:29–34.
8 Rahnemai-Azar AA, Rahnemaiazar AA, Naghshizadian R, *et al*. Percutaneous endoscopic gastrostomy: indications, technique, complications and management. *World J Gastroenterol* 2014;20:7739–51.
9 Corry J, Poon W, McPhee N, *et al*. Randomized study of percutaneous endoscopic gastrostomy versus nasogastric tubes for enteral feeding in head and neck cancer patients treated with (chemo)radiation. *J Med Imaging Radiat Oncol* 2008;52:503–10.
10 Mekhail TM, Adelstein DJ, Rybicki LA, *et al*. Enteral nutrition during the treatment of head and neck carcinoma: is a percutaneous endoscopic gastrostomy tube preferable to a nasogastric tube? *Cancer* 2001;91:1785–90.
11 Rogers SN, Thomson R, O'Toole P, *et al*. Patients experience with long-term percutaneous endoscopic gastrostomy feeding following primary surgery for oral and oropharyngeal cancer. *Oral Oncol* 2007;43:499–507.