



Same-Day Versus Late Percutaneous Endoscopic Gastrostomy Tube Placement in Patients Undergoing Head and Neck Cancer Surgery



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Abstract

Objective: To examine outcomes and complications in patients receiving a percutaneous endoscopic gastrostomy (PEG) tube on the same day of head and neck cancer surgery versus later in hospitalization.

Methods: The 2003-2014 Nationwide Inpatient Sample was queried for patients undergoing ablative head and neck cancer procedures who had a PEG tube placed. Cases were stratified by PEG timing into an early (on same day as ablative procedure) and late (later in hospitalization) group. Demographics and complications were compared using univariate analysis and multivariate regression modelling.

Results: A total of 4,068 cases were included, of which 2,206 (54.2%) received an early PEG and 1,862 (45.8%) received a late PEG. Late PEG patients were more likely to have a diagnosis of malnutrition (18.0% vs. 15.3%, p=0.018) or renal failure (4.7% vs. 3.0%, p=0.006). Reconstructive flap rate was the same between early and late PEG groups (20.1% and 20.8%, p=0.580). On multivariate regression analysis, patients receiving late PEG were more likely to experience: aspiration pneumonia, acute pulmonary disease, infectious pneumonia, sepsis, hematoma, wound disruption, surgical site infection, and fistula formation (all p<0.05). The mean length of stay and hospital charges in the late PEG group were significantly greater (17.1 vs. 12.6 days, p<0.001) and (\$159,993 vs. \$125,705, p<0.001), respectively.

Conclusions: Patients undergoing head and neck cancer surgery who received a PEG tube on the day of surgery had lower complication rates and a shorter length of stay. Same-day PEG placement may improve outcomes and help optimize resource utilization in this patient population.

Introduction

- Gastrostomy tube placement in patients undergoing head and neck cancer (HNC) treatment has become a customary practice for the prevention and treatment of malnutrition and other complications associated with HNC.
- Up to 50-60% of patients undergoing HNC treatment receive a gastrostomy tube either prior to or during treatment.^{1,2}
- There remains debate whether prophylactic versus reactive gastrostomy tube placement is most beneficial, with some arguing that proactive placement reduces risk of malnutrition, improves quality of life, reduces hospital stays and health care costs.^{3,4} On the other hand, gastrostomy tube placement is not without risk, with serious complications occurring in up to 3-10% of HNC patients, including infections, perforated bowels, and even death.^{5,6}
- The purpose of this study was to shed light on the decision of the timing of gastrostomy tube placement with the goal of comparing outcomes and complications of patients receiving a percutaneous endoscopic gastrostomy (PEG) tube on the same day of HNC surgery (early PEG) versus later in hospitalization (late PEG).

Methods and Materials

Patient Database:

- The National Inpatient Sample (NIS) was queried for cases from 2003-2014. The NIS is an administrative database that contains inpatient discharge data from over 7 million hospital stays per year, representing 20% of all discharges from US nonfederal hospitals.
- The database provides information on patient demographics, hospital characteristics, diagnosis codes, procedure codes, length of stay, hospital charges, and mortality.

Patient Selection:

- Cases were selected using International Classification of Diseases, 9th Edition codes for adult patients with a HNC diagnosis who also underwent an ablative surgical procedure. Cases were only included if the ablative procedure appropriately corresponded to the primary site of cancer diagnosis.
- Cases were then selected if they also underwent a PEG tube procedure and stratified into early PEG and late PEG. Patients who underwent a PEG procedure on the same day as the ablative surgery were stratified into the early PEG group, and patients who underwent a PEG procedure on a day after the ablative surgery were stratified into the late PEG group.

Statistical Analysis:

- The primary outcomes of interest were mortality, surgical complications, and medical complications.
- SPSS 24 (IBM, Armonk, New York) was used for univariate analysis and multivariable regression model construction.

Results

- A total of 4,068 cases were included, of which 2,206 (54.23%) received an early PEG and 1,862 (45.77%) received a late PEG.
- Patient baseline demographics are shown in **Table 1**.
- The odds of receiving a late PEG versus early PEG is shown in **Table 2**.
- The multivariate regression of odds of complications in late PEG versus early PEG groups is shown in **Table 3**.

Table 1 – Patient Demographics

	Same-Day PEG (%)	Late PEG (%)	p-value
Age, mean (years)	62.6 +/- 12.3	63.8 +/- 12.1	0.001
Gender			0.875
Male	70.6	70.4	
Female	29.4	29.6	
Race			0.026
White	71.4	69.6	
Black	10.1	9.8	
Other	11.1	14.1	
Unknown	7.4	6.4	
Insurance			0.057
Medicare	46.0	47.7	
Medicaid	14.4	15.5	
Private	33.6	29.6	
Other	6.2	7.1	
Primary Site			0.042
Larynx	27.9	28.7	
Hypopharynx	4.4	5.0	
Oral cavity	37.6	35.2	
Oropharynx	25.6	24.7	
Multiple	4.4	6.3	
Hospital Region			<0.001
Northeast	20.3	25.6	
Midwest	12.6	14.8	
South	46.2	38.3	
West	20.9	21.3	

Table 2 – Multivariate Regression, Odds of Receiving Late PEG

	OR	95% CI	P-value
Age	1.010	1.003-1.017	0.005
Gender			
Male	Ref		
Female	1.016	0.884-1.168	0.824
Race			
White	Ref		
Black	0.932	0.749-1.159	0.526
Other	1.270	1.045-1.543	0.016
Unknown	0.927	0.721-1.192	0.555
Insurance			
Medicare	Ref		
Medicaid	1.199	0.963-1.492	0.105
Private	1.027	0.861-1.225	0.768
Other	1.340	1.014-1.770	0.040
Malnutrition	1.212	1.024-1.435	0.026
Renal Failure	1.437	1.030-2.004	0.033
Hospital Size			
Small	Ref		
Medium	1.400	1.090-1.800	0.009
Large	1.275	1.029-1.579	0.027
Hospital Region			
Northeast	Ref		
Midwest	0.947	0.764-1.173	0.616
South	0.665	0.564-0.784	<0.001
West	0.803	0.665-0.971	0.024

Table 3 – Multivariate Regression - Odds of Complications in Late PEG Group

	OR	95% CI	P-value
Death	1.024	0.573-1.831	0.936
Medical Complications			
Aspiration pneumonia	1.865	1.416-2.456	<0.001
Acute pulmonary edema or failure	1.229	1.029-1.468	0.023
Acute renal failure	1.659	1.180-2.333	0.004
DVT/PE	1.442	1.005-2.069	0.047
Infectious pneumonia	1.489	1.204-1.841	<0.001
Urinary tract infection	1.256	0.924-1.707	0.146
Sepsis	1.675	1.165-2.408	0.005
Surgical Complications			
Hematoma, hemorrhage, seroma	1.450	1.117-1.882	0.005
Wound disruption	1.880	1.494-2.367	<0.001
Surgical site infection	1.329	1.021-1.729	0.035
Fistula formation	2.606	1.885-3.604	<0.001
Total Complications			
Any Medical Complication	1.434	1.252-1.642	<0.001
Any Surgical Complication	1.438	1.255-1.648	<0.001
Any Complication	1.547	1.361-1.758	<0.001

Conclusions

- Patients in the NIS database undergoing HNC surgery who received a PEG tube on the day of surgery had lower complication rates and a shorter length of stay when compared to patients who had tube placement at a later time.
- In appropriately selected patients, PEG tube placement at the time of oncologic surgery may improve outcomes, reduce complications and reduce healthcare associated costs.

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References

- Kramer S, Newcomb M, Hessler J, Siddiqui F. Prophylactic versus Reactive PEG Tube Placement in Head and Neck Cancer. Otolaryngol Neck Surg. 2014;150(3):407-412. doi:10.1177/0194599813517081
- Tulmay-Aguir CE, McClinton C, Young Z, Penagaricano JA, Maddox A-M, Vural E. Functional Outcomes of Chemoradiation in Patients with Head and Neck Cancer. Otolaryngol Neck Surg. 2015;146(1):64-68. doi:10.1177/0194599812459325
- Brown TE, Spurgin A-L, Ross L, et al. Validated swallowing and nutrition guidelines for patients with head and neck cancer: identification of high-risk patients for proactive gastrostomy. Head Neck. 2013;35(10):1385-1391. doi:10.1002/hed.23346
- Lewis SL, Brody R, Touger-Decker R, Parrott JS, Epstein J. Feeding tube use in patients with head and neck cancer. Head Neck. 2014;36(12):1789-1795. doi:10.1002/hed.23338
- Grant DG, Bradley PT, Pothier DD, et al. Complications following gastrostomy tube insertion in patients with head and neck cancer: a prospective multi-institution study, systematic review and meta-analysis. Clin Otolaryngol Off J ENT-UK Off J Neck Soc Otol-Rhino-Laryngol Service-Facial Surg. 2009;34(2):103-112. doi:10.1111/j.1749-4483.2009.01889.x
- McAllister P, MacIver C, Wales C, et al. Gastrostomy insertion in head and neck cancer patients: a 3 year review of insertion method and complication rates. Br J Oral Maxillofac Surg. 2013;55(8):714-718. doi:10.1016/j.bjoms.2013.07.005