



Elective Bedside Percutaneous Endoscopic Gastrostomy in Head Injury Patients Using Indigenous Peg Catheter is Feasible and Cost Effective

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ABSTRACT

Introduction: The main aim of this study is to assess the feasibility and cost-effectiveness of elective bedside percutaneous endoscopic gastrostomy (PEG) in critically injured patients using indigenous PEG catheter. Enteral nutrition is an important method to reduce catabolism as well as to prevent the gut mucosal atrophy and hence bacterial translocation. We have performed bedside PEG in 101 critically injured patients with head injury.

Material and methods:

101 bedside PEG were performed over a period of 3 years in patients with severe head injury patients who were admitted in trauma ICU at tertiary care hospital in Mumbai. We used pull-technique with our indigenous gastrostomy tube in all patients. The following results were observed.

Results:

62 patients were in the age group of 20 to 40 years. 100 of 101 patients were male with 67.32% of the patients having severe head injury (GC Score <8) and 22.72 % of patients were having Glasgow coma (GC) Score of 8-12. The ratio of operated cases to those conserved was 1.58:1. The mean procedure time was 15+/-8mins.

Conclusion:

Bedside PEG using indigenous PEG catheter is safe and easy to perform in patients with moderate to severe head injury.

KEYWORDS

Percutaneous Endoscopic Gastrostomy, Head Injury, Enteral Nutrition.

INTRODUCTION:

PEG is the procedure of choice for securing enteral alimentation in patients suffering from swallowing disorders due to neurologic disease, or geriatric patients and also patients with head injury. [1,2] The primary indication for elective bedside PEG placement in our patients was head injury, since it provides more secure access for enteral feeding than a nasogastric tube, especially in the patients with altered consciousness. Trauma is the leading cause of death in 25 to 45 years of age group of population. Enteral feeding should be started earlier in these patients to improve the outcome. Today the procedure of choice for long-term enteral tube feeding in patients with prolonged swallowing difficulties or inabilities is percutaneous endoscopic gastrostomy (PEG). [3] The success of elective minimally invasive surgery suggested that this concept could be adapted to the intensive care unit. Elective bedside PEG using indigenous PEG set is safe and cost effective in critically injured patients (image 1).

MATERIALS AND METHODS

101 elective bedside PEGs were performed consecutively in the head injury patients admitted over 3 year's period. Patients having anterior gastric antral ulcer, multiple gastric ulcers or large duodenal ulcer were excluded from this study and PEG was not performed in these patients. Distal gastric obstruction was ruled out before procedure. All elective bedside PEGs were performed under sedation with intravenous propofol supplemented by 2% lignocaine with epinephrine injected locally over incision site. The abdomen was prepared and draped with strict asepsis. Under sedation, a complete esophagogastroduodenoscopy was performed. We used the pull-through technique in which, the stomach was inflated with air to approximate the gastric and the abdominal walls. The puncture site was found by palpation, where the illumination of the endoscope was brightest (diaphanoscapy). Clear visualization of the indentation of the palpating finger was required before a cannula was inserted through the abdominal

wall into the stomach under direct vision of the endoscope. Then a thread was guided through the cannula, which was grabbed by the endoscopic forceps and retrieved outside the oral cavity.

An indigenous gastrostomy tube made from No.16 Ryle's tube was fixed to the end of the thread and again pulled through the mouth into the stomach until its buffer abuts the gastric mucosa. (Fig.1). the gastric wall was then gently approximated to the abdominal wall, and fixed to prevent movement of the tube. All patients received single-shot antibiotic prophylaxis. The gastrostomy tube was kept open for external drainage for first 24hours and then gradually feeds were started and increasing the amount to full feeds by next 24 hours.

RESULTS

We have performed 101 consecutive bedside PEGs in critically injured patients. Most of the patients were in the age group of 20 to 40, accounting for 61.38% (Table 1 about here). In our study, only one PEG was performed in female patient and rest of the 100 were male. Patients with head injury were classified into mild (13-15), moderate (8-12) and severe (<8) head injury group based upon the Glasgow Coma Scale. Maximum patients in whom PEG was performed were having severe head injury comprising of 68 (67.32%) patients, followed by 23 (22.7%) patients with moderate head injury, while only 7 (6.9%) patients were having mild head injury (Table 2 about here). PEG was performed in operated cases of head injury patients in 61.38% cases while rest of the cases were non operated. Out of all performed PEGs, 75.2% patients underwent the procedure during 3-7 days of admission, 11.8% during 8-14 day, 6.9% within 48 hours of admission and in 5.9% patients the procedure was done more than 2 weeks after admission (Table 3 about here). In our series complication rate was 14.57% and the most common complication was local infection in 10.4% cases. Other complications encountered were gastric ulcer in 2.08%, tube blockage in 1.04% and tube leakage in 1.04% patients (Table 4 about here). There was no serious procedure related complication in our series and mortality was nil. Cost effectiveness is far better compared to commercially available PEG set and operative gastrostomy (Table 5 about here).

DISCUSSION:

Enteral feeding should be started as early as possible in patients with polytrauma to prevent early gut mucosal atrophy. Thereby it prevents the bacterial translocation and thus prevents early sepsis. [4, 5, 6]The purpose of this study was to evaluate the feasibility and cost effectiveness of the bedside PEG in patients who require long-term enteral feeding but are unable to maintain sufficient oral intake.

The conventional approach to enteral access in the past was to use nasogastric, nasojejunal or surgically placed gastrostomy tubes. PEG was introduced in 1980 as an alternative to laparotomy for placement of a gastrostomy tube. PEG is particularly well suited to patients who have an increased risk for surgery and general anesthesia. It can be performed within 10 to 15 minutes, under sedation rather than general anesthesia, can be accomplished at the bedside if necessary, has low morbidity, and is successful in over 95% of patients. [3, 7]

Bedside PEG is safe, easy to perform and cost-effective. Care taken following the procedure involves examining stoma to look for signs such as swelling, discoloration, exudation, pus and leakage around the stoma. It should be cleaned daily. The tube should be rotated about 180 degrees and moved up and down about 1-2 cm in the stoma site on a daily basis after the stoma has completely matured. Flushing of tube should be done before and after each feed and administration of medicine to prevent clogging of the tube and subsequent blockage. Other case of blockage can be feeding through small-bore tubes, feeding with thick formulas, inadequately crushed medications or incompatibility between medications and enteral feeds. In addition to regular flushing of the tube, dissolving medications in water before administration and

preferential utilization of liquid forms of medications over solid-based forms are other preventive measures to prevent clogging of tube. Gentle squeeze technique or pull and push technique using syringe filled with warm water is also effective for a clogged tube.[8,9]

The complication rate was very low (Table 6). In our series, the overall complication rate was about 14.58%. Two patients were having tube leakage. One exploratory laparotomy was performed for peritonitis in a patient who was having intraperitoneal leakage. In other patient, the tube leakage stopped by taking another tube fixation stitch. There was no procedure related mortality in our study.

Advantages of the bedside PEG are:

Transport of the critically ill patient to operation theatre is not required.

Non-availability of the operation theatre will not be the problem.

Can be performed within 15 minutes as compared to operative feeding procedure, which takes about 1 hour.

No operation theatre charges.

No charge of drugs for anesthesia.

Manpower and working hours of the OT staff spared.

The cost of the indigenous PEG catheter is very low compared to the cost of the operative feeding procedure.

No post procedure pain relief required.

CONCLUSION: The indigenous technique of PEG is very much cost effective compared to commercially available PEG set and surgically performed gastrostomy. It can be performed easily at patient's bedside in trauma ICU. It is minimally invasive, time saving and has a very low complication rate.

TABLES :

Table 1: Showing distribution of the cases as per age

Age in years	No. of patients	Percentage
0-10	01	00.99
11-20	10	09.90
21-30	38	37.62
31-40	24	23.76
41-50	17	16.83
51-60	07	06.93
>60	04	03.96
Total	101	100

Table 2: Showing distribution of cases as per Glasgow coma score.

Glasgow coma Score	No. of patients	Percentage
Mild [13-15]	07	06.93
Moderate[8-12]	23	22.77
Severe[<8]	68	67.32
Total	101	100

Table 3: Showing time duration between PEG and admission of the patient

Time interval	No. of patients	Percentage
<48hours	07	06.93
3-7days	76	75.24
8-14days	12	11.88
>2weeks	06	05.94
Total	101	100

Table 4: Showing complications of elective bedside PEG

Complications	No. of patients	Percentage
Tube leakage	2	01.04%
Tube blockage	2	01.04%
Gastric ulcer	3	02.08%
Local infection	10	10.41%

Table 5: Showing cost comparison between indigenous, commercial PEG and operative feeding procedure

	Indigenous PEG	Commercial PEG	Surgical Gastrostomy
Feeding tube	70 Rs	6500 Rs	250 Rs
Anesthetic drug	75 Rs	75 Rs	350 Rs
Anesthetist charge	Nil	Nil	Nil
OT charge	Nil	Nil	200 Rs
Total	145 Rs	6575 Rs	800 Rs

560-567; discussion 560-567 [PMID: 2111125]

- Deitch EA, Winterton J, Li M, Berg R. The gut as a portal of entry for bacteremia. Role of protein malnutrition. *Ann Surg* 1987; 205: 681-692 [PMID: 3592811]
- Grant JP. Comparison of percutaneous endoscopic gastrostomy with Stamm gastrostomy. *Ann Surg* 1988; 207: 598-603 [PMID: 3377569]
- Schrag SP, Sharma R, Jaik NP, Seamon MJ, Lukaszczuk JJ, Martin ND, Hoey BA, Stawicki SP. Complications related to percutaneous endoscopic gastrostomy (PEG) tubes. A comprehensive clinical review. *J Gastrointestin Liver Dis* 2007; 16: 407-418 [PMID: 18193123]
- Sriram K, Jayanthi V, Lakshmi RG, George VS. Prophylactic locking of enteral feeding tubes with pancreatic enzymes. *JPEN J Parenter Enteral Nutr* 1997; 21: 353-356 [PMID: 9406135]

IMAGE:



Fig.1. Image showing Indigenous PEG catheter

REFERENCE:

- Osborne JB, Collin LA, Posluns EC, Stokes EJ, Vandenbussche KA. The experience of head and neck cancer patients with a percutaneous endoscopic gastrostomy tube at a Canadian cancer center. *NutrClinPract*.2012;27:661-8.[PubMed: 22895568]
- Kawa C, Stewart J, Hilden K, Adler DG, TietzeC, Bromberg MB, etal. A retrospective study of nurse-assisted propofol sedation in patients with amyotrophic lateral sclerosis undergoing percutaneous endoscopic gastrostomy. *NutrClinPract*.2012; 27:540-4.[PubMed: 22645103]
- Gauderer MW, Ponsky JL, Izant RJ. Gastrostomy without laparotomy: a percutaneous endoscopic technique. *J PediatrSurg* 1980; 15: 872-875 [PMID: 6780678]
- Alverdy J, Chi HS, Sheldon GF. The effect of parenteral nutrition on gastrointestinal immunity. The importance of enteral stimulation. *Ann Surg* 1985;202:681-684[PMID: 3935061]
- Deitch EA, Ma WJ, Ma L, Berg RD, Specian RD. Protein malnutrition predisposes to inflammatory-induced gut-origin septic states. *Ann Surg* 1990; 211: