

# Outcomes of Push and Pull Percutaneous Endoscopic Gastrostomy Placement in Patients

EHSAN RAHIM MEMON<sup>1</sup>, PREM KUMAR<sup>2</sup>, SHAISTA ZEB<sup>3</sup>, IMRAN ARSHAD<sup>4</sup><sup>1-4</sup>Assistant Professor, Gastroenterology Department, Isra University Hospital, Halaroad HyderabadCorresponding author: Imran Arshad, Email: [doctorimranarshad@gmail.com](mailto:doctorimranarshad@gmail.com), Cell: +92 333 4116553

## ABSTRACT

**Background and Aim:** The placement of a percutaneous endoscopic gastrostomy tube is now the preferred nutritional support device for long-term dysphagia patients. Based on the timing, tube dislodgement could cause significant morbidity. The present study's goal was to assess the outcomes of push and pull percutaneous endoscopic gastrostomy placement in patients.

**Methodology:** A descriptive-analytical study was carried out on 264 patients' undergone placement in percutaneous endoscopic gastrostomy tubes during the period from November 2018 to October 2021 at the Department of Gastroenterology and Hepatology of Isra University Hospital, Halaroad Hyderabad. Demographic details, indications, underlying diagnosis, and complications of the patients were assessed via medical records. Psychological status, physical and social performance, and health-related life issues were addressed through a pre-designed questionnaire.

**Results:** Of the total 264 patients undergone PEG placement procedure, the prevalence of successful PEG tube placement was 256 (97%). Out of successful PEG tube placement in 256, the incidence of push and pull was 158 (59.8%) and 106 (39.2%) respectively. The overall mean age was  $56.8 \pm 8.5$  years and patients were followed for a year. Tube dislodgement ( $p < 0.001$ ) and Peri-procedural bleeding ( $p = 0.001$ ) were significantly associated with push percutaneous endoscopic gastrostomy tubes placement while infected site ( $p = 0.021$ ), buried bumper ( $p < 0.001$ ), and granulation tissue formation ( $P = 0.032$ ) were associated with pull PEG. Mortality rate was 0.3% in placement of percutaneous endoscopic gastrostomy tubes.

**Conclusion:** Our study found that placement of push and pull percutaneous endoscopic gastrostomy tubes placement are safe procedures. PEG-tubes placement was established to be relatively free of serious immediate and long-term complications. The majority of caregivers and patients agreed that PEG-tubes aided in feeding and extending survival.

**Keywords:** Percutaneous endoscopic gastrostomy, Push, Pull, Complications and Outcomes

## INTRODUCTION

Percutaneous endoscopic gastrostomy is an alternate nasogastric tube for long-term management of dysphagic stroke patients [1]. It is surgically placed gastrostomy tubes placed in patients who cannot feed themselves with an intact gastrointestinal tract [2]. Long-term enteral nutrition could be effectively replaced with PEG tubes open gastrostomy [3]. PEG placement-related complication rate varies from 16 to 70% as reported in the current literature [4, 5]. Complications associated with the replacement of PEG tubes could be minor and major complications that are classified based on their severity. Granulation tissue formation, tube blockage, infected placement site, tube dislodgement, and leakage are minor complications whereas aspiration pneumonia, bowel perforation, major arterial bleeding, sepsis, buried bumper, and mortality related to PEG placement are major complications.

The pull PEG technique has been modified since its original description for removal and ease of placement [6, 7]. The flexible, button-typed PEG is now the most widely available pull PEG. Push PEG-tube replacement can be differentiated from pull PEG-tube based on main feature 1. A Seldinger guide wire method was utilized for direct placement of PEG-tubes via abdominal wall. This mechanism was suggested for peristomal infections, oral contamination, and malignancy seeding reduction at stomal site [8, 9], T-fastener technique for gastropexy, and tip of the inflated balloon. Globally, pull PEG tubes are prevalently used regardless of both commonly used push and pull techniques. However, based on outcomes of both pull and push procedures such as failed placement, complications, and mortality rate data is limited. The present study aimed to assess the vitamin B12 deficiency and risk factors in healthy infants.

## METHODOLOGY

A descriptive-analytical study was carried out on 264 patients' undergone placement in percutaneous endoscopic gastrostomy tubes during the period from November 2018 to October 2021 at the Department of Gastroenterology and Hepatology of Isra University Hospital, Halaroad Hyderabad. Demographic details, indications, underlying diagnosis, and complications of the patients were assessed via medical records. Psychological status, physical and social performance, and health-related life issues were addressed through a pre-designed questionnaire. Mentally

retarded patients under the age of 19 years were excluded. Prior to study conduction, ethical approval was taken from the Tertiary Care Hospital ethical review committee.

Medical records were revised to gather demographic information as well as PEG procedure outcomes such as complication and mortality. Age, weight, body mass index (BMI), height, gender, diabetes mellitus (DM), malignancies, chronic pulmonary disease, stroke, hypertension, type of PEG placement, and medication used were all collected. The push and pull methods are used for PEG placement. Both procedures necessitate the use of an endoscope, which is passed through the oral cavity and into the stomach. Gastric insufflation is used to align the stomach with the abdominal wall. The position of the puncture site is determined using diaphany from the endoscope and indentation of the stomach with a finger impression. The pull method inserts a guide wire through the puncture site, which the endoscope grasps through the oesophagus and oral cavity. Following that, a PEG tube is guided through the oral cavity and into the stomach via the wire. The push method uses the same principle as the insufflation and diaphany methods, but the push PEG is not guided through the oral cavity. The gastric wall is attached to the anterior abdominal wall with two t-fasteners, and then a small incision is made through which the tube is directly introduced into the stomach through the abdominal wall.

Categorical data are presented as proportions, while continuous data are displayed as mean and standard deviation. The Fisher's exact test and the independent samples t-test were used for categorical and continuous variables, respectively, to compare patients' demographical data and complications with the technique performed (i.e. push or pull). SPSS Statistics software version 23 was used for all statistical analyses.

## RESULTS

Of the total 264 patients undergone PEG placement procedure, the prevalence of successful PEG tube placement was 256 (97%). Out of successful PEG tube placement in 256, the incidence of push and pull was 158 (59.8%) and 106 (39.2%) respectively as shown in Figure-1. The overall mean age was  $56.8 \pm 8.5$  years and patients were followed for a year. Tube dislodgement ( $p < 0.001$ ) and Peri-procedural bleeding ( $p = 0.001$ ) were significantly associated with push percutaneous endoscopic gastrostomy tubes

placement while infected site ( $p=0.021$ ), buried bumper ( $p<0.001$ ), and granulation tissue formation ( $P = 0.032$ ) were associated with pull PEG. Mortality rate was 0.3% in placement of percutaneous endoscopic gastrostomy tubes. Table-I summarize the PEG placement indications, medication usage, and clinical profiles of the patients. The overall mean age was  $58.51 \pm 6.7$  years.

PEG placement indications were grouped into three as follows; Malignancy group consist of 201 (76.3%) followed by neurological disease in 49 (18.4%), and dysphagia or malnutrition morbidity in 14 (5.3%) as shown in Figure-2. Out of 201 malignant group, the most prevalent malignancies indication was head and neck in 185 (92%). The incidence of lung malignancies, thyroid gland, esophagus, renal cell carcinoma, and neck lymph node with primary tumors was 8 (4%), 1 (0.5%), 4 (2%), 1 (0.5), and 2 (0.9%) respectively. Of the neurological disease patients, incidence of stroke, neurotrauma, Parkinson disease, neurological related indications, amyotrophic lateral sclerosis, and multiple sclerosis was 13 (26.5%), 11 (22.4%), 1 (2%), 14 (28.6%), 5 (10.2%), and 5 (10.2%) respectively. The prevalence of hypertension, chronic pulmonary disease, and diabetic mellitus was 66 (25%), 37 (14%), and 31 (11.7%) respectively as shown in Figure-3. The incidence of frequent complications such tube dislodgement, formation of granulation tissue, infected site placement, and buried bumpers were 7.9%, 7.7%, 5.9%, and 2.8% respectively.



Figure-1: Prevalence of Pull and Push PEG replacement

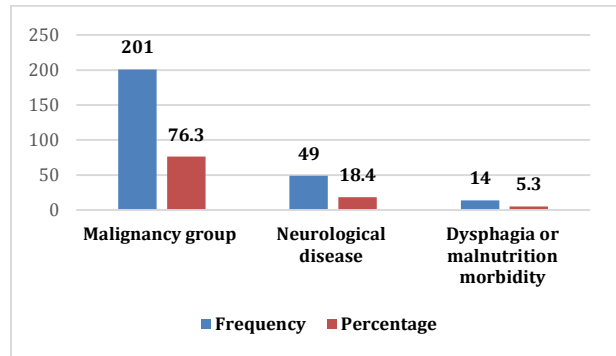


Figure-2: PEG placement categories

Table-1: PEG placement indications, medication usage, and clinical profiles of the patients

Parameters	Push PEG N=158	Pull PEG N=106	Total PEG N=264	P-value
Age (years)	57.3±9.2	56.3±7.8	56.8 ± 8.5	<0.001
BMI (kg/m <sup>2</sup> )	22.4±2.8	24.6±4.6	23.5±3.7	0.31
PEG Indications N (%)				
Malignancy	123 (61.2%)	78 (38.8%)	201 (76.3%)	<0.001
Head and Neck	107 (64.5%)	59 (35.5%)	166 (63%)	
Others	33 (76.7%)	10 (23.3%)	43 (16.3%)	
Comorbidities N (%)				
Diabetes	19 (61.3%)	12 (38.7%)	31 (11.7%)	0.01
Hypertension	47 (71.2%)	19 (28.8%)	66 (25%)	0.04
Pulmonary disease	23 (62.1%)	14 (37.9%)	37 (14%)	0.05

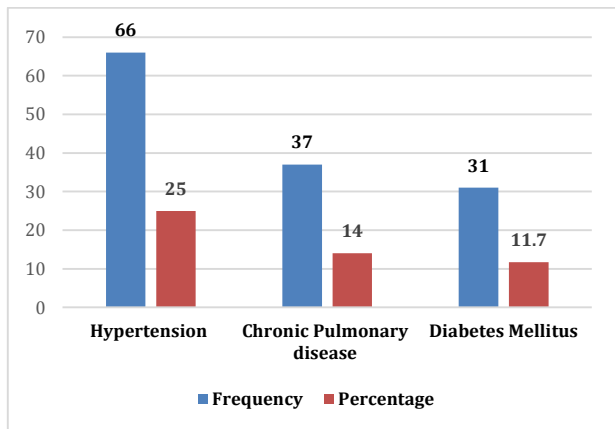


Figure-3: Prevalence of comorbidities

**DISCUSSION**

The present study focused on safety and complications related to PEG tube placement along with perspective of care givers and the patient’s response and outcomes. A higher success rate with lower morbidity and mortality were reported in patients underwent PEG tubes placement [10, 11]. Our findings also showed a comparable

level of safety with PEG-tube placement, such as infection at the PEG-tube site. Similarly, no major long-term complications, such as early mortality or fistula formation, were observed in the current series of patients [12, 13]. The artificial prolongation of a poor quality of life through nutrition is an ethical quandary [14]. The answer to whether a poor quality of life should be prolonged is not yet clear. A study found that deciding whether to use artificial feeding in advanced dementia is a difficult task [15]. This also raises significant financial, ethical, and moral concerns. Furthermore, after PEG-tube placement, patients with dementia may be deprived of the sensations of taste, touch, nurturing, and socialization [16, 17].

In current study, a total of 264 patients underwent pull and push PEG-tubes placement were referred and PEG tube placement associated complications were identified. The overall complications of PEG-tubes placement was 43.7% which resembled with previous research reported 16% to 70% [18]. Tubes dislodgment and severe bleeding were significant in push-type PEG tubes placement whereas infected placement site, buried bumper, and formation of granulation tissue were prominent in pull-type PEG tubes placement [19]. Additionally, mortality in most cases were associated with pull-type PEG tubes placement. It might be caused by bleeding and abdominal wall punctured during PEG placement. The push-type is associated with

significantly more peri-procedural minor bleeding, which is supported by two other studies [20, 21].

Minor bleeding requires no intervention, whereas major bleeding necessitates surgical or endoscopic intervention. The push-type procedure entails the direct insertion of a 15 Fr trocar as well as the use of two t-fasteners, which increases the risk of bleeding. Endoscopic intervention may be required in major bleeding cases where minor bleeding needs none. The prevalence of buried bumpers ranges from 0.3 to 8.8% [22, 23].

The most common cause of buried bumpers is a failure to mobilize the PEG tube. The PEG tube is instructed to be loosened and rotated by the patient. External traction, such as pulling the PEG tube, can also result in a buried bumper. If the patient does not comply, the internal bumper may apply pressure to the gastric wall, which may result in hyperplastic tissue burying the internal bumper in the gastric wall. The current study found a 3.0% incidence. Because of the fixation device, this is common in pull-type PEGs. Pull-type PEGs, as opposed to push-type PEGs, have rigid discs that can cause more necrotizing pressure to the gastric wall.

About 98% patients underwent PEG tubes placement were successful compare to 95% success rate reported in previous studies [24, 25]. Lack of diaphany was the prominent cause for procedure termination. Tubes placement patients were referred for radiological or surgical intervention in majority of cases followed by PEG procedure failure. The strength of the current study was large cohort inclusion in pull and push type placement, increasing data power and reliability.

## CONCLUSION

Our study found that placement of push and pull percutaneous endoscopic gastrostomy tubes placement are safe procedures. PEG-tubes placement was established to be relatively free of serious immediate and long-term complications. The majority of caregivers and patients agreed that PEG-tubes aided in feeding and extending survival.

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