Original Article

Indications and complications of percutaneous endoscopic gastrostomy in a quaternary care center in Nepal

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Abstract

Background and Aims : Percutaneous endoscopic gastrostomy is essential for long-term enteral nutrition, particularly in patients with neurological or structural swallowing impairments. Despite global use, there has been no data from Nepal. This study evaluates indications, endoscopic findings, and complications of gastrostomy tube insertion in a quaternary care center in Nepal.

Methods: This retrospective study analyzed patients who underwent new gastrostomy tube placement at Nepal Mediciti Hospital from April 2018 to April 2025. Data on demographics, clinical indications, endoscopic findings, and complications within one month related to the procedure, were collected and analyzed using descriptive statistics.

Results: The most common indication for percutaneous endoscopic gastrostomy placement was cerebrovascular accident (36.7%), followed by Parkinson disease (16.7%) and traumatic brain injury (16.7%). The mean age of patient was 58.7 years (SD ±20.49) among which majority of patients (23.2%) were between 60–69 years age group. Endoscopic findings were normal in 89.3% of cases. Reported complications were minimal, with 82.1% of patients experiencing no complications. Minor gastric bleeding (8.9%), tube dislodgement (3.6%), wound infection (3.6%), and tube leakage (1.8%) were the complications observed.

Conclusion: The PEG tube insertion is safe and effective, with minimal early complications. Its crucial role in managing neurological and oncological disorders by optimizing the proper nutrition emphasizes the need for careful patient selection. Further research with more sample size and long term follow up is needed to substantiate its safety and long-term outcomes, especially in resource-limited settings in Nepal.

Introduction

Percutaneous endoscopic gastrostomy (PEG) tube insertion is essential for providing long-term enteral nutrition and relieving gastric pressure in patients with various medical conditions[1,2]. Since its introduction by Gauderer et al. in 1980, PEG has mainly replaced surgical gastrostomy because of its lower complication rates, cost-effectiveness and better patient outcomes[1,3]. Worldwide, neurological conditions include stroke, cerebral palsy, brain injuries, amyotrophic lateral sclerosis, Parkinson disease, and other disorders that cause dysphagia or difficulties with swallowing[4,5]. Additional indications include obstruction of the pharynx or esophagus due to advanced tumors, mediastinal masses caused by lymphoma, medullary thyroid cancers, invasion of lymph nodes by an unknown primary tumor and long-term gastric decompression[6].

Although specific data on the use of PEG tubes in Nepal is limited, the procedure is increasingly being conducted in tertiary care centers. The country is facing a rising burden of neurological disorders and cancers, making it essential to study the indications for PEG tubes[7]. Nepal's geographical and socioeconomic challenges may impact PEG tube insertion accessibility and outcomes, indicating a need for focused research. Understanding when to insert a PEG tube in patients with neurological disorders is vital for a variety of reasons. First, it gives us insight into the local impact of these diseases and the healthcare needs of those affected. By studying this, we can better select the right patients and determine the best time for PEG tube

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placement, ultimately improving their chances of a better outcome. Many individuals facing neurological issues, like strokes-which constitute a significant cause of disability around the globe—often need ongoing support for their nutrition. Ensuring proper care is vital for their recovery and quality of life support. Similarly, neurodegenerative diseases like Parkinson disease and motor neuron disease often need PEG feeding as they progress[8,9]. The significance of studying oncological indications for PEG tube insertion cannot be overstated. Head and neck cancers, in particular, often require PEG tubes for maintaining nutrition during chemoradiotherapy, which can cause severe dysphagia and compromise oral intake. Understanding the specific needs of oncology patients in Nepal can help improve their nutritional status and overall treatment outcomes.

The objectives of this study were to analyze the primary indications for PEG tube insertion in patients with neurological and oncological disorders in a quaternary care center in Nepal, to examine the clinical significance of the endoscopic findings during PEG tube placement, and to evaluate the early complications within one month following PEG tube insertion. This study addresses these objectives to enhance the understanding of PEG tube usage in Nepal, aiming to improve patient care and outcomes in the essential gastroenterology and nutrition support areas. The findings will benefit local clinical practices and offer valuable insights for similar resource-limited settings worldwide[10,11].

Materials And Methods

A retrospective observational study was conducted at Nepal Mediciti Hospital, a quaternary care center in Nepal from April 2018 to April 2025. The study focused on patients who underwent PEG tube insertion during this period. The inclusion criteria included patients who underwent PEG tube insertion during the study period and had complete medical data, including age, gender, clinical indications, endoscopic findings, and reported complications. The exclusion criteria were patients with incomplete or missing medical records and unclear clinical indications.

Variables and Data Collection

Demographics such as the age and gender of the patients were recorded. The clinical indications were divided into neurological disorders (Cerebrovascular accidents, Parkinson disease, Motor neuron disease, hypoxic brain injury, traumatic brain injury, and Myasthenia Gravis) and oncological disorders (carcinoma esophagus, carcinoma nasopharynx, and brain tumor). The endoscopic findings included normal findings, esophageal erosions, gastric erosions, and duodenal ulcers. Similarly, outcomes included reported complications within one month (gastric bleeding, tube dislodgement, tube leakage, wound infection, or none).

Procedural Details

The PEG tube insertion was performed by experienced gastroenterologists using standardized endoscopic techniques to ensure safety and efficacy. The procedure was performed under sterile conditions in a dedicated endoscopy suite with advanced imaging and monitoring systems. A multidisciplinary team was involved in perioperative patient care, including anesthetists, gastroenterologists, and nursing staff. Pre-procedure fasting for 6–8 hours, anticoagulation management as per patient risk assessment, and prophylactic antibiotics administered selectively to reduce infection risk. Conscious sedation using midazolam and fentanyl, or general anesthesia in select cases alongside local anesthesia, was given. A diagnostic endoscopy assessed mucosal integrity and confirmed anatomical landmarks for PEG placement. The "pull" technique, first introduced by Gauderer et al.1, is now recognized as the most widely used method for PEG tube placement. In this procedure, a string is threaded through a needle into the abdominal wall and the stomach. It is then grasped with endoscopic biopsy forceps and pulled out through the esophagus and mouth. After that, the string is secured to the external end of the feeding tube, pulling the tube from the mouth into the esophagus and stomach and through the abdominal wall. Patients were monitored for complications (bleeding, infection, or aspiration pneumonia). Feeding was initiated within 24 hours, following a stepwise dietary progression.

Statistical Analysis

Descriptive Statistical Methods: categorical variables (e.g., the endoscopic procedure before the procedure, clinical indications and complications) were expressed as frequencies and percentages, whereas continuous variables (e.g., age) were summarized using means and standard deviations (SDs).

Results

The study included 60 patients, with a mean age of 58.7 years (SD ±20.49). The (60–69) year age group had the highest representation (23.2%), indicating that PEG is most commonly performed in older adults - likely due to age-related dysphagia, neurodegenerative disorders, and stroke-related feeding difficulties. This was followed by the 50–59 (17.9%) and 70–79 and 80–89 age groups (16.1% each). Younger patients, particularly those below 20 years (3.6%), and above 90 years (1.8%) were underrepresented.

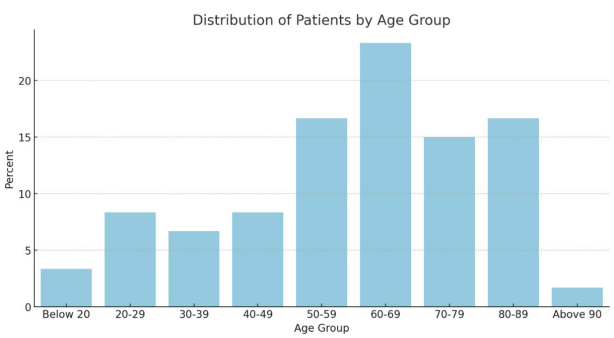

Figure 1: Distribution of age group and percutaneous endoscopic gastrostomy indication

Most patients (89.3%) had normal endoscopic findings. Gastric erosions (7.1%) were the most frequently noted abnormality, possibly attributable to NSAID use, systemic illness, or stress ulcers. Duodenal ulcer and esophageal erosions were each identified in 1.8% of patients. Overall, the findings support that PEG is generally safe, even in the presence of minor mucosal pathology.

Table 1: Endoscopic Findings before PEG tube insertion

Endoscopic Findings	Percent % (n)
Normal findings	89.3 (54)
Duodenal ulcer	1.8 (1)
Esophageal erosions	1.8 (1)
Gastric erosions	7.1 (4)
Total	**100 (60)**

The leading indication was cerebrovascular accident (36.7%), affirming the strong association between stroke-related dysphagia and the need for long-term enteral feeding. Parkinson disease (16.7%) and traumatic brain injury (16.7%) were the next most common indications, followed by hypoxic brain injury (11.7%), motor neuron disease (8.3%), Alzheimer's disease (1.7%), and Myasthenia gravis (1.7%). Other indications included oncological indications such as brain tumor (3.3%), carcinoma esophagus (1.7%) and nasopharyngeal carcinoma (1.7%). These findings illustrated in Figure 2 highlights that neurological conditions dominate the clinical justification for PEG, reflecting global trends and highlighting the importance of long-term nutritional strategies in neuro-compromised patients.

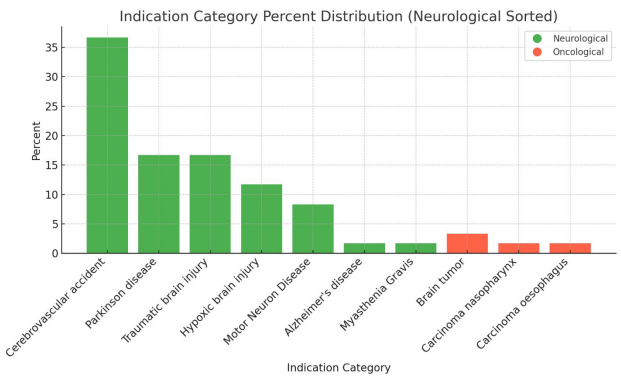

Figure 2: Distribution of age group and percutaneous endoscopic gastrostomy indication

Most patients (83.3%) experienced no complications, confirming the overall safety of PEG placement. The most common complication was minor gastric bleeding (8.3%), likely linked to insertion trauma or mucosal fragility; the bleeding was controlled during the procedure. Wound infection and tube dislodgement were each reported in 3.3%, and tube leakage occurred in 1.7% of cases. As shown in Table 2, the low rate of complications supports the feasibility of PEG in suitable candidates.

Table 2: Complications Reported Within 1 Months

Complications	Percent % (n)
None	83.3 (50)
Minor gastric bleeding	8.3 (5)
Tube dislodgement	3.3 (2)
Tube leakage	1.7 (1)
Wound infection	3.3 (2)
Total	**100 (60)**

Discussion

This study on the insertion of percutaneous endoscopic gastrostomy tubes offers valuable insights into the reasons for the procedure, endoscopic findings, and overall early complications in Nepal. The results provide meaningful comparisons with global and regional literature while highlighting specific challenges and opportunities for improvement within Nepal. Neurological disorders were the primary reasons for PEG tube insertion in this study, aligning with global trends noted by Rahnemai-Azar et al.[2] and Gomes et al.[4]. In particular, cerebrovascular accidents (36.7%), Parkinson disease (16.7%), and traumatic brain injuries (16.7%) were identified as the most prevalent neurological indications. These results are in line with studies from other countries that also recognize neurological disorders as the main reason for PEG tube placement[8,12]. Dysphagia is a common finding after a stroke, and its incidence is reported to be as high as 45% among those admitted to the hospital[13]. Patients often experience difficulties with feeding and swallowing which can result in inadequate nutrition, stunted growth, chronic aspiration leading to lung infections and other complications. The Epidemiologic Oxford Feeding Study found a notable link between the extent of motor impairments and the requirement for gastrostomy feeding[14].

PEG is the preferred feeding method when nutritional intake is likely inadequate for more than four to six weeks and when enteral feeding is likely to prevent further weight loss, correct nutritional deficiencies, and improve quality of life[15]. Following the insertion of the PEG tube, it's essential to conduct regular follow-ups to monitor the patient's progress in regaining their swallowing ability. PEG tubes can be removed anytime if patients regain spontaneous swallowing [16]. Randomized studies in patients after stroke who received gastrostomy feeding have shown improved nutritional outcomes, a higher likelihood of survival, and earlier discharge[17]. A recent study found that prophylactically placed PEG tubes led to fewer complications than those inserted for therapeutic reasons in cancer patients. More than 40% of patients with head and neck malignancy have some degree of malnutrition[18]. Our study indicated a lower percentage of oncological indications for PEG tube insertion (6.7%) compared to global statistics. Numerous international studies have identified head and neck cancers as a significant reason for PEG tube placement[19,20]. The differences observed may be attributed to variations in cancer rates, detection capabilities, or treatment methods in Nepal compared to more developed nations. Our study found that 89.3% of patients had normal endoscopic results during PEG tube placement, which aligns with findings from previous studies. However, 10.7% exhibited abnormal results, including esophageal and gastric erosions, highlighting the importance of thorough endoscopic evaluations. The technical feasibility of PEG placement is relatively high, with an overall success rate between 95% and 100%[21]. The incidence of early or immediate mortality related to PEG procedures ranges from 0% to 2%. The 30-day mortality rate is between 2.4% and 6.5%19. The incidence of early or immediate mortality related to PEG procedures ranges from 0% to 2%. Additionally, the 30-day mortality rate is between 2.4% and 6.5%[22].

Before proceeding with the procedure, it's crucial to establish the medical necessity. Contraindications can be categorized into two main types: absolute and relative contraindications. Absolute contraindications include conditions such as sepsis, hemodynamic instability, severe ascites, peritonitis, coagulopathy (characterized by an international normalized ratio (INR) over 1.5 or a platelet count below a certain threshold), abdominal wall infections at the insertion site, the presence of interposed organs (with the colon being the most common), total gastrectomy, absence of informed consent, and inability to oppose the anterior gastric wall with the abdominal wall adequately. Relative contraindications, on the other hand, encompass factors such as obesity (which may make it challenging to identify the appropriate insertion site), non-obstructive malignancies in the oropharynx or esophagus, hepatomegaly, splenomegaly, undergoing peritoneal dialysis, gastric varices, and previous partial gastrectomy[2]. The placement of a tube should be tailored to each patient's specific

needs, preferences, diagnosis, and expected lifespan. The aim is not only to enhance the patient's survival and nutritional condition but also to boost their quality of life, which doesn't always align with improvements in nutrition[23]. Endoscopic findings during PEG tube insertion are critical as they can reveal concurrent pathologies that influence tube placement and post-procedure management. For example, esophageal or gastric erosions may dictate the tube type and care after insertion. These findings can also indicate disease progression and treatment effects in oncology patients. Although the procedure is generally safe, early complications within the first month can occur, affecting patient recovery and outcomes. Understanding these risks is essential for optimizing patient selection and perioperative care. While most patients recover without issues, some may experience complications ranging from tube leakage to serious problems like gastric bleeding.

Percutaneous endoscopic gastrostomy tube insertion is generally considered safe and successful in at least 95% of patients. However, complications can occur. While most studies report low procedure-related mortality, the mortality rate may increase in patients with underlying comorbidities19. Removal of the PEG tube is recommended when it is no longer needed or when complications such as persistent leakage or buried bumper syndrome require its removal. Experts have suggested using a "cut and push" technique to remove PEGs in adults[24]. The PEG tract typically closes within the first few days following the removal of the PEG, but there are times when a gastrocutaneous fistula may remain. Factors like a longer duration of tube placement, local infection, and issues with tissue healing can lead to a delayed closure of the PEG tract. Techniques for closing the fistula include hemoclips and endoscopic banding[25]. Infection at the tube site is the most frequent minor complication after PEG placement. The occurrence rate ranges from 5% to 25% in various studies, with some reports indicating it can be as high as 65%[26]. Periostomal leakage typically happens in the initial days following the placement of a PEG tube, but it can also affect patients with a well-established PEG tract. When assessing the leakage, it's essential to check the patient for signs of infection, ulceration, or a buried bumper[27]. Or any other potential causes such as tube displacement, slowed gastric emptying, excessive or residual gavage, and enlarged gastric fistula. Intervention generally starts with meticulous prevention and continues with treatment of specific causes, including underlying disease[28]. Tube dislodgement is a frequent reason for patients with PEG tubes to visit the emergency department, with some studies indicating that it may happen in as many as 12.8% of cases[29]. Seeding of cancer cells in the stoma is an uncommon complication among individuals with head and neck cancer. Some experts suggest it happens during the placement of the stoma when medical instruments come into contact with cancerous tissue. In contrast, others think it may result from the spread of cancer via lymphatic or blood vessels[30].

Managing PEG tube insertions for neurological and oncological patients in Nepal poses significant challenges due to limited resources, inadequate equipment, and a lack of specialized nutrition support teams. Patients in remote areas often face accessibility issues, and malnutrition complicates both procedures and recovery. While our study indicates that 89.3% of patients had normal endoscopic findings, esophageal and gastric erosions in 9.3% of cases underscore the need for careful examinations. There is also a considerable gap in awareness regarding PEG feeding among healthcare providers and the public, which can lead to delays in necessary care. This study is significant as it is one of the first in Nepal.

This study's results underscore the importance of early nutritional support in neurologically impaired patients, with cerebrovascular accidents, Parkinson's disease, and traumatic brain injuries being leading indications. The low complication rates further affirm the safety and feasibility of PEG in resource-limited settings, especially when trained gastroenterologists are available. Although our study is limited by its small sample size, addressing these challenges could significantly enhance patient care in Nepal. Future research should focus on multicenter studies and long-term assessments of complications and outcomes.

Conclusion

In Nepal, PEG tube insertions are primarily performed for neurological disorders, highlighting the critical need for timely nutritional intervention in these patients. The surprisingly low rate of oncological indications for PEG suggests potential deficiencies in cancer diagnosis and management within the healthcare system. To enhance PEG practices, it's crucial to implement clear guidelines, foster multidisciplinary team collaboration, and provide comprehensive healthcare professional training. Future research should focus on evaluating the long-term outcomes and cost-effectiveness of PEG in low-resource settings like Nepal to optimize its application and improve patient care.

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