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Safety, success, and outcomes of percutaneous endoscopic gastrostomy performed under local anesthesia in ASA III–IV patients: a single-center retrospective analysis

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ABSTRACT

Introduction: Percutaneous endoscopic gastrostomy (PEG) is widely used for long-term enteral nutrition; however, procedural sedation may increase cardiopulmonary risk in elderly, frail patients and those with comorbidities. This study evaluated the feasibility and safety of PEG placement under topical pharyngeal and local infiltrative anesthesia without procedural sedation in patients with American Society of Anesthesiologists (ASA) physical status III–IV.

Materials and Methods: This retrospective, single-center observational study included patients with ASA physical status III–IV who underwent attempted PEG placement between January 2024 and December 2025. All procedures were initially attempted without procedural sedation. Patients requiring conversion to sedation because of intolerance were excluded from the local anesthesia-only outcome analysis. Demographic characteristics, comorbidities, procedure duration, complications, and 30-day mortality were analyzed.

Results: Among 196 patients, PEG placement was technically successful in all cases. Thirty-eight patients required conversion to sedation, whereas 158 completed PEG placement without procedural sedation, yielding a local anesthesia-only completion rate of 80.6%. The mean age of the local anesthesia-only cohort was 81.6±9.7 years, and 92 patients (58.2%) were female. Early complications occurred in 11 patients (7.0%), late complications in 21 (13.3%), and overall patient-based complications in 31 (19.6%). One patient (0.6%) developed a perforation requiring surgery. Thirty-day all-cause mortality in the local anesthesia-only cohort was 8.2%, with no procedure-related mortality in either group.

Conclusions: PEG placement without procedural sedation was feasible in most selected patients with ASA physical status III–IV, although approximately one-fifth required conversion to sedation. This approach may be considered for selected high-risk patients.

Keywords: ASA physical status, complications, enteral nutrition, local anesthesia, percutaneous endoscopic gastrostomy, unsedated

Introduction

Percutaneous endoscopic gastrostomy (PEG) is a key method of providing nutritional support to patients who require long-term enteral feeding and have a functional gastrointestinal tract.[1–4] Since Gauderer et al.[1] first described PEG as a minimally invasive gastrostomy technique that avoids laparotomy, it has become a practical alternative to both surgical gastrostomy and prolonged

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nasogastric tube feeding.[1,2] Although nasogastric tubes may be suitable for short-term enteral support, prolonged use can reduce patient comfort and may be associated with tube dislodgement, nasopharyngeal irritation, reflux, aspiration, ulceration, and bleeding.[2–4] Current clinical practice guidelines therefore consider PEG an important option when enteral feeding is expected to be required for four weeks or longer.[2]

Patients referred for PEG are often elderly and frail, and many have neurological diseases, impaired swallowing safety, palliative care needs, or critical illnesses requiring intensive care.[3–6] Cerebrovascular disease, dementia, Parkinson's disease, neuromuscular disorders, head and neck malignancies, and other progressive systemic diseases are common clinical conditions in which PEG is considered.[2–5] Many of these patients also have cardiac, pulmonary, or metabolic comorbidities. Therefore, although PEG is technically a minimally invasive procedure, the patient population in which it is performed often carries substantial clinical risk.[5–8]

PEG is commonly performed with sedation to improve patient comfort, facilitate endoscopic manipulation, and increase procedural tolerance.[6,9] However, sedation is not equally safe for all patients. Advanced age, frailty, a high American Society of Anesthesiologists (ASA) physical status classification, reduced respiratory reserve, aspiration risk, neurological impairment, tracheostomy, and intensive care admission may all increase the risk of sedation-related cardiopulmonary events.[6,7,10] Current endoscopic sedation guidelines emphasize that sedation decisions should be individualized according to physiological reserve, comorbidity burden, and the expected balance between procedural benefits and risks rather than being based solely on the procedure itself.[6] These guidelines also recommend lower sedative doses, enhanced monitoring, and consideration of unsedated alternatives in elderly or comorbid patients with ASA physical status III or higher.[6]

Because of these potential sedation-related risks, performing PEG under topical pharyngeal anesthesia and local infiltrative anesthesia without procedural sedation may be a clinically relevant alternative for high-risk patients. The theoretical advantages of this approach include avoiding intravenous sedatives or analgesics that may contribute to respiratory depression, hypoxemia, aspiration, hemodynamic instability, and prolonged postprocedural recovery.[6,9,10] Conversely, unsedated PEG may be limited by patient cooperation, gag reflex, oropharyngeal passage, endoscopic manipulation, and overall procedural tolerance.[10–14] Therefore, defining the clinical settings in which unsedated PEG can be performed safely and effectively remains important.

Early studies of unsedated PEG frequently focused on transnasal approaches and ultrathin endoscopes.[11–13] Dumortier et al.[11] reported that unsedated transnasal PEG was feasible in selected patients and was associated with low complication rates. Lin and Shen also demonstrated that unsedated transnasal PEG could be performed by a single physician with a high success rate and an acceptable procedure duration.[12] McCulloch et al.[13] described nasal unsedated seated PEG as an effective option for high-risk candidates. However, transnasal approaches require an ultrathin endoscope, a suitable nasal passage, and consideration of the risk of epistaxis, and they may not be readily available in all centers.[11–13] Evaluation of a standard peroral endoscopic approach for unsedated PEG is therefore relevant to routine clinical practice.

Although the available literature on conventional peroral or transoral unsedated PEG is more limited, existing evidence suggests that this approach may be feasible in selected patients.[10,14–17] Steed et al.[10] reported that unsedated PEG could be performed using pharyngeal and local anesthesia in patients considered unsuitable for sedation or unwilling to receive sedation. Gul and Aydin evaluated unsedated peroral PEG in 49 high-risk patients and found that the procedure was generally well tolerated, with acceptable complication rates.[14] In a larger contemporary series, Yemez et al.[15] assessed conventional peroral unsedated PEG in 312 patients and reported a procedural success rate of 99%, a PEG-related complication rate of 9.2%, and a 30-day mortality rate of 5.1%. Additional studies evaluating unsedated outpatient PEG in patients with stroke and unsedated PEG using transoral ultrathin endoscopy in patients with amyotrophic lateral sclerosis further support the technical feasibility of avoiding sedation in different patient populations.[16,17]

Nevertheless, data remain limited for patients specifically classified as ASA physical status III–IV, particularly in cohorts that include both intensive care and palliative care patients and report early and late complications, 30-day mortality, and factors associated with complications after PEG performed under topical and local anesthesia. Reporting the rate of successful completion without sedation, the need for conversion to sedation, and proce-

dure-related mortality is also clinically important. This study aimed to evaluate the feasibility, technical success, procedure duration, early and late complication rates, 30-day mortality, and factors associated with complications in patients with ASA physical status III–IV undergoing PEG placement under topical pharyngeal and local infiltrative anesthesia without procedural sedation.

Materials and Methods

Study Design and Patient Population

This retrospective, single-center observational study evaluated patients with American Society of Anesthesiologists (ASA) physical status III–IV who were scheduled for percutaneous endoscopic gastrostomy (PEG) placement between January 2024 and December 2025. The study was conducted at a secondary-care state hospital. Adult patients who required long-term enteral nutrition because of inadequate or unsafe oral intake and were classified as ASA physical status III–IV were eligible for inclusion. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.

During the study period, 196 patients with ASA physical status III–IV and an indication for PEG placement were evaluated. All procedures were initially attempted without sedation using topical pharyngeal anesthesia and local infiltrative anesthesia. In 38 patients, the unsedated approach was not tolerated, and conversion to procedural sedation was required. The key clinical characteristics of these patients and the reasons for conversion were recorded descriptively. The local anesthesia-only analysis included 158 patients in whom PEG placement was completed under topical pharyngeal and local infiltrative anesthesia without procedural sedation. Overall PEG placement, including procedures in patients who were converted to sedation, was technically successful in all 196 patients.

Inclusion and Exclusion Criteria

Patients were included if they were 18 years of age or older, were classified as ASA physical status III or IV, had an indication for PEG because of the need for long-term enteral nutrition, and underwent attempted PEG placement between January 2024 and December 2025. In all patients, the gastrointestinal tract was considered suitable for enteral feeding, and the procedure was initially planned under local and topical anesthesia without sedation.

Patients younger than 18 years were excluded from the study. Patients who required conversion to procedural sedation because of intolerance of the unsedated procedure were excluded from the local anesthesia-only outcome analysis but were described separately. Intolerance was defined as the inability to continue the procedure safely because of severe gagging, agitation, inability to cooperate, or unacceptable patient discomfort despite topical pharyngeal and local infiltrative anesthesia. Patients with standard contraindications to PEG placement, including uncorrectable coagulopathy, peritonitis, severe abdominal wall infection at the planned puncture site, massive ascites, hemodynamic instability, inability to identify a safe puncture site, or distal gastrointestinal obstruction, were not considered eligible for this protocol.

Ethical Approval and Informed Consent

The study protocol was approved by Samsun University Non-Interventional Clinical Research Ethics Committee (Approval Number: 2026/4/3, Date: 18.03.2026). Written informed consent for the procedure was obtained from all patients before PEG placement or, when patients were unable to provide consent because of their clinical condition, from their legal representatives. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Procedure Technique

All PEG procedures were performed by one of four general surgeons experienced in upper gastrointestinal endoscopy and PEG placement. For patients hospitalized in the intensive care unit, the procedure was performed at the bedside under intensive care conditions. Patients hospitalized in palliative care units were transferred to the endoscopy unit for the procedure. No sedative medication was administered specifically for PEG placement in the local anesthesia-only cohort.

All patients received prophylactic intravenous cefazolin 1 g approximately 30 minutes before the procedure. Topical pharyngeal anesthesia was achieved using 10% lidocaine spray. Local infiltrative anesthesia at the abdominal puncture site was administered using 2% prilocaine. Oxygen saturation, noninvasive blood pressure, and heart rate were monitored throughout the procedure.

After upper gastrointestinal endoscopy, the gastric lumen

was evaluated. An appropriate puncture site was identified using endoscopic transillumination and external finger indentation of the anterior abdominal wall. After a safe access site was confirmed, the PEG catheter was placed using the standard pull technique. Procedure duration was defined as the time from the beginning of the endoscopic procedure to placement and fixation of the PEG catheter. After the procedure, patients were observed clinically for a short period. In patients without early complications or other contraindications to feeding, enteral nutrition through the PEG catheter was initiated within 4–6 hours after the procedure.

Variables and Data Collection

Demographic and clinical data were reviewed retrospectively from the hospital electronic medical record system. Age, sex, hospitalization unit, comorbidities, neurological diagnoses, presence of malignancy, tracheostomy status, intubation status, procedure duration, early complications, late complications, 30-day mortality, conversion to procedural sedation, and reasons for conversion were recorded.

Hospitalization unit was classified as either the intensive care unit or the palliative care unit. Comorbidities were grouped as cardiac, pulmonary, or metabolic diseases. Neurological conditions included Alzheimer's disease/dementia, cerebrovascular disease or stroke, Parkinson's disease, epilepsy, and cerebral palsy. Patients with complete procedural and outcome data were included in the final analysis. No missing data were identified for the variables analyzed in the final cohort.

Definitions of Complications

Adverse events occurring within the first 7 days after PEG placement were defined as early complications. Complications occurring after day 7 during the documented clinical follow-up available in the hospital records were defined as late complications. Complications were categorized according to the clinical records as local/peristomal infection, bleeding, perforation, tube dislodgement, or tube obstruction.

The patient-based overall complication rate was calculated as the proportion of patients who developed at least one early or late complication during follow-up. If the same patient experienced both an early and a late complication, that patient was counted only once in the overall complication analysis. Thirty-day mortality was defined as death from any cause within the first 30 days after PEG placement. Procedure-related mortality was defined as death directly attributable to the PEG procedure or a procedure-related complication.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 24.0. Continuous variables were expressed as mean±standard deviation or median and range, depending on the distribution. Categorical variables were presented as numbers and percentages.

Clinical variables were compared between patients with and without complications. Categorical variables were compared using the chi-square test or Fisher's exact test and were evaluated using univariable logistic regression, where appropriate. Continuous variables were compared using Student's t test or the Mann–Whitney U test, depending on the distribution. Results for categorical variables were reported as odds ratios, 95% confidence intervals, and p values. Because no statistically significant predictors were identified in the univariable analyses and the number of complication events was limited, multivariable regression was not performed. A p value of <0.05 was considered statistically significant.

Patients requiring conversion to procedural sedation were summarized descriptively. Baseline characteristics were also compared exploratorily between patients who completed PEG placement without sedation and those who required conversion to procedural sedation. Continuous variables were compared using Student's t test or the Mann–Whitney U test, depending on the distribution, and categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate.

Results

Patient Flow and Technical Success

Between January 2024 and December 2025, 196 patients with American Society of Anesthesiologists (ASA) physical status III–IV and an indication for percutaneous endoscopic gastrostomy (PEG) placement were evaluated. All procedures were initially planned without sedation using topical pharyngeal anesthesia and local infiltrative anesthesia. Overall PEG placement, including procedures in patients who required conversion to sedation, was technically successful in all 196 patients, yielding an overall technical success rate of 100%.

Thirty-eight patients did not tolerate the unsedated procedure and required conversion to procedural sedation. The mean age of these patients was 80.8±8.3 years. Twenty-four patients were female (63.2%), and 19 patients (50.0%) were hospitalized in the intensive care unit. The most common reason for conversion was a pronounced gag reflex or retching, observed in 24 patients (63.2%), followed by agitation in 9 patients (23.7%). Less frequent reasons included anxiety in 2 patients (5.3%), desaturation in 2 patients (5.3%), and vomiting or a choking sensation in 1 patient (2.6%). Overall, conversion to procedural sedation was primarily required because of intolerance to endoscopic passage despite topical anesthesia, including a pronounced gag reflex or retching, agitation, and difficulty maintaining cooperation during the procedure.

These patients were excluded from the local anesthesia-only outcome analysis. The final analysis included 158 patients in whom PEG placement was completed under topical pharyngeal and local infiltrative anesthesia without sedation. The completion rate under local anesthesia without sedation was 80.6%. The study flow is shown in Figure 1.

In an exploratory comparison, patients requiring conversion to procedural sedation were more frequently hospitalized in the intensive care unit than those who completed PEG placement without sedation (50.0% vs. 30.4%, p=0.035) and more frequently had pulmonary disease (28.9% vs. 8.9%, p=0.002). Alzheimer's disease or dementia was less frequent among patients requiring conversion (39.5% vs. 60.8%, p=0.028). No statistically significant differences were observed in age, sex, cardiac disease, metabolic disease, malignancy, tracheostomy status, intubation status, or 30-day all-cause mortality.

Demographic and Clinical Characteristics

The mean age of the 158 included patients was 81.6±9.7 years. Ninety-two patients were female (58.2%), and 66 were male (41.8%). One hundred ten patients (69.6%) were hospitalized in palliative care units, and 48 (30.4%) were hospitalized in the intensive care unit (Table 1).

Comorbidities included cardiac disease in 99 patients (62.7%), metabolic disease in 53 (33.5%), pulmonary disease in 14 (8.9%), and malignancy in 13 (8.2%). Alzheimer's disease/dementia and cerebrovascular disease/stroke were the most common neurological conditions. Alzheimer's disease or dementia was present in 96 patients (60.8%), cerebrovascular disease or stroke in 73 (46.2%), Parkinson's disease in 10 (6.3%), epilepsy in 10 (6.3%), and cerebral palsy in 2 (1.3%). Fourteen patients (8.9%) had a tracheostomy, and 7 (4.4%) were intubated (Table 1).

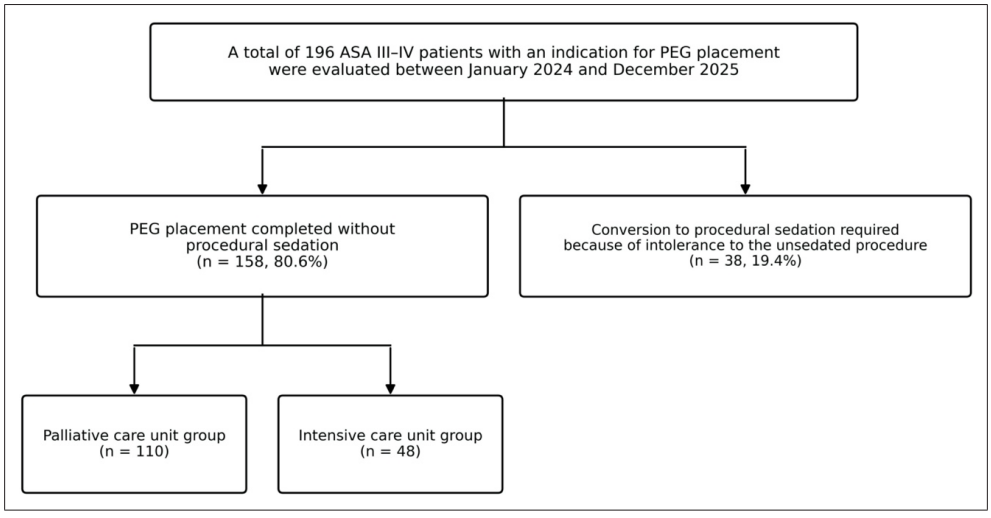

Figure 1. Study flowchart. Of the 196 patients with American Society of Anesthesiologists (ASA) physical status III–IV who were evaluated for percutaneous endoscopic gastrostomy (PEG) placement between January 2024 and December 2025, 158 (80.6%) completed the procedure without procedural sedation, whereas 38 (19.4%) required conversion to procedural sedation because of intolerance of the unsedated procedure. Among the patients who completed PEG placement without procedural sedation, 110 were hospitalized in the palliative care unit and 48 in the intensive care unit. PEG, percutaneous endoscopic gastrostomy; ASA, American Society of Anesthesiologists.

Table 1. Baseline demographic and clinical characteristics of patients who completed PEG placement under local anesthesia

Variable	Value
Total patients	158
Age, years	81.6±9.7
Sex	
Female	92 (58.2)
Male	66 (41.8)
Hospitalization unit	
Palliative care unit	110 (69.6)
Intensive care unit	48 (30.4)
Comorbidities	
Cardiac disease	99 (62.7)
Metabolic disease	53 (33.5)
Pulmonary disease	14 (8.9)
Malignancy	13 (8.2)
Neurological conditions	
Alzheimer's disease/dementia	96 (60.8)
Cerebrovascular disease/stroke	73 (46.2)
Parkinson's disease	10 (6.3)
Epilepsy	10 (6.3)
Cerebral palsy	2 (1.3)
Airway-related status	
Tracheostomy	14 (8.9)
Intubation	7 (4.4)

Values are presented as mean±standard deviation or n (%). Percentages may exceed 100% for comorbidities and neurological conditions because some patients had more than one condition. PEG: percutaneous endoscopic gastrostomy.

Procedure Duration and Procedural Outcomes

The mean procedure duration among the 158 patients who completed PEG placement under local anesthesia was 18.0±3.2 minutes. The median procedure duration was 17 minutes, with a range of 12–29 minutes. The mean procedure duration was 19.0±2.4 minutes in patients with a tracheostomy and 17.9±3.3 minutes in those without a tracheostomy. Although the procedure duration was numerically longer in patients with a tracheostomy, the difference was not statistically significant (p=0.084) (Table 2).

Early and Late Complications

Early complications occurring within the first 7 days after PEG placement were observed in 11 patients, corresponding to an early complication rate of 7.0%. The most common early complication was local/peristomal infection, which occurred in 9 patients (5.7%). Bleeding occurred in 1 patient (0.6%), and perforation occurred in 1 patient (0.6%). The patient with perforation required surgical intervention, survived, and did not experience procedure-related mortality (Table 3).

Late complications occurring after day 7 were recorded in 21 patients, corresponding to a late complication rate of 13.3%. Late complications included local/peristomal infection in 7 patients (4.4%), tube dislodgement in 6 (3.8%), bleeding in 5 (3.2%), and tube obstruction in 3 (1.9%) (Table 3).

In the patient-based analysis, 31 patients experienced at least one early or late complication during follow-up, yielding an overall complication rate of 19.6%. Although the total number of early and late complication events was 32, one patient experienced both an early and a late complication; therefore, the patient-based overall complication count was 31 (Table 3).

Mortality

Thirty-day all-cause mortality was 8.2% (13/158) among patients who completed PEG placement without procedural sedation (Table 3). Among the 38 patients who required conversion to procedural sedation, 30-day all-cause mortality was 10.5% (4/38). The overall 30-day all-cause mortality rate for the entire cohort was 8.7% (17/196). No deaths were directly attributed to the PEG procedure or to a procedure-related complication in either group.

Factors Associated With Complication Development

When patients with and without complications were compared, no statistically significant differences were identified in sex, hospitalization unit, cardiac disease, metabolic disease, pulmonary disease, malignancy, tracheostomy status, intubation status, or the common neurological variables analyzed, including Alzheimer's disease/dementia and cerebrovascular disease/stroke (Table 4).

For continuous variables, the mean age was 81.6±12.7 years in patients with complications and 81.5±8.8 years in those without complications; the difference was not statistically significant (p=0.470). The mean procedure dura-

Table 2. Procedural characteristics and technical outcomes

Variable	Value
Total patients with ASA physical status III–IV evaluated for PEG placement	196
Overall technical success of PEG placement	196/196 (100.0)
Completed under topical pharyngeal and local infiltrative anesthesia without sedation	158/196 (80.6)
Required conversion to procedural sedation because of intolerance	38/196 (19.4)
Procedure duration, min	18.0±3.2
Procedure duration, median (range), min	17 (12–29)
Procedure duration according to tracheostomy status	
Tracheostomy present	19.0±2.4
Tracheostomy absent	17.9±3.3
p value	0.084

Values are presented as mean±standard deviation, median (range), or n (%). ASA: American Society of Anesthesiologists; PEG: percutaneous endoscopic gastrostomy.

tion was 18.7±3.4 minutes in patients with complications and 17.9±3.2 minutes in those without complications; this difference was also not statistically significant (p=0.180) (Table 5).

Table 3. Early and late complications and mortality among patients who completed PEG placement without procedural sedation

Outcome	n (%)
Early complications (within 7 days)	**11 (7.0)**
Local/peristomal infection	9 (5.7)
Bleeding	1 (0.6)
Perforation	1 (0.6)
Late complications (after day 7)	**21 (13.3)**
Local/peristomal infection	7 (4.4)
Tube dislodgement	6 (3.8)
Bleeding	5 (3.2)
Tube obstruction	3 (1.9)
Patients with at least one complication	31 (19.6)
Major complication requiring surgery	1 (0.6)
30-day all-cause mortality	13 (8.2)
Procedure-related mortality	0 (0.0)

One patient experienced both an early and a late complication; therefore, the total number of complication events was 32, whereas the patient-based overall complication count was 31. The patient with perforation required surgical intervention but survived, and no procedure-related mortality occurred. PEG: percutaneous endoscopic gastrostomy.

No statistically significant factors associated with complication development were identified in the univariable analyses.

Discussion

This retrospective, single-center study evaluated the feasibility and safety of percutaneous endoscopic gastrostomy (PEG) placement under topical pharyngeal anesthesia and local infiltrative anesthesia without procedural sedation in patients with American Society of Anesthesiologists (ASA) physical status III–IV. The principal findings can be summarized as follows: overall PEG placement, including procedures in patients converted to sedation, was technically successful in all evaluated patients; 80.6% of patients completed the procedure without requiring sedation; and among the 158 patients who completed PEG placement under local anesthesia, the patient-based overall complication rate was 19.6%, the 30-day all-cause mortality rate was 8.2%, and procedure-related mortality was 0.0%. The most common reasons for conversion to procedural sedation were a pronounced gag reflex or retching and agitation, whereas anxiety, desaturation, and vomiting or a choking sensation were less common. In addition, age, sex, hospitalization unit, comorbidities, tracheostomy status, intubation status, the neurological variables analyzed, and procedure duration were not significantly associated with complication development.

In exploratory comparisons, conversion to procedural sedation was more frequent among patients hospitalized in the intensive care unit and those with pulmonary dis-

Table 4. Univariable analysis of categorical factors associated with overall complications

Variable	Odds ratio	95% CI	p
Female sex	1.17	0.52–2.62	0.839
Intensive care unit hospitalization	0.76	0.31–1.84	0.665
Cardiac disease	1.10	0.49–2.50	1.000
Pulmonary disease	0.29	0.04–2.32	0.306
Metabolic disease	1.11	0.49–2.54	0.834
Malignancy	0.73	0.15–3.46	1.000
Tracheostomy	1.73	0.51–5.95	0.478
Intubation	0.67	0.08–5.80	1.000
Alzheimer's disease/dementia	1.46	0.63–3.35	0.418
Cerebrovascular disease/stroke	0.95	0.43–2.09	1.000

Overall complication was defined as the occurrence of at least one early or late complication. Reference categories were male sex, palliative care unit hospitalization, and absence of the relevant comorbidity or clinical condition. CI: confidence interval.

Table 5. Continuous variables according to overall complication status

Variable	Complication present	Complication absent	p
Age, years	81.6±12.7	81.5±8.8	0.470
Procedure duration, min	18.7±3.4	17.9±3.2	0.180

Values are presented as mean±standard deviation. Overall complication was defined as the occurrence of at least one early or late complication.

ease, whereas Alzheimer's disease or dementia was less frequent among patients requiring conversion; however, these findings should be interpreted cautiously.

The overall technical success rate in the present study was 100%. This finding is consistent with previous reports and guidelines describing PEG as a procedure with a high technical success rate when appropriate patient selection and identification of a safe access site are achieved.[2–5] Since the original description by Gauderer et al.,[1] a major advantage of PEG has been its less invasive nature compared with open surgery and the fact that general anesthesia is often not required. Current PEG guidelines also emphasize that PEG can be performed with a high success rate when indications and contraindications are carefully evaluated.[2] In the present study, the local anesthesia-only completion rate of 80.6% suggests that a topical/local anesthesia approach may not be sufficient for every high-risk patient but can be successfully completed in most patients with ASA physical status III–IV.

Reported success and tolerability rates for unsedated PEG vary according to the technique used and patient selection. Steed et al.[10] completed unsedated peroral PEG without complications in a small series of patients considered unsuitable for sedation and reported that the procedure was better tolerated than expected. Gül and Aydın[14] evaluated unsedated peroral PEG in 49 high-risk patients and concluded that the technique was safe, tolerable, and feasible. In a larger series of 312 patients, Yemez et al.[15] reported a 99% success rate for peroral unsedated PEG. The present study adds to this evidence by focusing on a more fragile population with ASA physical status III–IV, including a substantial proportion of intensive care and palliative care patients, and by demonstrating that unsedated PEG can be completed in most of these patients.

Studies of transnasal and ultrathin endoscope-based unsedated PEG also support the technical feasibility of avoiding sedation.[11–13,17] Dumortier et al.[11] attempted unsedated transnasal PEG in 23 patients and successfully completed the procedure in 21; the failures were related to an inability to achieve transillumination rather than to the unsedated approach itself. Lin and Shen reported a 96.8% success rate and a mean procedure duration of 14.7 minutes in a prospective study of unsedated transnasal

PEG, with no major complications or procedure-related mortality.[12] Sato et al.[17] also evaluated unsedated PEG using transoral ultrathin endoscopy in patients with amyotrophic lateral sclerosis. However, transnasal or ultrathin endoscope-based techniques may require specific equipment and suitable anatomical conditions. Therefore, the ability to use a standard peroral approach with topical and local anesthesia may provide a practical advantage, particularly in centers with limited access to specialized equipment.

The mean procedure duration in the present cohort was 18.0±3.2 minutes. This appears broadly comparable with the procedure times reported in studies of unsedated PEG.[12–15] Lin and Shen reported a mean procedure duration of approximately 14.7 minutes for unsedated transnasal PEG.[12] Yemez et al.[15] performed peroral unsedated PEG using pharyngeal lidocaine anesthesia and the pull technique in the standard supine position. Considering that our cohort included older patients with ASA physical status III–IV who were hospitalized in palliative care units and intensive care units, an average procedure duration of 18 minutes appears clinically reasonable. Procedure duration was numerically longer in patients with a tracheostomy, but the difference was not statistically significant. This suggests that tracheostomy may increase organizational or positioning complexity but was not itself associated with complications or procedural failure in this cohort.

Sedation remains an important and appropriate component of PEG practice in many patients. In selected patients, sedation can be administered safely by experienced teams with appropriate monitoring and, when necessary, anesthesiology support.[6,9,18] Amornyotin et al.[9] reported that propofol-based sedation did not increase complication rates during PEG placement. Strijbos et al.[18] showed that PEG under conscious sedation in patients with amyotrophic lateral sclerosis was not associated with an increased risk of respiratory complications. These findings indicate that sedation should not be considered inherently unsafe in all patients. The focus of the present study, however, is not whether sedation can be safe but whether an unsedated topical/local anesthesia approach can provide a feasible alternative for patients considered to be at high risk for sedation-related complications, such as those with ASA physical status III–IV.

Alternative gastrostomy techniques also have an important role in high-risk patients. Percutaneous radiological gastrostomy has been proposed as an alternative to PEG in patients with amyotrophic lateral sclerosis and advanced respiratory impairment, with some studies suggesting potential respiratory advantages.[19,20] Leeds et al.[21] compared endoscopic and radiological gastrostomy and reported broadly similar mortality outcomes between the approaches.[21] Mohamed Elfadil et al.[22] compared radiologic and endoscopic gastrostomy in a randomized study and reported that radiologic gastrostomy may be noninferior to PEG in terms of complications, pain, and quality of life. Reis et al.[23] demonstrated that bedside percutaneous ultrasound-guided gastrostomy may be an alternative in critically ill patients. Zippi et al.[24] also reported that PEG can be performed at the bedside in selected critically ill patients in the intensive care unit. These techniques may be valuable in selected populations, but access to interventional radiology, expertise in ultrasound-guided gastrostomy, or specialized devices is not uniform across institutions. In this context, unsedated peroral PEG using standard endoscopic equipment may offer a practical approach in resource-limited settings.

PEG complication rates vary substantially across the literature depending on the patient population, follow-up duration, complication definitions, and procedural technique.[3–5,25] Stenberg et al.[25] reported 30-day minor and major complication rates of 11% and 15%, respectively, in a multicenter retrospective study of 389 patients and identified factors such as age, diabetes mellitus, malignancy, heart failure, lower body mass index (BMI), and higher C-reactive protein levels as potentially associated with adverse outcomes. Hucl and Spicak[5] emphasized that most PEG complications are minor, although major complications can be life-threatening. In the present study, early complications occurred in 7.0% of patients, late complications in 13.3%, and the patient-based overall complication rate was 19.6%. These rates are within the range reported in previous high-risk PEG populations. However, the occurrence of one perforation requiring surgical intervention highlights that even an unsedated approach requires careful patient selection, technical expertise, and close follow-up.

The most common complication in the present study was local/peristomal infection, consistent with the broader PEG literature.[3–5,14,15] With the pull technique, passage of the tube through the oropharyngeal tract may contribute to contamination of the abdominal wall tract and increase the risk of peristomal infection.[2,3] Antibiotic prophylaxis is

therefore an important component of PEG practice.[2,3] Current guidelines and reviews support the administration of a single preprocedural dose of antibiotics, particularly when the pull technique is used, to reduce the risk of peristomal infection.[2,3] In the present study, all patients received intravenous cefazolin 1 g approximately 30 minutes before the procedure; nevertheless, local infections still occurred. This suggests that prophylaxis reduces but does not eliminate the risk of infection and that patient age, care setting, comorbidity burden, stoma care, and postprocedural follow-up may also influence infection development.

Thirty-day all-cause mortality was 8.2% among patients who completed PEG placement without procedural sedation and 8.7% in the entire cohort. No deaths were directly attributed to the PEG procedure or to a procedure-related complication. Reported 30-day mortality after PEG varies widely and is often more closely related to underlying disease, nutritional status, age, inflammation, malignancy, neurological disease, and level of care than to the procedure itself.[7,21,25] Johnston et al.,[7] using National Confidential Enquiry into Patient Outcome and Death (NCEPOD) data, emphasized that many patients who died within 30 days after PEG had neurological disease and serious comorbidities and that the expected benefit of PEG may be limited in some cases. Stenberg et al.[25] reported 30-day and 90-day mortality rates of 15% and 28%, respectively, and showed that mortality was influenced by patient-related factors.[25] Yemez et al.[15] reported a 30-day mortality rate of 5.1% in a peroral unsedated PEG series. The 8.2% mortality rate observed in the local anesthesia-only cohort appears consistent with these data, particularly given the older population with ASA physical status III–IV, and the absence of procedure-related mortality supports the procedural safety of this approach in selected patients.

Limitations

This study has several limitations. First, it was retrospective and single-center in design; therefore, patient selection, procedural decision-making, and follow-up may have been influenced by local practice and institutional experience. Second, there was no independently selected sedated PEG control group; therefore, direct comparison with a planned sedated PEG strategy was not possible. Third, although the key characteristics of the 38 patients who required conversion to procedural sedation and the reasons for conversion were described, these patients were not included in the local anesthesia-only outcome analysis, which may have introduced selection bias toward patients who better tolerated the unsedated approach. The exploratory comparisons between groups were unadjusted and should not be interpreted as a predictive model. Fourth, patients with ASA physical status III and IV were not analyzed separately. Fifth, the causes of 30-day mortality were not classified in detail; therefore, mortality was reported as 30-day all-cause mortality. Sixth, late complications were identified from documented clinical follow-up in hospital records; therefore, the duration and completeness of late complication surveillance may not have been uniform across all patients. Nevertheless, the absence of procedure-related mortality is clinically relevant to the primary safety outcome of this study.

Despite these limitations, this study provides real-world data on elderly and comorbid patients with ASA physical status III–IV, including those in palliative care and intensive care settings. The findings suggest that PEG placement can be completed without additional procedural sedation under topical pharyngeal and local infiltrative anesthesia in selected high-risk patients. The unsedated approach is not suitable for all patients, as approximately one-fifth required conversion to sedation. Careful patient selection, preprocedural assessment, monitoring, experienced operators, appropriate technique, and close postprocedural follow-up are therefore essential for safe implementation.

Conclusion

Unsedated PEG placement under topical and local anesthesia can be completed in a high proportion of selected patients with ASA physical status III–IV, although approximately one-fifth may require conversion to procedural sedation because of intolerance. Complication rates were within the range reported in high-risk PEG populations, and no procedure-related mortality occurred. In patients considered to be at increased risk for sedation-related adverse events, this approach may represent a practical alternative when appropriate patient selection and experienced procedural teams are available. Prospective, multicenter studies are needed to better define patient selection, the safety profile, and longer-term outcomes.

Disclosures

Ethics Committee Approval: Ethics committee approval was obtained from Samsun University Non-Interventional Clinical Research Ethics Committee (Approval Number: 2026/4/3, Date: 18.03.2026).

Informed Consent: Written procedural informed consent was obtained from all patients before PEG placement or, when patients were unable to provide consent because of their clinical condition, from their legal representatives. The study was conducted in accordance with the principles of the Declaration of Helsinki.

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