

# Feasibility, safety and efficacy of percutaneous endoscopic gastrostomy on ventilated patients in ICU

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## Abstract

An audit of 27 ventilated patients who underwent percutaneous endoscopic gastrostomy (PEG) in ICU revealed that this procedure could be safely performed in the ICU under local anesthesia. None of the patients had any hemodynamic or respiratory complications. All of them could be started on enteral feeds on the following day. PEG done in the ICU avoids the complications of transportation to the operation theater and general anesthesia.

**Key words:** Intensive care unit, percutaneous endoscopic gastrostomy (PEG), safety

## Introduction

Despite early diagnosis and appropriate treatment, nosocomial infections are an important poor prognostic factor in the ICU patients on ventilator.<sup>[1-3]</sup> Early enteral feeds are associated with better outcomes but the association of nasogastric feeds with increased incidence of nosocomial pneumonia has offset this advantage.<sup>[4,5]</sup> The conventional approach to enteral access is to use nasogastric or nasojejunal tubes, but these not only cause gastroesophageal junction to be incompetent but also bacteria are known to migrate along the tube into the throat and ultimately into the respiratory passages.<sup>[4-6]</sup> Surgical gastrostomy overcame this complication but required transportation to Operation Theater and risks of anesthesia. Percutaneous Endoscopic Gastrostomy (PEG) was introduced in 1980 as an alternative to laparotomy for placement of a gastrostomy tube.<sup>[7]</sup>

The common indications for PEG are patients likely to need prolonged mechanical ventilation and or tube feeding either due to trauma, head injury, stroke or neurological disease.

As invasive surgery requires the patient to be transported to the operation theater which usually acts as a deterrent for non-life saving surgery in ICUs we decided to study the feasibility, safety and efficacy of bedside PEG procedure in seriously ill, ventilated patients avoiding the risks of anesthesia and transportation.<sup>[8,9]</sup>

## Materials and Methods

This was a retrospective analysis of a prospectively collected data. Twenty-seven ventilated patients, who underwent PEG in the ICU between April 2002 to April 2006, formed the study group. PEG was performed in the ICU using Freka PEG set 20 F, under local anesthesia. Gastroscope was passed and stomach was distended with air. Once trans-illumination was seen, trochar with canula was introduced per abdomen into the stomach followed by the thread, which was pulled out through the mouth. PEG catheter was attached to it, pulled out

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through the anterior abdominal wall and fixed. Incidents like bleeding, abdominal distension were monitored. Feeding was started within 24h of the procedure.

## Results

### Demography

There were 21 males and six females with ages ranging from 18 to 74 years. Twenty-four patients had head injury while three had spontaneous intracranial bleed. All the 27 patients were ventilated and on Ryles tube feeding prior to PEG. Average ventilator days and ICU stay prior to PEG were eight days. Nine patients had Ventilator Associated Pneumonia (VAP) before PEG.

Twenty-five patients had tracheostomy while two patients had air way accessed with endotracheal tubes. Procedure time averaged eight minutes. Two patients with endotracheal tubes had their cuffs deflated to enable a smoother passage of PEG tube and hence the procedure time was few minutes longer. All the patients were hemodynamically stable and maintained saturation throughout the procedure.

Eighteen patients were weaned from ventilator and shifted out of ICU in 48h. All nine patients who had VAP required further ICU stay up to an average of nine days following the procedure, but none developed further episodes of VAP. No complications such as bleeding, perforation of viscous (other than stomach), pneumoperitoneum or peritonitis were seen during or following the procedure.

Enteral feeds were started after 24h in all patients and were well-tolerated.

No complications like bleeding, peritonitis and abdominal distension were observed in any of the 27 patients in immediate post procedure period. Longest follow up was for 60 days. Days on PEG feeding ranged from 40 to 60 days. No long-term complications were observed. One patient had minor wound infection and was treated with local dressings.

### Discussion

Our study shows PEG to be a safe bedside procedure even for ventilated patients and therefore can be easily performed in ICU. The short procedure time, use of local anesthesia for the procedure did not add to the morbidity

in our patients. These findings are comparable to that in other studies.<sup>[7-9]</sup>

Despite studies showing early gastrostomy to reduce the incidence of VAP, invasive procedures in ICU patients are usually differed for the additional risk involved. We found that PEG procedure was safe and could be performed in the ICU under local anaesthesia, involved no transportation of ventilated patients, none developed hemodynamic compromise or desaturation during the procedure. Enteral feeds could be started within 24h in all patients thereby eliminating the need for expensive parenteral feedings and its associated complications.

Our study showed eighteen of the twenty-seven patients studied could be shifted out of the ICU within 48h suggesting an influence on the length of ICU stay. There were no cases of VAP in any of the patients following the procedure. Patients who had VAP prior to the procedure did not develop any additional complications and could be weaned off the ventilator in the next four to nine days.

Complications of PEG are infrequent, with a mortality rate of 0.3 % and morbidity rate of 3-5% in the largest reported series.<sup>[7,8]</sup> A recent literature review of PEG cites an overall complication rate of 17% with only 3% regarded as serious. Reported complications include wound infection, peritonitis, septicaemia, peristomal leakage, tube dislodgement, aspiration, bowel perforation and gastro colic fistula.<sup>[10-12]</sup> No patient in our series showed the above-mentioned complications. Our longest followed-up patient till date is a case of severe head injury on PEG feeds for last nine months and has no complications. Presently for long-term patients skin level buttons are available which can replace the protruding tube once the stoma matures. As seen in other studies long-term follow-ups, including the procedure for removal of PEG did not result in any complication.<sup>[12]</sup>

An absolute contraindication to PEG is the inability to bring the anterior wall of stomach in apposition to the anterior abdominal wall. Therefore patients with prior subtotal gastrectomy, ascites or marked hepatomegaly and obesity will require careful evaluation to be sure that the stomach and abdominal wall can be brought together with gastric insufflation. Coagulation defects if correctable are not a contraindication for the procedure.<sup>[13]</sup>

Kostdema E and colleagues as well as Ibrahim *et al.* showed very early PEG done on the day of intubations to significantly reduce the incidence of VAP when compared to patients on nasogastric feedings.<sup>[10,11]</sup> In our cases early PEG was not done as a result the influence of PEG on incidence of VAP in our group of patients cannot be commented upon. As we have seen in our study that PEG is a safe bedside procedure. Future prospective studies can evaluate the influence of early PEG on incidence of VAP in our ICUs.

### Conclusion

PEG is suited particularly for patients who have an increased risk of transportation and surgery under general anesthesia. It can be safely performed in ICU as a bedside procedure in ventilated patients and probably helps in reducing the ICU stay.

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**Source of Support:** Nil, **Conflict of Interest:** None declared.