

Articolo Originale - Original Article

Enteral nutrition in the ICU: Clinical experience of Percutaneous Endoscopic Gastrostomy

F. FERRARO, A. CAPASSO, E. TROISE, S. LANZA, F. FERRARA, R. REGOLO, A. DI SIMONE, C. BELLUOMO ANELLO

Dipartimento di Scienze Anestesiologiche, Chirurgiche e dell'Emergenza, Servizio di Terapia Intensiva, Seconda Università degli Studi di Napoli - Italia

ABSTRACT: Introduction. Data in the literature demonstrate the advantages of enteral feeding vs. parenteral feeding. Mini-invasive gastrostomy, first described in 1980, seems easier to perform and has fewer complications than surgical gastrostomy. This study aimed to describe our experience with percutaneous endoscopic gastrostomy (PEG) in critical patients in the intensive care unit (ICU).

Materials and methods. Between October 1999 and June 2003, 35 patients, mean age 66.1 yrs (range 29-92) underwent PEG. The majority (20 patients), were affected by neurological diseases. PEG, using the pull technique, was performed 18.9 days (range 1-35) after admission to the ICU. PEG was always associated with tracheostomy and performed using total intravenous general anesthesia at the bedside in the ICU.

Results. Mean procedure time was 8 ± 4 min. The patient groups were followed-up for 1 yr. There were no related complications observed during hospitalization and during domiciliary nursing. Catheter substitution was performed only in three patients.

Conclusions. Our experience, in accordance with the literature, demonstrates that PEG is a safe and effective technique for medium and long-term enteral feeding in the ICU. (RINPE 2004; 22: 86-90)

KEY WORDS: Enteral nutrition, Percutaneous endoscopic gastrostomy

PAROLE CHIAVE: Nutrizione enterale, Gastrostomia percutanea endoscopica

INTRODUCTION

Data in the literature support the enteral vs. parenteral route in the nutrition of critical patients (1): enteral feeding seems easier to administer and is more physiologic, preventing the intestinal atrophy and bacterial translocation and stimulating immunological response (2). Nasogastric tubes used in the past have been inadequate in long-term therapy, due to patient discomfort and the risks of decubitus ulcers and aspiration pneumonia (2). Surgical gastrostomy and jejunostomy are always performed in the operating theater with general anesthesia and are associated with high morbidity and mortality rates (3, 4). The first description of mini-invasive gastrostomy appeared in 1980 (5). Since then,

several authors have reported their experience with this technique, which has excellent results in terms of morbidity and patient management (6).

The purpose of this study was to describe our experience with percutaneous endoscopic gastrostomy (PEG) in the treatment of critical patients in a general intensive care unit (ICU).

MATERIALS AND METHODS

Between October 1999 and June 2003, 35 patients, 18 males and 17 females, mean age 66.1 yrs (range 29-92) underwent PEG. Patients, enrolled in this study, presented the following admission diagnosis: cardiorespira-



Fig. 1

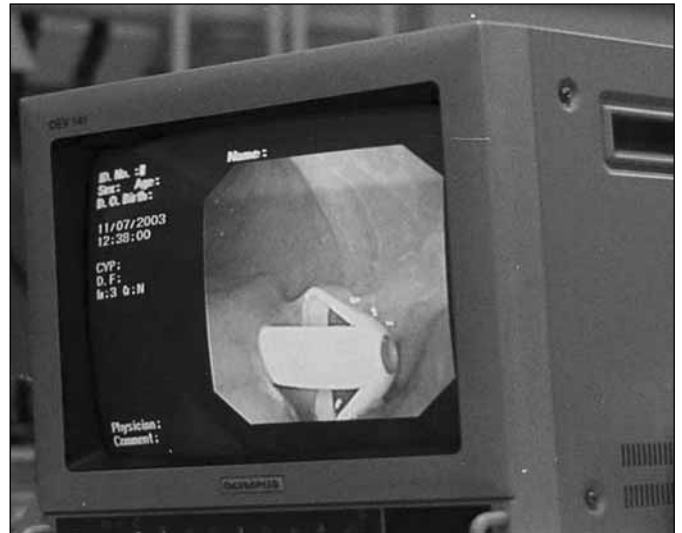


Fig. 2



Fig. 3



Fig. 4

tory insufficiency, 23 patients (65.7%); cerebral vascular accident, four patients (11.4%); coma, five patients (14.2%), and post-operative monitoring after major surgical procedures, three patients (8.2%). The severity of the illness was assessed in each patient using the Acute Physiology and Chronic Health Evaluation (APACHE) III Score, 71.48 ± 27.36 (media \pm SD) (range 20-119). Patients were affected by the following concomitant disease: amiotrophic lateral sclerosis, six patients (17.1%), Alzheimer's disease, one patient (2.8%), Parkinson's disease, two patients (5.7%); Friederich's Atassia, one patient (2.8%); polymyositis, one patient (2.8%); COPD, five patients (14.2%); myocardial stroke, five patients (14.2%); hypertension, six patients (17.1%);

and sepsis, eight patients (22.8%). In one patient diaphragmatic relaxation was present, and one patient was mono-pulmo.

Patients had already received enteral nutrition through a nasogastric tube and PEG was performed 18.9 days (range 1-35) after admission to the ICU.

We preferred to use the "pull" technique (7, 8) in all patients. In 25 patients (71.4%) we used a carbotan catheter (Dura-PEG Abbott™) (Fig. 1) with a non-collapsible bumper, in seven patients (20%) a poliurethan catheter (Sonda PEG Nutricia™ (n=1), Entristar Tyco™ (n=6)) (Fig. 2) and in three patients (8.5%) a silicone catheter (MIC-PEG Ballard™ (n=1), Corflo max PEG Corpak™ (n=2)), the last two groups with a collapsible

bumper. PEG was always associated with tracheostomy (Fig. 1); the technique, was always performed at the bedside in the ICU, using total intravenous general anesthesia for patients with spontaneous ventilation and using local anesthesia for patients on mechanical ventilation (VAM) under sedation.

Enteral feeding through PEG usually started 24 h after the end of the procedure.

RESULTS

The average procedure time was 8 ± 4 min.

Our population was followed-up for 1 yr. In this period we observed no complications related either to procedures (such as stoma infections, accidental perforations and hemorrhages) (Fig. 3) or to the management of gastrostomy, even in domiciliary nursing. In one patient, PEG was successfully removed, without endoscopic assistance (PEG with a collapsible bumper), before his discharge from hospital.

Catheter substitution, performed without endoscopic assistance, was necessary in three patients (8.5%) during the 1st yr, because of stoma inflammation due to enteric reflux between the stoma and the catheter. The reflux occurred using an Entristar Tyco™ catheter with a collapsible fenestrated bumper (Fig. 2). The inflammation was resolved by placing a catheter with a collapsible non-fenestrated balloon bumper.

In addition, we evaluated the outcome at 1 yr and we observed that 26 patients were still alive while nine patients died from underlying disease during hospitalization.

DISCUSSION

The advantages of enteral feeding vs. the parenteral feeding, in normal functional gastrointestinal tract patients, are well known (1, 2) and they are fewer costs, patient compliance and gastrointestinal tube integrity maintenance (7, 8). PEG seems to be a safe and cost-effective alternative to operative gastrostomy, the latter requiring general anesthesia and it is not without significant morbidity and mortality, furthermore, failed PEG does not preclude subsequent operative gastrostomy (11).

PEG indications are: neurological diseases with swallowing incapacity, pharyngeal and esophageal neoplasias (9, 10) and in our opinion, long-term hospitalized patients after major surgical procedures unable to swallow.

In patients unable to swallow, we evaluated the aspiration risk. A functional test of swallowing with methyl-

ene blue was performed in patients with tracheostomy: a positive test was indicative for PEG placement. In patients without tracheostomy, we searched for radiological signs of aspiration pneumonia. During VAM to reduce the incidence of aspiration, we routinely used a further protective device consisting of continuous aspiration for cleaning the subglottic area (Hi-Lo™ Evac Mallinckrodt/Tyco).

Absolute PEG contraindications are: massive ascitis, gastric varices, hepatomegaly, coagulopathies and total esophageal stenosis. Previous abdominal surgery may not represent a problem if there is good adhesion between the abdominal and the gastric wall. In our experience, diaphragmatic relaxation was not an absolute contraindication to the procedure (Fig. 4), as our patient was on VAM, we delayed PEG placement for some time, until the VAM pushed the stomach into the abdomen (12).

In the literature, there are no statistically significant differences in success and complication rates between the push and pull methods in PEG placement (13). We preferred the pull technique because it is easier to perform and it is not associated with the risk of spacing out the plans crossed by the stoma during percutaneous dilation, this reduces complications such as infections and/or hemorrhage.

From our experience, we prefer using carbotan tubes (Figs. 1, 3, 4) with high biocompatibility, but not their collapsible bumpers, which allow tube substitution only with endoscopic assistance; therefore, we placed it to manage the long-term enteral nutrition. We did not need to change the carbotan tube at 1 yr. Instead we used the polyurethane or silicon tubes with collapsible bumpers (removable tube without endoscopic assistance) (Fig. 2) for middle term nutrition. Our results, with no significant complications, confirm the literature data (14-17). Moreover, the biocompatibility of materials used (carbotan and polyurethane) allows a delay in tube substitution: in our series this was necessary only in three patients (8.5%), some months after the procedure using the polyurethane tube and the fenestrated collapsible bumper; the latter being the reason for stoma inflammation (8.5%). In our experience, the high cost of carbotan has allowed cheaper nursing without the need for substitution during follow-up. No patient who received PEG suffered from reflux and/or diarrhea, probably because gastrostomy efficiently closes the esophageal sphincter instead of the nasogastric tube (2); therefore, good nursing (with slow enteral exhibitions and with adequate temperature) avoids the common enteral feeding complications. We reserved the use of nasojejunal tubes or trans-PEG jejunostomy for patients with severe gastroesophageal reflux or gastric motor disorders.

CONCLUSIONS

Our experience, in accordance with the literature, demonstrates that PEG, performed in the ICU, seems to be a safe and effective technique for medium and long-term enteral nutrition. From this perspective, PEG allows reduced hospitalization with fewer costs in the ICU.

RIASSUNTO

Introduzione. Diversi AA, in letteratura, hanno evidenziato i vantaggi della nutrizione enterale rispetto a quella parenterale. La gastrostomia mini-invasiva, descritta per la prima volta nel 1980, risulta più facile da eseguire e presenta un minor rischio di complicanze rispetto alla gastrostomia chirurgica. Lo scopo di questo studio è di riportare la nostra esperienza sull'applicazione della Gastrostomia Percutanea Endoscopica (PEG) nel paziente critico in una Unità di Terapia Intensiva generale (ICU).

Materiali e Metodi. Nel periodo compreso tra Ottobre 1999 e Giugno 2003, in 35 pz, di età media 66.1 aa (intervallo 29-92) è stata eseguita la PEG. La maggior parte dei pz (20 pz) erano affetti da patologie neuro-

logiche. La PEG, eseguita secondo metodica PULL è stata effettuata dopo 18.9 gg (intervallo 1-35) dall'ammissione in ICU. La PEG è stata sempre associata a tracheostomia e realizzata in anestesia generale totalmente endovenosa, a letto del paziente in ICU.

Risultati. La durata media della procedura è stata di 8±4 minuti. Su questi pazienti è stato effettuato un follow-up di un anno. Nessuna complicanza è stata osservata sia durante il ricovero ospedaliero che durante l'assistenza domiciliare. La sostituzione della sonda PEG è stata necessaria solo in 3 casi.

Conclusioni. La nostra esperienza, in accordo con la letteratura, ha mostrato che la PEG, realizzata in ICU, rappresenta una sicura e valida tecnica per la gestione della nutrizione enterale a lungo e medio termine.

Address for correspondence:

Fausto Ferraro, MD
Servizio di Terapia Intensiva
Seconda Università degli Studi di Napoli
Corso Vittorio Emanuele, 649/c
80121 Napoli
e-mail: fausto.ferraro@unina2.it

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