

Percutaneous endoscopic gastrostomy: a practical overview on its indications, placement conditions, management, and nursing care

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Abstract:

Percutaneous endoscopic gastrostomy (PEG) feeding represents the most effective and safest option for feeding patients with an impaired or diminished swallowing ability, despite having a functioning digestive system. In order to make it more widely used in clinical practice, this guideline aims to cover its indications, placement conditions, management, and nursing care. The use of PEG has evolved to be useful in many situations beyond degenerative neuromuscular disorders, with an increasing body of evidence supporting the advantages of PEG tubes in oncologic and pediatric patients. Risk factors for complications after PEG tube placement associated with malnutrition and several organic disorders. Patients suitable for PEG tube placement should be individually identified to implement the advantages of this technique while minimizing risk events. The safety of placing a PEG tube in patients under antibiotic prophylaxis in reducing peristomal infection. Percutaneous endoscopic gastrostomy-related complications are rare and mostly prevented by appropriate nursing care. Best medical practice and nursing care will ensure optimal performance leading to a wider acceptance, and greater utility of PEG by healthcare professionals, patients, and caregivers. Conclusion PEG feed as the most valuable access for patients with a functional gastrointestinal system who have abnormalities in swallowing mechanisms.

Key words: Percutaneous endoscopic gastrostomy; Impaired or diminished swallowing ability; In the gastrointestinal nutrition

Introduction

Percutaneous endoscopic gastrostomy (PEG) is a revolutionary method of gastrointestinal nutrition, initially introduced by Gauderer and colleagues in 1980. This method marked a significant advancement over the previous prevalent use of nasogastric tubes (NGTs), which, relatively simple to place, presented several complications for long-term use^[1]. Currently, there are reports highlighting the numerous advantages of PEG. The American Gastroenterology Association has adopted it as the method of choice for patients who are unable to maintain oral intake but require long-term nutrition support. PEG effectively avoids the erosion of the nasal, pharyngeal, esophagus, and cardia mucosa resulted from long-term indwelling of the gastric tube. It also preserves the anti-reflux function of the lower esophagus and cardia, thereby reducing the risk of gastroesophageal reflux and aspiration pneumonia.

1 Indications and contraindications of percutaneous gastrostomy (PEG)

1.1 Indications

The main indications for PEG include patients who are unable to eat orally due to the following conditions: Dysphagia caused by central nervous system damage, such as stroke, brain trauma, vegetative state, or amyotrophic lateral sclerosis (ALS); Head and neck tumors, either before or after radiotherapy or surgery; Hospitalized patients with malignant or nonmalignant ascites; Esophageal perforation. Duodenal perforation; Esophageal anastomotic fistula; Gastroplegia or gastrointestinal stasis following abdominal surgery; Aspiration pneumonia; Oral feeding disorders with preserved normal gastrointestinal function^[2-11].

1.2 Contraindications

The contraindications for PEG include the following: Severe coagulation dysfunction^[12]; Gastric varices; Large or complete gastric incisions; Acute abdomen or severe skin infections; Significant ascites or patients undergoing peritoneal dialysis.

2 Surgery

2.1 Preparation

2.1.1 General Preparations

The general preparations mainly include the following: Perform relevant examinations, such as blood tests (routine and coagulation), liver function tests, CT scans, and ECG. Discontinue anticoagulant medications at least one week before the procedure. Administer prophylactic antibiotics to prevent fistula infections. Establish venous access, provide nutritional supplementation, adjust water and electrolyte balance, and ensure the patient fasts for 8 – 12 hours before the procedure. Provide psychological support and obtain informed consent.

2.1.2 Instrument preparation

Prepare conventional surgical instruments, percutaneous gastrostomy kits, and any additional required equipment.

2.2 Surgical operation

Place the patient in the left lateral decubitus position. The gastroscope is inserted while the patient is supine (alternatively, the procedure may be performed under X-ray guidance). Inflate the stomach with air to bring the stomach wall close to the abdominal wall. Confirm the stomach's position by percussing the left upper abdomen and observing the endoscopic light transmitted through the abdominal wall. After determining the insertion site, mark the skin at the gastric wall fixation site and the gastric fistula site. Use this area as the center for disinfection. Administer local anesthesia. Using a syringe, slowly inject the anesthetic while inserting the needle vertically. When the tip reaches the stomach, air bubbles can be observed due to the negative pressure. Perform percutaneous fixation of the gastric wall and abdominal wall using gastric wall fixators.

Proceed with the percutaneous gastrostomy: Make a small incision (approximately 5 mm) at the predetermined fistula site. Vertically insert the PS needle, assembled with the T-shaped support sleeve, into the stomach. Confirm under endoscopic guidance that the tip of the holder reaches the stomach. Leave the T-shaped holder in place and remove the PS needle. Im-

mediately block the holder with your fingers to prevent air leakage. Insert the gastrostomy tube until the latex-coated portion is fully in place.

Inflate the balloon with sterile distilled water. While pulling the tube out, gently tear and remove the T-shaped support sleeve. Gently pull the catheter to confirm that the balloon is securely against the anterior gastric wall. Press the catheter into the guide plate of the fixed plate to form a traction fixation with the abdominal wall. Secure it with two straps and then apply a bandage^[13].

3 Nursing

3.1 Intraoperative care

Pay attention to monitoring the pulse, blood pressure, and blood oxygen saturation. Keep the airway open, remove oral secretions as needed, and closely observe any changes in the patient's condition.

3.2 Postoperative care

After 72 hours of fasting post-operation, hemostatic, anti-inflammatory, and acid-suppressing drugs were administered, along with bed rest provided. Vital signs were carefully monitored to ensure stability. Additionally, the patient was closely observed for any signs of severe chest pain, abdominal pain, vomiting, and melena, while the surgical wound was also regularly checked for any evidence of bleeding^[14].

3.3 Care of the fistula

During the first 1 to 2 weeks after the operation, the skin around the fistula should be routinely disinfected twice a day. Two sterile gauze pieces should be prepared with a gap cut into each: the lower layer should face downward, and the upper layer should face upward. Observe the fistula for signs of bleeding, swelling, or secretions, and monitor the depth of the tube. If no redness, swelling, bleeding, or secretions are observed in the fistula after 1 to 2 weeks, the frequency of dressing changes can be reduced to once a day until the wound is completely healed. Once the fistula is fully formed, the dressing can be changed 2 to 3 times per week. The fistula should also be mobilized 2 to 3 times per week to prevent adhesion. Notify medical staff immediately if any abnormalities occur. Regularly replace the sterilized distilled water in the balloon

(this is recommended to be done by professional medical staff). Two weeks after the surgery, the fistula should be inspected to confirm it is intact, and the gastric wall fixation sutures should be removed.

3.4 Tube-feeding care

Tube feeding is initiated 72 hours after the operation, either by drip or push-in method. The initial daily volume should not exceed 300 mL and can gradually increase based on the patient's gastric emptying capacity, generally reaching 1 500 – 2 000 mL per day. If conditions allow, a nutritionally balanced enteral nutrient solution should be used for dripping. The drip rate must be controlled to prevent complications; typically, 500 mL of the solution is infused over 4 to 6 hours. In winter, use a warmer to prevent the solution from being too cold, which could lead to abdominal pain and diarrhea. If nutritionally balanced solutions are unavailable, alternatives such as rice soup, vegetable soup, milk, or fish soup can be used, followed by a gradual transition to semi-liquid, high-nutrition foods like pureed vegetables and minced meat. Feed the patient 4 to 6 times a day, with 200 – 250 mL per session. The temperature of the food should be maintained at 38 – 40 °C. Each injection of food should be slow, with moderate quantities, and the feeding volume and speed must strictly align with the patient's gastric emptying capacity.

Before each tube feeding, withdraw and measure the gastric residue. If the residue exceeds 100 mL, consider the patient intolerant and adjust the feeding schedule accordingly. Ensure trace element supplementation and monitor blood biochemistry regularly. Oral medications can be administered with 30 – 50 mL of warm water.

During or 30 – 60 minutes after tube feeding, position the patient in a semi-sitting posture to prevent aspiration. Perform sputum suction 1 hour before or after feeding. If coughing or sneezing occurs during feeding, pause the procedure and resume only once the patient recovers to avoid aspiration. Flush the fistula with 20 – 30 mL of warm water before and after each food injection to maintain cleanliness and prevent obstruction. If oral intake is insufficient, adjust the amount of tube feeding accordingly.

In cases of diarrhea, check the cleanliness of the food and utensils and ensure the food is not too cold. If the patient is unconscious during tube feeding, ensure the food temperature is appropriate, as overheating may cause discomfort.

4 Complications

Avoid premature and excessive tube feeding after surgery. Take care to prevent infection of the stoma while bathing by keeping the fistula clean and dry. Regularly check the abdomen to monitor for bloating. If an infection develops around the fistula, wash the area with 2% hydrogen peroxide (H_2O_2), clean it with 0.9% sodium chloride solution, and apply zinc oxide ointment to protect the skin. If necessary, administer anti-infective drugs to treat the infection. To prevent local bleeding caused by granulation tissue growth, clean the area daily with a 10% sodium chloride solution^[15–17].

5 Summaries

Percutaneous gastrostomy is an essential medical procedure designed for patients who are unable consume food orally, yet possess a functional digestive system. This technique is favored in medical setting due to its straightforward application, high safety profile, and low incidence of complication. Consequently, it has become widely accepted and utilized in healthcare facilities. To further ensure more effective implementation of this procedure, it is critical to provide professional training for medical personnel and home caregivers involved in the procedure. Additionally, providing individualized guidance for each patient helps prevent complications early and ensures safe and effective care for every patient.

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