Percutaneous endoscopic gastro-duodenostomy: modified technique

Nine cases and review of the literature

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SUMMARY

Objectives — Percutaneous endoscopic gastro-jejunostomy is appropriate for patients with severe neurologic deficit to avoid repeated tube feeding-related aspiration. We describe a modified technique of endoscopic gastro-duodenostomy.

Patients and methods — This technique was performed in 9 patients with severe neurologic deficit. No fluoroscopy was necessary. The gastrostomy button was pushed across the pylorus into the bulb; a nasogastric tube was then placed in the duodenum under endoscopic control and the button was drawn to the gastric wall. When the gastroduodenal tube migrated or was occluded, the button was placed in the bulb through the pylorus and maintained in this position for alimentation.

Results — Placement of the gastro-duodenostomy tube was successful without any complication in 100% of patients. The mean duration of the procedure was 15 min. The tube had to be removed for migration (N = 4) and occlusion (N = 5) after a mean period of 5.8 weeks (range: 2-10). During the follow-up period, no tube feeding-related aspiration was observed.

Conclusion — This modified low-cost technique of endoscopic gastro-duodenostomy is simple and efficient.

RÉSUMÉ

Gastro-duodénostomie percutanée par voie endoscopique technique modifiée. Présentation d’une série de 9 cas et une revue de la littérature

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Objectifs — La gastro-jéjunostomie d’alimentation permet de prévenir les complications d’inhalation chez les malades souffrant de déficit neurologique sévère. Nous décrivons une technique modifiée de mise en place de gastro-duodénostomie par voie endoscopique.

Malades et méthodes — Cette technique a été réalisée chez 9 malades souffrant de déficits neurologiques sévères. Elle ne nécessite pas de contrôle fluoroscopique. Le disque de butée était positionné dans le bulbe puis une sonde naso-gastrique était poussée à travers la sonde de gastrostomie dans le duodénum avant de tirer le disque de butée vers la paroi gastrique. En cas de migration ou d’occlusion de la sonde, le disque de butée était maintenu dans le bulbe pour la poursuite de la nutrition entérale.

Résultats — La mise en place de la sonde de gastro-duodénostomie a été possible sans complication dans 100 % des cas. La durée moyenne de mise en place était de 15 minutes. La sonde a dû être retirée pour migration (N = 4) ou occlusion (N = 5) dans un délai moyen de 5,8 semaines (extrêmes 2-10). Durant la période de suivi, aucune complication d’inhalation liée à la nutrition entérale n’a été observée.

Conclusion — Cette technique modifiée de gastro-duodénostomie est simple, efficace et peu coûteuse.

Introduction

Percutaneous endoscopic gastrostomy has become the method of choice for long-duration enteral nutrition [1, 2]. Aspiration pneumonia is a serious complication of percutaneous gastrostomy and can occur in 10 to 22% of patients [3]. Abnormal stomach emptying and gastroesophageal reflux are the main risk factors for this complication [4-6] usually seen in patients with severe neurologic deficit. In this situation, percutaneous endoscopic gastrojejunalostomy is the alternative choice [7, 8]. This endoscopic method requires fluoroscopy to position the jejunal button. Tube or guidewire loops in the stomach are a major problem. Despite technical improvements, insertion of a jejunal tube remains a difficult task [9, 10]. In the present work, we describe a technique for gastroduodenostomy developed by modifying the gastrojejunalostomy technique to insert a gastrostomy tube in the duodenum.

Patients and methods

We applied our modified technique in nine consecutive patients with severe neurological deficit due to a cerebral vascular event (N = 6), brain tumor resection (N = 2) and encephalitis (N = 1).

We used a GIF gastroscope (Olympus®), the PEG kit® (Bard 20F), a 10F nasogastric tube, and a foreign body forceps (Olympus® FO). The technique involved two steps. The first step was performed in the endoscopy or intensive care unit under neuroleptic analgesia. A percutaneous endoscopic gastrostomy tube was inserted with the pull technique. A nasogastric tube was then pushed through the gastrostomy tube to the button. The button was held by the foreign body endoscopy forceps and pushed into the bulb through the pylorus instead of leaving it in the pylorus. The endoscope was then positioned in the second duodenum where the foreign body forceps was used to push the gastrostomy tube as far as possible towards the duodenojejunal junction. Once the nasogastric tube was positioned, the gastrostomy tube was pulled back to its initial position in contact with the gastric wall. Tube feeding began 24 hours later. Since
the formation of a fibrous percutaneous tract required two weeks, in the event of migration into the stomach or obstruction before two weeks, the gastroduodenal tube was replaced using the same technique. The second step was performed in the event of migration, obstruction or accidental pull out of the gastroduodenal tube more than two weeks after the gastrostomy. Upper endoscopy was performed after intravenous midazolam injection to push the tube back through the pylorus into the bulb with the foreign body forceps. The objective of this second step was to maintain the button in the bulb and use the gastrostomy tube for nutrition instead of the gastroduodenal tube (figures 1 and 2).

Results

This technique was successful in all nine patients without fluoroscopy. Mean follow-up was 111 days (range: 25-350). The first step was achieved in all patients without complication and none of the gastroduodenal tubes had to be replaced. On average, the tube had to be withdrawn at 5.8 weeks. Accidental pull out of the gastroduodenal tube occurred in four patients 2, 4, 5, and 8 weeks after insertion. For the five other patients, obstruction of the gastroduodenal tube developed at 3, 5, 6, 9, and 10 weeks. For these nine patients, when the gastroduodenal tube was withdrawn, the gastrostomy button was pushed into the bulb and remained in place until replacement of the gastroduodenal tube. During the study period, tube feeding via the gastrostomy was conducted without reflux, aspiration pneumonia or migration.

Mean duration for the first step of the procedure was 15 minutes. The second step lasted 10 minutes. None of our patients presented signs of reflux, regurgitation, or accidental aspiration. Likewise, evacuation of gastric secretions was not a problem in any of our patients. The position of the gastroduodenal tube in the duodenum and the position of the button was checked on plain abdominal film performed one week after each step and endoscopically if the gastrostomy tube had to be changed.

Discussion

Percutaneous endoscopic gastrostomy is indicated when nutritional support is planned for more than one month. This technique is generally warranted in patients with neurological deficits, particularly after cerebral vascular events as in our patients [11]. In patients with severe neurological deficit, gastroparesis or gastroesophageal reflux increases the risk of aspiration pneumonia [12]. For these patients, gastrojejunostomy is indicated, either as first-intention or by transforming a previous gastrostomy. Nutritional support beyond the duodenal-jejunal junction could avoid the problems of regurgitation and aspiration [8, 13-15]. Failure (up to 30%) can be related to several factors: inconstant position of the tube beyond the duodenal-jejunal junction, absence of double tubes in gastric and jejunal positions to allow gastric aspiration, and use of jejunal tubes with an inner diameter less than 12F [16]. New endoscopic methods have been recently described to facilitate insertion of the jejunostomy tube beyond the duodenojejunal junction: fluoroscopy-guided enteroscopy [17], combined enteroscopy and laparoscopy [18], use of the gastrostomy orifice to reach the small bowel [19], replacement of the jejunal tube by a nasobiliary drain [9], use of tubes with inner diameters greater than 12F [20], use of special guidewires [21, 22] or smaller diameter endoscopes passed through the gastroduodenal tube or via the naso route [23]. These methods are relatively complex and difficult to implement. With our modified technique the mean duration of the two steps was 25 minutes. In the literature, the mean time necessary for gastrojejunostomy, including the endoscopy and/or fluoroscopy times, varies from 20 to 40 minutes depending on the technique used [17, 24].

Our method has several advantages compared with previously described techniques. Firstly, the 10F nasogastric tube is used as a gastroduodenal feeding tube instead of jejunal tubes and nasobiliary drains thus reducing the cost of the procedure. The second advantage is related to modifications of the technique described by Sibille et al. [25] where the collar of the gastrostomy tube is pushed into the bulb under endoscopic guidance before introduction of the gastroduodenal tube with the foreign body forceps and then used pushed it into the third portion of the duodenum. This modification prevents formation of loops in the stomach and duodenum, facilitating insertion of the duodenal tube. The third advantage is that the endoscopic procedure can be performed without fluoroscopy. The novel feature of our method is that the gastrostomy collar can be left in the bulb after the gastroduodenal tube has been withdrawn or becomes obstructed at least two weeks after insertion. The pylorus prevents the collar from migrating into the stomach so feeding can be delivered via the gastrostomy tube without requiring a jejunal tube. None of our
patients had any problem with evacuation of the gastric contents and none experienced regurgitation back into the stomach despite the fact that the feeding tube was situated above the duodenojejunal junction.

In conclusion, our experience demonstrates that this is a simple and effective method with reduced cost since a simple nasogastric tube is used. Fluoroscopy is also avoided and the duodenal tube can be inserted without risk of a gastric loop. Feeding can be delivered via the gastrostomy tube alone placed in the bulb without complications. These preliminary results are encouraging and suggest that a larger scale study should be conducted with longer follow-up.

REFERENCES