

# Morbidity and Mortality of Laparoscopic Feeding Gastrostomy in Dysphagic Patients: Case-Series from a Specialized Center in the Treatment of Special Needs Patients

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## ABSTRACT

**Objectives:** Describe the surgical technique of a laparoscopic feeding gastrostomy developed in a specialized center in the treatment and follow-up of special needs patients. **Patients and methods:** Observational study of 22 patients followed in our Institution from 2004 to 2007 who were submitted to laparoscopic feeding gastrostomy. Seven patients were also submitted to a gastroesophageal reflux surgical procedure. A single purse-string was used in the laparoscopic gastrostomy. A second stitch was placed fixating the gastric wall to the skin (external fixation). **Results:** There was no mortality. Surgical morbidity was 4.5%. The gastrostomy feeding tube was displaced in 3 patients (13.6%) due to inadequate care at home. Laparotomy to relocate the feeding tube was necessary in 2 of these 3 patients. **Discussion and conclusions:** The laparoscopic feeding gastrostomy technique described is simple, rapid, and associated with low surgical morbidity in these special needs patients. However, the high incidence of post-operative feeding tube dislodgement indicates the need of adequate post-operative home orientation.

**Key words:** gastrostomy, laparoscopy, feeding tube, mortality, morbidity.

Bras. J. Video-Sur, 2008, v. 1, n. 2: 076-081

Accepted after revision: March, 26, 2008.

## INTRODUCTION

Dysphagia is an impairment of swallowing involving any structures of the upper gastrointestinal tract from the lips to the stomach. Causes of dysphagia include neuromuscular diseases in 80% of the cases (cerebral palsy, neurodegenerative disorders, cerebral trauma and chromosomal abnormalities), surgery to the digestive system, intense gastroesophageal reflux and idiopathic reasons<sup>1</sup>.

Difficulty in eating and drinking, intense salivation, excessive tongue movement, coughing while eating, wet or hoarse voice quality, repetitive bronchopneumonia are clinical signs of dysphagia, those symptoms are an alert to a prompt treatment avoiding complications such as malnourishment, worsening general and neurological status, recurrent pulmonary infection and oesophagic bleeding<sup>2,3</sup>.

Clinical treatment (medicamentous or nutritional) is one of the first choices in cases of dysphagia, thus surgical and endoscopic methods are only performed when clinical therapies failed. Minimally invasive techniques are preferably chosen and they can be done endoscopically (PEG – *percutaneous endoscopic gastrostomy*), radiologically ((PRG-*percutaneous radiological gastrostomy*) and even surgically (laparotomy or laparoscopy), since they are able to be performed<sup>2,4,5</sup>.

Individuals with cerebral palsy frequently present reflux associated to severe dysphagia<sup>6</sup>. Those cases are prone to repetitive bronchopneumonia, not only for the reflux but also for the prolonged use of nasogastric tube, thus videolaparoscopic surgery is indicated to control reflux disease (cruroraphy and gastric fundoplication). Although during the last years

percutaneous endoscopic gastrostomy have been indicated to the treatment of dysphagia, videolaparoscopy seems to be an attractive alternative method mainly in those cases in which it can be performed for reflux disease and dysphagia treatment simultaneously or when endoscopic procedure is contraindicated.

The objective of this manuscript is to describe the results of the gastrostomy technique performed through videolaparoscopy developed by the surgical staff of a specialized center in the treatment and follow-up of special needs patients.

## PATIENTS E METHODS

This is a case-series descriptive observational study. From 2004 to 2007, twenty-two special needs ambulatory patients were followed up in our Institution. Our study included a convenience (consecutive) sample of 16 male patients (72,7%) and 6 female patients (27,3%), aged from 18 to 25 years. Seven patients were submitted to laparoscopic surgery for concomitant treatment of gastroesophageal reflux disease and dysphagia.

During a multidisciplinary meeting composed of a pneumologist, an otorhinolaryngologist, a gastroenterologist, a digestive tract surgeon, an endoscopist, a physiatrist, a nutritionist and a psychologist the indication of surgery of all cases of dysphagia were individually discussed. Cases of dysphagia that failed clinical treatment were indicated to laparoscopic gastrostomy, though with contraindication to PEG (previous abdominal surgery, obesity, hematology alterations, ascites, portal hypertension, esophageal stenosis (**narrowing**), and severe respiratory difficulty) or with indication to gastroesophageal reflux surgical correction. After formal indication to surgery, family and/or **caregivers** are informed about the risks and benefits of this procedure, and then an informed consent for laparoscopy is fulfilled.

Patients were admitted to hospital the day before the surgical procedure in order to improve their pulmonary condition through physical therapy exercises and also to be preoperatively evaluated by the general physician.

Antibiotic prophylaxis was administered in all patients for 24 hours preoperatively with first generation cephalosporin (cephalothin). All cases were submitted to intravenous general anesthesia and

oro-tracheal intubation (or ventilation via tracheostomy). During the procedure the members of the surgical team were standing in this position: the surgeon between the patient's legs, the first assistant (video camera) on the patient's right side, the second assistant on the patient's left side (when cruroraphy and gastric fundoplication were performed) and the scrub nurse to the patient's left side. The surgeon in some cases stood to the patient's right side due to the difficulty to separate the legs because of ankylosis or other osteomuscular deformities. Laparoscopic hardware with monitor, insufflator, camera and light source were placed to the patient's left side.

After the Veress needle puncture and CO<sub>2</sub> insufflation into the abdominal cavity the trocars were inserted. In case of previous surgery the first trocar was inserted under direct vision of the abdominal cavity. In patients that were submitted only to gastrostomy the trocars were inserted as follows: a 10mm optical trocar at the umbilicus or beside it, a second 10mm trocar for manipulation into the left iliac fossa at the para-median line and a third 5mm trocar for manipulation into the right hypocondrium at the para-median line. In patients that were submitted to surgical treatment for gastroesophageal reflux disease the trocars were inserted as follows: a 10mm optical trocar at the umbilicus or beside it, a second 5mm trocar into the epigastric region to retract the liver, a third 10mm trocar for manipulation into the left flank close to the costal margin, a fourth 10 mm trocar for traction of the stomach into the left pararectal region and a fifth 5mm trocar for manipulation into the right subcostal region at the hemiclavicular line.

Diaphragmatic cruroraphy (one or two "X" silk sutures) and gastric fundoplication (Brandalise-Araña modified technique<sup>7</sup>) were the initial procedures to be performed followed by gastrostomy in cases submitted to those surgical procedures. A purse-string suture was performed on the anterior abdominal wall (2.0 silk) on a transitional zone between the body and the antropyloric in order to accomplish gastrostomy. At the center of this suture the gastric mucosa was exposed by using the button control for cut and coagulation of the electro-surgical pencil. Bard tri-Funnell gastrostomy tube 16F, Bard® - (Figure1) was inserted into the abdominal cavity through a port at the left subcostal region on the sheath of the abdominis rectus muscle. The distal extremity of the probe was guided into the gastric cavity and the balloon was insufflated with 20ml of saline. The purse-string suture

was pulled tight and tied narrowing the space between the gastrostomy tube and the gastric wall. A second simple stitch (2.0 silk) was externally tied to the purse-string diametrically opposed to the first knot. A Kelly forceps was inserted into the same gastrostomy port in the abdominal wall, then the ends of the simple suture were exteriorized, pulled along with the tube and tied up to the skin with a transfixation suture at the tube entry port (thread exteriorization; figure 2) (external anchoring; figure 3). Finally, the gastrostomy feeding tube bolster was fixed to the skin with two 4.0 Nylon stitches.



*Figure 1 - Tri Funnel silicone gastrostomy tube.*

During the immediate postoperative period patients fast for 8 hours with the gastrostomy tube opened and connected to a collecting bag. After this period patients were debilitated due to a gastrostomy lower than 150ml then they initially received through an enteral feeding tube a small volume infusion to avoid abdominal distension and diarrhea.

At hospital discharge a nutritionist and a nurse gave to family and/or **caretakers** instructions about enteral nutrition and tube feeding care at home. The patients were followed up for at least 6 months at the general surgery ambulatory.



*Figure 2 - Exteriorization of the thread with a Kelly forceps.*



*Figure 3 - Gastrostomy tube placement. The ends of the simple suture that were exteriorized and fixed to the skin are depicted through the bolster (external anchoring).*

## RESULTS

There was no register of postoperative mortality (30day) as well as cardiovascular and pulmonary complications. During the surgical procedure none of the patients needed blood transfusion.

On the second postoperative day patients were discharged, excluding one case submitted to concomitant surgery (cruroraphy + fundoplication + gastrostomy) that presented nutritional and gastric content leakage around the gastrostomy tube and developed cellulites on the abdominal wall. After the tenth postoperative day this case developed necrotizing fasciitis around the tube and the balloon was extruded. Then the patient was submitted to an exploratory laparotomy in which was not observed signs of peritonitis or accumulation into the abdominal cavity. Subsequently the gastrostomy was reverted, and then the linear cutter stapler was used to resect the anterior gastric wall. For nutritional support was chosen classic jejunostomy. After the second surgical procedure the case progressed satisfactorily, thus during 14 days the patient remained in the hospital to treat cellulites on the abdominal wall with antibiotic therapy.

In three cases (13,6%) the gastrostomy tube fell out at home, and in two of them before the 15<sup>th</sup> postoperative day. As family and/or caretakers during diet infusion inadvertently deflated the balloon of the feeding tube in all cases. The gastrostomy tube could not be reinserted and exploratory laparotomy was necessary to replace the gastrostomy tube and investigate the abdominal cavity in two of the cases due to the lateness to look for a hospital. None of these cases resulted in postoperative or clinical complications. Exploratory laparotomy was not performed in the third case because of the high surgical risk factor. The gastrostomy surgery was previously postponed due to precarious clinical conditions (anemia, bronchopneumonia and subclavian vein thrombosis).

Morbidity and mortality data of the laparoscopic procedures performed are depicted in table 1.

## DISCUSSION

Although nasogastric tube is a simple and cheap alternative to feeding special needs individuals,

it is a temporary method and it should only be used for long term nutrition in patients that are not indicated for surgery. It has associated risk of gastroesophageal reflux, aspiration of gastric contents to the trachea and pulmonary and airways infection, in addition to mechanical lesions to the esophageal mucosa. Moreover sometimes is difficult to infuse certain food and medications through the nasogastric feeding tube due to its small caliber<sup>2,8</sup>.

Gastrostomy when well indicated brings long term progress to clinical, nutritional and cognitive-motor status, to the easiness to infuse food and medications, to pubertal development and general infection and mortality rates<sup>2</sup>.

PEG is the technique of choice in our institution; however, when PEG was contraindicated or surgical treatment was necessary to correct gastroesophageal reflux laparoscopy was indicated. Both methods are equivalent with 1 to 2% of mortality rate and 3 to 12% of morbidity rate. Mortality rate as high as 4% and morbidity rate up to 32% in children and adolescents have already been described. Those differences may be explained by the heterogeneous criteria to select patients and to define postoperative morbidity. Postgastrostomy complications more frequently described in the literature are: tube dislodgment, bowel obstruction, bleeding, peritonitis, viscera lesions, fistulas, and pulmonary aspiration of the enteral nutrition. Fistulas occur at a rate of 2 to 3% of the cases and they may be asymptomatic for a long period. Gastrostomy may exacerbate the symptoms and cause bronchoaspiration of the gastric contents and the nutritional diet in patients with gastroesophageal reflux disease<sup>2,5,6,8</sup>.

The present study reported low mortality (0%) associated to the laparoscopic procedure but 18,2%

**Table 1** – Morbidity and mortality data of the studied population (n=22).

	n	%
Postoperative mortality	0	0,0 %
Cardiovascular complications	0	0,0%
Pulmonary complication	0	0,0%
Necrotizing fasciitis	1	4,5%
Surgical site infection	1	4,5%
Sepsis	0	0,0%
Blood transfusion	0	0,0%
Gastrostomy tube dislodgement	3	13,6%

of morbidity: one case with cellulites and infection of the abdominal wall and three cases of dislodged tube at home. However, in our opinion these three cases should not be statistically included as operative morbidity as this complication was not surgical, it occurred because of inadequate care of the gastrostomy tube at home. Disregarding these cases, morbidity rate associated to the procedure would be 4,5%.

Patient developed cellulites and necrotizing fasciitis around the gastrostomy tube in the only complication directly associated to the procedure. It is supposed that enough leakage of gastric content caused inflammation and contamination of the subcutaneous cellular tissue. This fact associated to the traction of the balloon of the feeding tube against the abdominal wall contributed to the necrosis and posterior tube extrusion on the tenth postoperative day. In spite of the evident seriousness, the abdominal cavity was not contaminated with gastric contents or nutritional diet because the stomach was anchored to the abdominal wall.

The gastrostomy technique described in this manuscript depicted a very attractive way to fix the stomach to the abdominal. At first as it is performed in the classic open Stamm-Senn technique surgeons tried internally to suture the stomach to the abdominal wall<sup>9,10</sup>. Nevertheless, soon it was observed the great technical difficulty to perform this suture as the laparoscopic clamps were almost parallel to the abdominal wall. Externally anchoring the stomach to the abdominal wall fixing it to the skin with a simple suture was the best option to overcome this technical difficulty.

Despite all the instructions given to family and/or caretakers before patient's hospital discharge it is important to call the attention that in almost 15% of the cases the gastrostomy feeding tube was dislodged at home. Enteral diet administration was not appropriately done and the balloon was inadvertently deflated in all cases. This clarifies two facts: 1) Family and/or caretakers need to understand the guidelines to handling properly the gastrostomy feeding tube at home. This is a key point to the indication or not of a laparoscopic gastrostomy; 2) the guidelines on how to manage the gastrostomy tube at home were not clearly and efficiently informed. Surprisingly, the institution where the study was performed has a specialized ostomy and wound care group. This multidisciplinary team of nurses, nutritionists and physical therapists

are trained to care and manage the gastrostomy tube and enteral nutritional diet and also the skin. In conclusion training should not be restricted to health professionals, yet it should involve family and/or caretakers as well.

## CONCLUSION

The laparoscopic gastrostomy technique described in this manuscript seems to be attractive due to its simplicity and low mortality and morbidity. However, it calls to our attention the dislodgment of the tube during the postoperative period in 15% of the patients, which evince the necessity of an adequate and careful instruction on home management and care of the gastrostomy tube. Consequently, the benefit of laparoscopic gastrostomy is dubious in patients whose family and/or caretakers do not understand and cooperate with the management and care of the gastrostomy tube in spite of its low morbidity and mortality.

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