

# The Lortat–Jacob operation by laparoscopic access to treat gastroesophageal reflux in pediatric patients

## Preliminary results

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### Abstract

**Background:** Even in the pediatric field, the technique most commonly used in the laparoscopic treatment of GERD is 360 fundoplication (according to Nissen and variants), but this is not devoid of serious complications or sequelae, such as persistent dysphagia or the “gas bloat syndrome.” In fact, there has been no lack of proposals of alternative techniques in literature aiming to reduce these negative postoperative events, especially in pediatric patients. At our pediatric surgical clinic at Bari University, the first choice technique is the Lortat–Jacob operation, used in traditional surgery for over 20 years and that has yielded excellent results both as regards control of GER and the complication and sequelae rate. Aim of this study, based on purely preliminary results, was to demonstrate the feasibility of the Lortat–Jacob operation by laparoscopic access in pediatric patients, even younger than 1 year old. To our knowledge, there are no other references in literature to the use of this technique by laparoscopic access in pediatric patients.

**Methods:** Antireflux plasty sec. Lortat–Jacob by laparoscopic access was performed in 10 patients of ages ranging between 10 months and 11 years. The technique adopted took into account all the recognized principles of the traditional surgical approach. The most delicate stage was the extensive mobilization of the distal esophagus at the level of the mediastinum, owing to the risk of bleeding, and of pleural and vagal lesions. Mean operative time was 1002 (8021202). All the operations were performed laparoscopically, and no intraoperative complications were recorded. The nasogastric probe was removed within 24 h postoperatively, and liquid feeding was recommenced within 36 h. All patients were discharged within 72 h.

**Results:** No complications or short or medium term sequelae were observed. Follow-up is still in the early stages, but the first radiological endoscopic, and pH monitoring controls have shown excellent results.

**Conclusion:** The initial data on our recent, limited experience show that the Lortat–Jacob operation can be performed by laparoscopic access in expert hands, provided scrupulous attention is paid to the timing and principles laid down for the traditional surgical approach. Moreover, laparoscopic access allows even greater care to be taken to prevent damage to the vagal nerves during mobilization of the terminal esophagus at the mediastinic level, as they are easier to identify even in children under 1 year old, thanks to the magnification of the image. The good control of GER and absence of complications or short or medium term sequelae justify our choice to use this operation. However, our results are still preliminary and need to be confirmed by an increasing number of patients and longer term follow-up.

**Key words:** Gerd — Lortat–Jacob operation — Fundoplication — Laparoscopy

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Surgical treatment of GER is becoming more and more common even in the pediatric field. This is largely due to the advent of laparoscopic surgery, whose mini-invasive nature featuring short postoperative stay, rapid functional recovery, and above all, only minor effect on the young patient’s emotional state have all contributed to make this the treatment of choice.

The most commonly used technique by both traditional and laparoscopic access in both the adult and the pediatric patient is 360° fundoplication (according to Nissen and variants) [3, 4, 8]. However, although this is undoubtedly a valid technique, it carries some serious complications and/or sequelae, such as persistent dysphagia or “gas bloat syndrome” [4].

**Table 1.** Overall signs and symptoms observed in the 10 patients treated

Vomiting and/or regurgitation	4
Retrosternal pyrosis	1
Delayed growth	2
Dry cough and recurrent pharyngotonsillitis	2
Recurrent bronchopneumonia	1
Bronchospastic crises	1

Persistent dysphagia in particular severely affects the final result in all patients with impaired esophageal motility (IEM), preoperatively diagnosed by manometry [4, 13, 14].

A number of alternative techniques have been proposed in literature (180° or 270° posterior fundoplication according to Toupet, 90° anterior fundoplication, etc.) aiming to reduce these postoperative sequelae, especially in neuropathic patients, who are most severely affected by IEM [5, 7, 12, 16].

For this reason, the surgical approach should aim to correct the anatomy of all the gastroesophageal components, to enable these to compensate for any anomalous release of LES and, while preventing GER, avoid hindering the passage of food bolus, already complicated by the presence of IEM [1, 2, 6, 9–11, 13–15].

The Lortat–Jacob technique does not require the use of any technical tricks aiming to increase pressure at the LES level but only focuses on reestablishment of the correct anatomy of the cardio-tuberosity region and achieving an adequate abdominal segment of esophagus and a good His angle. Thus it does not expose patients to the risk of dysphagia, unlike the “fundoplication,” while it is fully able to control the GER.

It is known that subjects with normal development of the cardio-tuberosity region but hypotonic LES do not necessarily develop GER [3].

In view of the above considerations, for over 20-years our surgical school, the Chirurgia Pediatrica Universitaria di Bari, has continued to adopt the Lortat–Jacob technique to treat GERD, obtaining both excellent results as regards resolution of the GER and a low incidence of complications or postoperative sequelae.

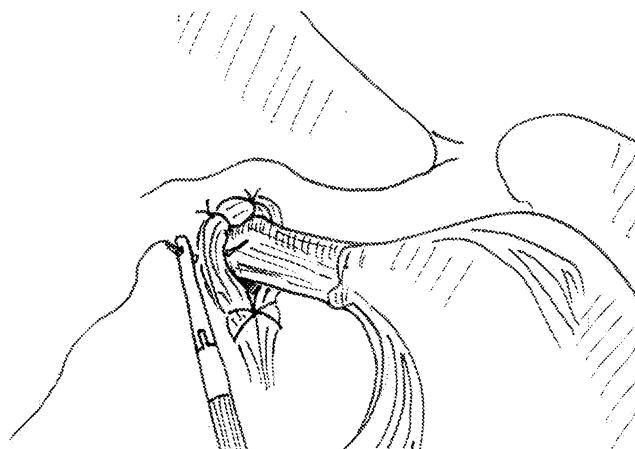
In view of these considerations, we decided to perform the technique by laparoscopic access and the aim of this study, based on purely preliminary data, was to demonstrate the feasibility of the Lortat–Jacob operation by laparoscopic access even in pediatric patients under 1 year of age.

## Materials and methods

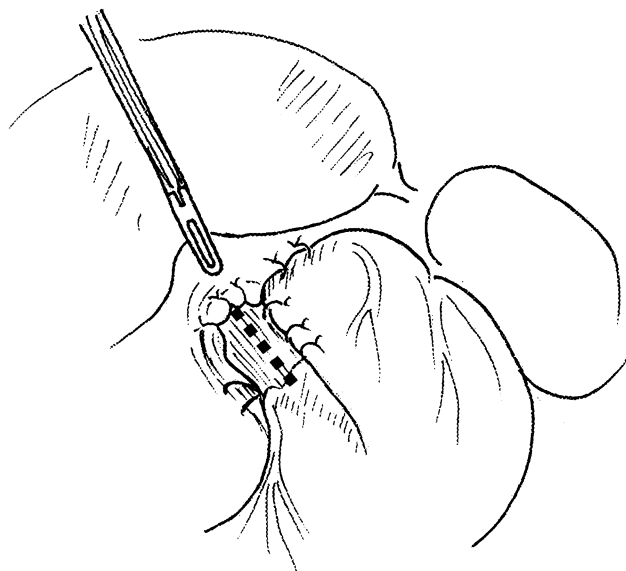
From November 1999 to December 2000, antireflux plasty sec. Lortat–Jacob was performed by laparoscopic access in 10 patients aged between 10 months and 11 years.

The indications for surgery were the clinical history and the results of a pool of diagnostic tests including X-rays of the esophagus, stomach, and duodenum, 24-h esophago-gastric pH monitoring, esophageal manometry, and esophago-gastro-duodenoscopy with biopsy.

Of the 10 cases treated, 6 had purely “gastroenterological” symptoms, consisting of frequent regurgitation and/or vomiting episodes (4/6), associated with delayed weight increase (2/6), and referred retrosternal pyrosis (3/6); 3 had mixed gastroenterological and respiratory symptoms featuring occasional regurgitation episodes associated with



**Fig. 1.** Securing of the esophagus to the diaphragmatic hiatus with 4 nonreabsorbable 3/0 sutures.



**Fig. 2.** Final result (the dashed line indicates the esophageal segment recovered in the abdomen).

a dry nocturnal cough and recurrent pharyngotonsillitis (2/3), as well as recurrent bronchopneumonia episodes (1/3); 1 had slight anemia; and 1 had exclusively respiratory symptoms featuring frequent bronchospastic crises (Table 1).

Radiography showed grade III G.E.R. in 6 cases, grade I in 2, and no RGB episode in 2 cases; in 8 cases there was alteration of the gastroesophageal junction, with a mobile cardiac sphincter and widening of the His angle. In all cases, 24-h pH monitoring was positive, with a reflux index ranging from 13.5% to 38%. Endoscopy showed esophagitis in 8 patients, 3 of whom suffered from grade I, 4 from grade II, and 1 from grade III; in 2 cases there was epithelial acanthosis of the esophageal mucosa.

Esophageal manometry showed LES impairment in 4 patients and ineffective esophageal motility in 1 patient (suffering from grade III esophagitis).

Patient preparation was as for all operations on the esophago-gastric junction. A five-port technique was used: (A) 10 mm transumbilical for 30° angled telescope; (B) 5 mm in the subparaxiphoid region for atraumatic forceps; (C) 5–10 mm in the left hypochondrium for the scissors, dissector, needle holder and, if necessary, clip applicator; (D) 5 mm in the right side-hypochondrium for hepatic retraction; (E) 5 mm in the left pubo-inguinal region at the midclavicular level for gastric traction.

The technique was carried out paying meticulous attention to the principles for traditional access, with the aim of obtaining an abdominal esophageal segment of at least 3–4 cm (according to age and size),

reducing the width of the esophageal hiatus, securing the esophagus to the diaphragmatic hiatus, recreating an acute His angle, and reestablishing the gastric fundus below the diaphragm, thus restoring the correct anatomy of the cardio-tuberosity region (Figs. 1 and 2).

The most delicate surgical maneuver is the extensive mobilization of the distal esophagus at the level of the mediastinum, owing to the risk of bleeding and pleural or vagal lesions. Mean operation time was 100 min (80–120 min). All 10 operations were successfully completed by laparoscopic access and no intraoperative complications arose.

The nasogastric probe was removed within 24 h postoperatively and liquid feeding was restarted within 36 h. All patients were discharged within 72 h.

## Results

No patient complained of dysphagia after recommencing feeding of either liquids or solids. The signs and symptoms of GER disappeared in all patients.

Follow-up, consisting of radiology at 3 months from the operation and esophageal pH monitoring and endoscopy at 6, 12, 24, and 60 months, is still incomplete. The first radiological examinations demonstrated excellent reconstruction of the anatomy of the gastro-esophageal junction, with an adequate abdominal esophagus segment and an acute angle of His.

Some of the successive follow-up visits have already been carried out in 7 patients, 3 having undergone pH monitoring and endoscopy at 6 and 12 months, and 4 patients at 6 months only. The remaining 3 patients were operated on less than 6 months ago.

The preliminary results are encouraging, as all pH tests were negative (reflux index 0.5% to 3.2%) and the signs of esophagitis had disappeared in 6/7 patients. In

only 1 patient (suffering from grade III esophagitis preoperatively) was acanthosis of the esophageal mucosa observed to persist at 6 months from the operation.

## Discussion

Twenty years of good results in the surgical correction of GER in pediatric patients using the Lortat–Jacob technique convinced us that it would be unwise to abandon this technique when videosurgery became the norm; on the contrary, we decided to convert the technique for use by laparoscopic access.

The preliminary data on our recent, limited experience with the new technique show that in expert hands the Lortat–Jacob can be successfully performed by laparoscopic access, provided scrupulous attention is paid to the timing and principles laid down for the traditional surgical approach.

Moreover, laparoscopic access allows even greater care to be taken to prevent damage to the vagal nerves during mobilization of the terminal esophagus at the mediastinic level, as they are easier to identify thanks to the magnification of the image. For this reason, the incidence of antropyloric dyskinesia, often a concomitant cause of recurrence, is reduced to a minimum.

The good control of GER and absence of complications or short- or medium-term sequelae justify our choice to use this operation. However, our results are still preliminary and need to be confirmed by an increasing number of patients and longer term follow-up.