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Laparoscopic extended cardiomyotomy in children: an effective procedure for the treatment of esophageal achalasia

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Abstract

Purpose: Achalasia of the esophagus is characterized by aperistalsis and incomplete relaxation of the lower esophageal sphincter in response to swallowing. The objective of the present study is to present the experience of a modified Heller myotomy via a laparoscopic approach for the treatment of children who had this condition.

Methods: A retrospective review of medical records of all patients who underwent this procedure from 2000 to 2009 was performed. The procedure consisted of an extended esophagomyotomy beginning on the lower part of the lower esophageal sphincter and continuing 5 to 6 cm above on the lower third of the esophagus, and then extended 3 to 4 cm below to the stomach, associated with an anterior 180-degree hemi-fundoplication according to Dor's technique.

Results: Fifteen patients were included in the study. There were 8 female and 7 male patients. Mean operating time was 190 minutes with no intraoperative complications and 1 conversion to open surgery because of difficulty in dissecting an inflamed distal esophagus. In a mean follow-up period of 32.3 months, 2 patients had recurrence of mild dysphagia that disappeared spontaneously, and 1 required a single botulinum toxin injection with complete resolution of symptoms.

Conclusion: We conclude that the laparoscopic extended Heller myotomy with Dor fundoplication is a safe and effective method for the treatment for achalasia in the pediatric population even in advanced cases.

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Achalasia is a primary motility disorder of the esophagus characterized by aperistalsis and incomplete relaxation of the lower esophageal sphincter in response to swallowing. Despite being described from birth until the ninth decade of life, it is rare during the first 2 decades. The estimated incidence is 0.11 cases per 100,000 children [1], and childhood achalasia accounts for only approximately 5% of the total cases of achalasia [2].

The most prominent symptoms are regurgitation, vomiting, weight loss, growth retardation, aspiration pneumonia, and occasional retrosternal pain.

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There are some palliative treatment modalities for esophageal achalasia, such as pneumatic dilatation [3], intrasphincteric injection of botulinum toxin (botox) [4], and oral pharmacotherapy with calcium channel antagonists [5]. Especially in children, surgical therapy seems to be the best treatment choice leading to a high rate of symptom relief and long-lasting efficacy [6,7].

So far, no consensus has been reached regarding the optimal choice of initial therapy and whether an antireflux procedure should be routinely added to an esophagomyotomy [8]. Nevertheless, the current most accepted technique is laparoscopic Heller cardiomyotomy combined with antireflux fundoplication [9,10]. In adults, it is recognized that Heller cardiomyotomy is not effective in many advanced cases (markedly dilated or sigmoid-shaped esophagus), and in these cases, esophagectomy with gastric or colonic transposition is necessary [11,12]. Surgical experience in children is still limited, and little is known about long-term results of Heller cardiomyotomy for advanced and non-advanced childhood cases.

In our center, we have been performing a modified Heller myotomy using a laparoscopic approach that consists of an extended myotomy combined with Dor fundoplication. This procedure has been indicated in children younger than 18 years with advanced and non-advanced megaesophagus.

1. Patients and methods

The study comprised a retrospective review of medical records of all patients submitted to laparoscopic cardiomyotomy for esophageal achalasia from 2000 to 2009 in a single tertiary center. The study protocol was approved by the ethical committee of our institution.

Information collected for each patient included age, sex, associated diseases, presenting symptoms, duration of the symptoms, and previous treatments such as pneumatic dilatation, botulinum toxin injections. All routine blood and urine biochemical analyses were performed, including tests for the diagnosis of *Trypanosoma cruzi* infection.

Flexible upper gastrointestinal endoscopy was performed to exclude the presence of organic obstruction and coexisting disease. Esophageal manometry was carried out in stage I cases to confirm the diagnosis of achalasia.

Duration of surgery, early and late complications, length of postoperative stay, results, and length of follow-up were also analyzed.

1.1. Surgical technique

For all children, treatment consisted of an extended esophagomyotomy procedure via a laparoscopic approach associated with an anterior 180-degree hemi-fundoplication according to Dor's technique (Fig. 1).

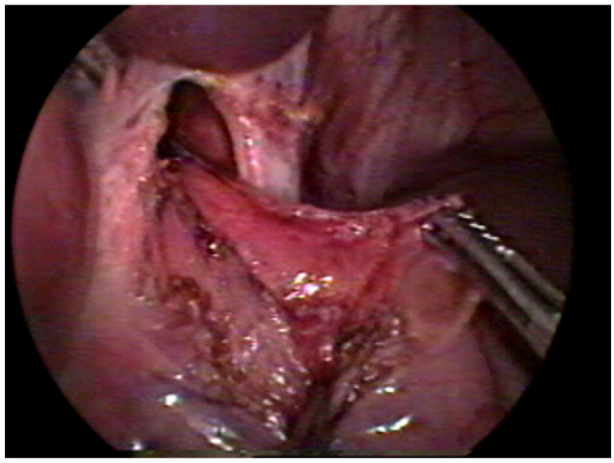

Fig. 1 Laparoscopic extended esophagomyotomy. Note that the long myotomy extends to the stomach.

The patients were placed supine on the operating table in the reverse Trendelenburg position. The surgeon worked between the legs of the patient. A five 5-mm ports technique was used. One was placed below the xiphoid appendix for retraction of the left hepatic lobe, one in the left upper, and another in the right upper abdominal quadrant for the operative instruments, and the fourth in the left lower quadrant to allow for caudal retraction of the stomach.

The phrenoesophageal membrane was opened, and the anterior aspect of the esophagus was widely exposed. The longitudinal muscle of the esophagus was spread, and the circular muscle was cut with a harmonic scalpel or hook to separate the submucosal plane from the muscularis. Two graspers held the borders of myotomy to separate them and expose the submucosal plane. The extended myotomy was begun on the lower part of the lower esophageal sphincter and continued to 5 to 6 cm above on the lower third of esophagus, and then extended to the stomach for 3 to 4 cm. The integrity of the mucosa was carefully inspected. A Dor fundoplication was constructed with the use of the anterior wall of the gastric fundus that was secured to the upper border and to the edges of the myotomy.

2. Results

Fifteen patients were included in the study. There were 8 female and 7 male patients. The mean age was 12 years (range, 9-17 years). The associated conditions were Down syndrome (1), Berardinelli syndrome (1), and myelomeningocele (1). No patients had Chagas disease.

The most frequently reported symptom was weight loss (11 patients, 73%), and the mean weight loss was 7.6 kg. Progressive dysphagia was present in 10 patients (66%), regurgitation in 8 (53.3%), cough in 2 (13.3%), and heartburn in 1 (6.6%). The mean duration of symptoms until diagnosis was 30 months (range, 4-84 months). Two

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