



# Single-port laparoscopic Heller myotomy and Dor fundoplication: initial experience with a new approach for the treatment of pediatric achalasia

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Single-port;  
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## Abstract

**Purpose:** The aim of this report was to evaluate the safety and feasibility of single-port laparoscopic Heller myotomy and Dor fundoplication (SPLHD) as treatment of pediatric esophageal achalasia.

**Methods:** A 9-year-old boy with a significant history of achalasia underwent SPLHD. The single-port was inserted using an umbilical incision. The falciform ligament and left liver lobe were raised using an elevating suture, providing good visualization of the operative field at the cardia. The Heller myotomy was planned to be 4 cm long, extending 1 cm onto the gastric wall.

**Results:** The SPLHD was successfully accomplished without the need for any skin incisions or additional ports. Oral intake was resumed on the first postoperative day, and the length of hospital stay was 8 days. The patient had complete resolution of dysphagia and regurgitation. No complications were noted, and the patient had an excellent cosmetic result.

**Conclusions:** The SPLHD is a safe and feasible procedure for symptomatic pediatric achalasia when performed by a surgeon experienced in laparoscopic and esophageal surgery.

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Surgical treatment of esophageal achalasia traditionally has been reserved for patients who have residual dysphagia after pneumatic dilatation or botulinum toxin injection. Over the last decade, advancements in minimally invasive surgical techniques, (laparoscopy or thoracoscopy) have resulted in the application of these techniques to a wide range of diseases in children [1-6]. One of the newest minimally invasive surgical techniques is single-port laparoscopic surgery (SPLS), which has the potential to provide better

cosmetic outcomes in addition to less wound pain and decreased recovery time.

In 1995, we started using a laparoscopic approach for Heller myotomy and Dor fundoplication in adults with achalasia, and favorable therapeutic outcomes have been obtained with relief of dysphagia and regurgitation [7]. Our team has also recently performed successful nephrectomy, Nissen fundoplication, appendectomy, and inguinal hernioplasty in children using SPLS. The aim of this report was to evaluate the safety and feasibility of single-port laparoscopic Heller myotomy and Dor fundoplication (SPLHD) as treatment of esophageal achalasia in children.

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## 1. Methods

### 1.1. Clinical history

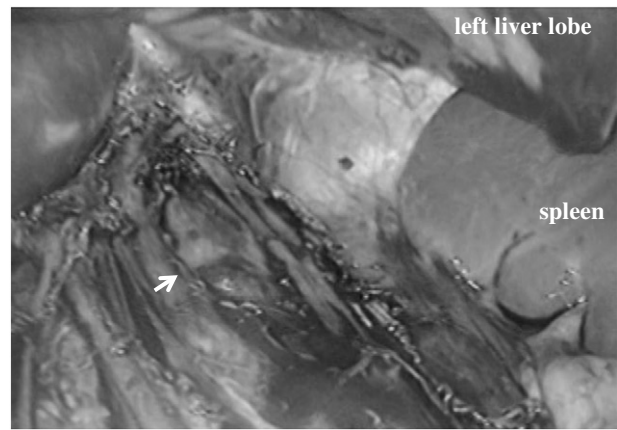
A 9-year-old boy consulted a local physician for dysphagia and vomiting of 3 years duration. At first, the boy was diagnosed with nervous vomiting and was prescribed liquid food. He was subsequently referred for persistence of symptoms. A barium swallow revealed spindle-type achalasia and a maximum esophageal diameter of 4 cm. Upper gastrointestinal endoscopy showed no evidence of esophagitis or esophageal tumor. Esophageal manometry revealed an increased lower esophageal sphincter pressure (26 mm Hg), lack of deglutitive relaxation of lower esophageal sphincter, and disappearance of peristaltic contractions. The patient was diagnosed with esophageal achalasia. We explained treatment options, including medical therapy, endoscopic pneumatic dilatation, and surgical therapy. The patient and his parents decided that he should undergo surgical treatment to achieve early resolution of symptoms. About the procedure, after being fully informed of the advantages and disadvantages of laparoscopic surgery and SPLS, the patient preferred to undergo SPLS because it places emphasis on cosmetic results.

### 1.2. Surgical technique

The procedure was performed by a surgeon experienced in advanced laparoscopic and esophageal surgeries. Under



**Fig. 1** The SILS port was placed through an umbilicus. The falciform ligament and left liver lobe were raised using a suture thread, providing a good operative field at the cardia.



**Fig. 2** Intraoperative view of SPLHD. The myotomy (arrow) was performed using an L-shaped electrocautery.

general anesthesia, the patient was placed in the supine position. The surgeon's position was to the right of the patient. The abdomen was prepared and draped appropriately. A 2.5-cm skin incision was made on the umbilicus, and a SILS port (Covidien, New Haven, CT) was inserted. Pneumoperitoneum was maintained at a pressure of 8 mm Hg. Three 5-mm cannulas were inserted through the SILS port. A 5-mm flexible endoscope, a rotulator dissector (Covidien), and SonoSurg (Olympus, Japan) were the primary tools used in the operation. The falciform ligament and left liver lobe were elevated using a 3-0 ethibond thread by Lapaherclosure (Hakkou-shoji, Nagano, Japan), providing good visualization of the operative field at the cardia (Fig. 1). The phreno-esophageal membrane overlying the esophagus was divided, and the left crus was identified. Mobilization of the esophagus was limited to its anterior aspect, leaving the posterior attachments intact. The Heller myotomy was performed using an L-shaped electrocautery and was 4.0 cm in length, extending 1.0 cm onto the anterior gastric wall. The smooth muscle was divided down to the mucosa (Fig. 2). Intraoperative endoscopy was performed simultaneously with the myotomy to assess the adequacy of the myotomy and to detect any esophageal mucosal tears. The short gastric vessels were divided to relieve any tension on the wrap.



**Fig. 3** Completion of a Dor fundoplication (arrow).

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