Case Report

Laparoscopic Heller Myotomy with Dor Antireflux for Achalasia

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Background: *The ideal antireflux procedure following laparoscopic Heller myotomy for achalasia is controversial. The authors present a laparoscopic technique of partial anterior fundoplication to bolster the myotomy.*

Material and Method: *Between August 2002 and March 2006, 11 patients (eight females and three males; median age, 33 years) underwent a laparoscopic Heller myotomy with bolstering partial anterior fundoplication. The results of the barium swallow and manometry studies were consistent with achalasia. Failed medical treatments included balloon dilation, botulinum injection, and calcium channel blockers, were indications for surgery.*

Results: *The pre-operative weight loss was 9 Kg (range, 3-16) with a mean duration of symptoms of 29 months (range, 12-72). Sixty-three percent (7 of 11) of the patients had undergone pneumatic balloon dilation before surgery. Myotomy was confirmed with endoscopic guidance. Partial anterior fundoplication was performed with the edges of the myotomy on the right and left sides sutured to the stomach, which covered the myotomy. No conversion was required. The mean operative blood loss was 70 mL (range, 30-150). The mean operative time was 3 hours. Patients resumed solids at 2.5 days (range, 2-5). None of the patients had any perioperative or postoperative complications. Follow-up ranged up to 4 years (median, 2). Postoperatively, symptoms of dysphagia (to both solids and liquids), heartburn, odynophagia, regurgitation, and cough were significantly reduced in all patients.*

Conclusion: *Laparoscopic cardiomyotomy with anterior partial fundoplication achieves excellent symptomatic relief for patients with achalasia, and it can be performed with minimal morbidity.*

Keywords: *Achalasia, Cardiomyotomy, Partial fundoplication, Dor patch, Laparoscope*

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Esophageal alchalasia is an idiopathic primary motor disorder of the esophagus that is associated with a failure of normal relaxation of the lower esophageal sphincter (LES). Microscopically, the disease is manifested by an absence of the myenteric neural plexus and monocellular infiltrate with marked hypertrophy of esophageal muscle. Although the etiology of achalasia is unknown, it has also been suggested to be an autoimmune disease. Achalasia occurs equally in both sexes, with the onset typically in the third or fourth decade. The current therapeutic approach remains palliative, aimed at symptomatic relief of LES obstruction. In 1914, Heller described a surgical procedure for cardiospasm of the esophagus. Before that time, the only effective treatment for achalasia was esophageal dilation. Originally, he performed an extramucosal myotomy of the anterior and posterior walls of the distal esophagus. Patients noted relief of dysphagia initially after surgery, but marked reflux resulted and the procedure was associated with significant morbidity. Late recurrence of dysphagia was caused by peptic stricture. Laparoscopic techniques for esophageal surgery provide a minimally invasive approach for patients with esophageal motility disorders. This new modality has resulted in a resurgence of the surgeon's role in the proper management of esophageal disorders and has

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dramatically changed the operative approach to the distal esophagus. The laparoscopic procedure is technically demanding and requires advanced laparoscopic skills. The magnification afforded by the video laparoscopic system allows the surgeon to visualize all muscle layers and to perform the myotomy accurately. When combined with intraluminal endoscopy, the laparoscopic approach leads to optimal outcomes.

Material and Method

Between August 2002 and March 2006, eleven patients (eight females and three males; median age, 40 years) who failed medical or endoscopic treatments underwent a laparoscopic Heller myotomy with bolstering partial anterior fundoplication. The data were collected retrospectively. Results of barium swallow and manometry studies were consistent with achalasia. Failed medical treatments included balloon dilation, botulinum injection, and calcium channel blockers.

After induction of general anesthesia, the patient is placed in a modified lithotomy position. The surgeon stands between the patient's legs and the assistant surgeon on the patient's left; the camera holder is on the right as Fig. 1. The patient is prepared and the abdomen draped in a sterile manner.

Pneumoperitoneum is created through open technique at the umbilicus. A 15-mm port is placed in the midline above the umbilicus, and a 30-degree oblique laparoscope is used. Two additional 5-mm ports and one more 10-mm are placed under direct vision with the video laparoscope in the mid-clavicular line below the costal margin and the other two laterally in the anterior axillary line below the costal margin. The left lobe of the liver was elevated by Nathanson's liver retractor introduced through 5 mm the epigatrium wound as Fig. 2. Both crura and the anterior vagus are identified after the phrenoesophageal ligament is opened. A Babcock clamp is then used to grasp the stomach caudally. The hepatogastric ligament is divided with the electrocautery hook and the right crus is retracted laterally. The right side of the esophagus is carefully dissected to visualize the posterior vagus nerve. The left crus is similarly dissected to its point of origin from the right crural leaflet. A "window" is created behind the esophagus wall, and a cordtape is placed behind the esophagus. Traction is placed caudally to mobilize it so that at least 6 to 8 cm of the esophagus is below the hiatus. The hiatus is later closed with sutures. An endoscope is placed through the patient's mouth toward the hiatus while a Babcock clamp is inserted laparoscopically and used to retract

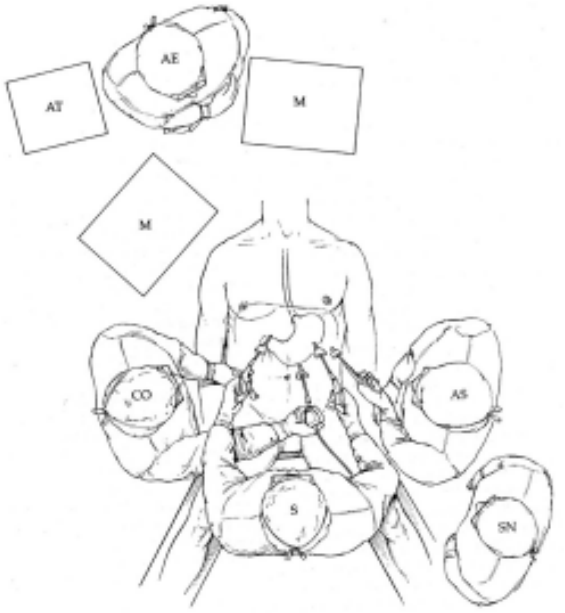

Fig. 1 Surgical position including patient, anesthesiologist, surgeon and assistant surgeon

Fig. 2 Positions of surgical ports and liver retractor

the cardioesophageal junction. The endoscopist identifies the zone of high pressure, and the surgeon marks the zone with the light from the scope. A 7-to 10-cm esophagomyotomy is performed. The circular fibers of the LES are then divided by lifting individual fibers away from the mucosa with the electrocautery hook and then dividing them with a short burst of current. Only the electrocautery hook is used to perform the myotomy. Transillumination, provided by the endo-

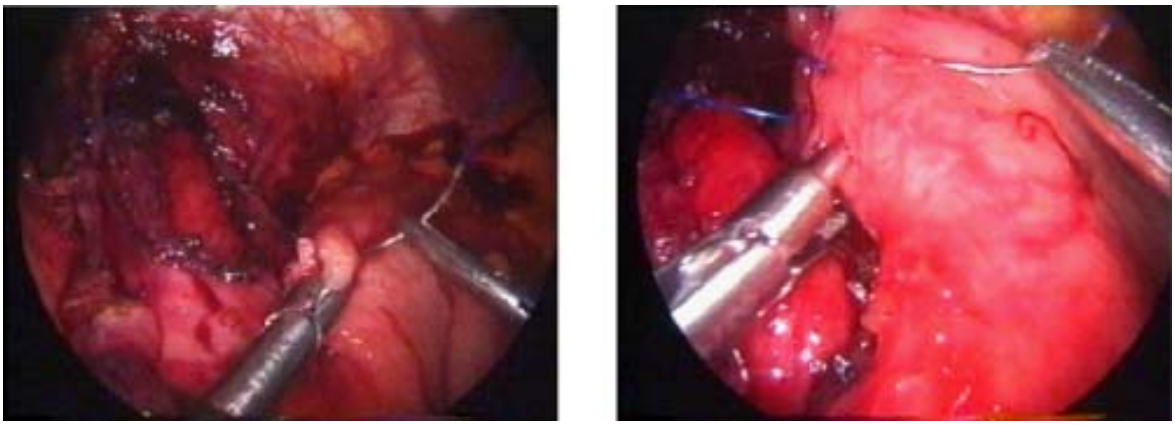

Fig. 3 Suturing gastric fundus to the edges of the myotomy and to the crura

scope, ensures complete division of the muscle fibers only in case of previous pneumatic balloon dilation. When completed, the myotomy is tested by examining it with the endoscope and insufflating air while the esophagus is submerged under saline solution. Then the endoscope is removed. Next, a partial anterior fundoplication is performed with the edges of the myotomy on the right and left sides sutured to the stomach, which covers the myotomy (Fig. 3). The anterior wall of the gastric fundus is sutured to the edges of the myotomy and to the crura. At the end of the procedure, all the operative accesses are examined and bleeding is controlled. The port sites are closed with subcuticular 4-0 sutures. Data were presented by means of case series and summarized with mean or median and range.

Results

Patients had symptoms for an average of 29 months (range, 12-72) before seeking medical attention. Dysphagia, regurgitation, and weight loss were noted in all patients. Sixty-three percent of the patients had undergone endoscopic balloon dilation prior to surgery. The preoperative weight loss before the surgery was 9 kg (range, 3-16). The mean operative time for surgery was 180 minutes (range, 135-255). The mean operative blood loss was 70 ml (range, 30-150). None of the presented patients had any esophageal mucosa perforation. No conversions were required in the entire group. After surgery, patients resumed solids at 2.5 days (range, 2-5) during their hospital stay. All patients reported subjective relief of dysphagia and regurgitation. The post-operative complications including subcutaneous emphysema, and pneumothorax were not detected in all the presented patients. At 6 to 48 months of follow-up, no patients had reflux symptoms or any recurrent dysphagia. All demographic data and outcomes of surgery are shown in Table 1 and 2.

Discussion

Non-operative treatment for achalasia includes medical management with pharmacologic smooth muscle relaxants to reduce LES pressure. Injection of botulinum toxin directly into the LES by endoscopy has been shown to decrease LES pressure by 33% in humans[1]. Endoscopic pneumatic balloon dilation is also an effective treatment for achalasia. The range of symptomatic improvement has been reported to be between 48% and 78% of patients, but in experienced hands, the initial rates of success should be more than 70%[2]. Several different surgical approaches have been advocated for the treatment of achalasia, including cardiomyotomy via laparotomy[3], thoracotomy[4], thoracoscopy[5], and laparoscopy[6]. However, in recent years, the laparoscopic approach has appeared to be gaining in popularity. Several published non-randomized studies comparing the open abdominal and laparoscopic approaches to cardiomyotomy have now come out in favor of the latter approach[1,7], arguing that it results in a symptomatic improvement comparable to that of the established open procedure but with less surgical trauma and significantly less morbidity at early follow-up. The addition of a fundoplication is controversial, and many opposing views have been advanced over the years[6,8-12]. Although one group has reported successful laparoscopic cardiomyotomy without an additional antireflux procedure[12], there are also many reports of the occurrence of troublesome gastro-esophageal reflux and its complications follow-

Table 1. Demographic data in the studied patients

No.	Sex	Age (yr)	Duration of symptom (mo)	Weight loss (kg)	Previous treatment
1	F	22	15	3	Balloon dilatation
2	F	49	36	8	Balloon dilatation
3	F	31	23	10	Balloon dilatation
4	F	28	12	4	Balloon dilatation
5	F	43	48	15	No
6	M	19	12	5	Balloon dilatation
7	F	33	48	12	Balloon dilatation
8	F	40	15	8	Balloon dilatation
9	M	39	14	6	No
10	M	34	72	16	Balloon dilatation
11	F	26	24	12	No
Average (range)		33 (19-49)	29 (12-72)	9 (3-16)	

Table 2. Outcome of laparoscopic Heller myotomy in the studied patients

No.	Operative time (min)	Blood loss (ml)	Duration of follow-up (mo)	Postoperative symptom	
				Dysphagia	Reflux
1	215	80	48	None	None
2	195	175	48	None	None
3	255	150	42	None	None
4	170	45	36	None	None
5	165	50	30	None	None
6	185	80	24	None	None
7	210	125	22	None	None
8	155	30	18	None	None
9	140	45	16	None	None
10	165	60	12	None	None
11	135	30	6	None	None
Mean (range)	180 (135-255)	70 (30-150)	28 (6-48)		

ing open cardiomyotomy without fundoplication, with an incidence ranging from 3% to 31%[7,9,10,11,14,15]. For this reason, most surgeons continue to advocate adding a partial fundoplication to the procedure. If the fundoplication is omitted during laparoscopic myotomy, there is likely to be a risk of reflux similar to that seen following open surgery. The authors believe that the use of an anterior partial fundoplication (Dor patch) has several advantages. Not only does it do a better job of buttressing the myotomized segment of the esophagus, thus preventing excessive mucosal pouting and sealing any unrecognized minor mucosal perforations, it also acts as an antireflux procedure. Because it is a partial fundoplication, it does so without adding significant resistance to esophageal emptying. Thus, it reduces the risk of dysphagia, which is inherent when a full (Nissen) fundoplication is performed in achalasia patients[7]. The results of the present study are comparable to those of other published series[6], with an excellent overall outcome obtained by the laparoscopic operation. However, in the current study, all data were collected retrospectively and the number of patients included is small. Nevertheless, with follow-up now extending up to 4 years, the present study reports short to longer-term follow-up data following the laparoscopic approach. The present study confirms the feasibility of performing laparoscopic cardiomyotomy with the addition of a partial anterior

fundoplication. There was a relatively short operating time, a short postoperative hospital stay, and a rapid return to work and other normal activities. Overall morbidity for the procedure was low, and most intra-operative complications, such as mucosal perforation, could be recognized and dealt with laparoscopically at the time of surgery; therefore, they did not influence the overall outcome significantly. The incidence of clinical postoperative gastro-esophageal reflux was also low with this approach, and dysphagia was usually greatly improved. This procedure provides excellent symptom control, with successful relief of dysphagia, without creating a subsequent problem with abnormal gastro-esophageal reflux. Furthermore, overall patient satisfaction following surgery is high.

The authors report the first series of cases in Thailand with modified anterior fundoplication, similar to those of the Dor procedure. The authors believe it is an effective antireflux procedure. Furthermore, bolstering the myotomy may help heal small esophageal perforations and keep the myotomy open.

Conclusion

Laparoscopic cardiomyotomy with anterior partial fundoplication achieves excellent symptomatic relief for patients with achalasia, and it can be performed with minimal morbidity.

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การผ่าตัดกล้ามเนื้อหลอดอาหารส่วนปลายโดยใช้กล้องในผู้ป่วยอะคาเลเซีย

ธีรพล อังกูลภักดีกุล, สุริยะ จักกะพาก

***ภูมิหลัง**: การทำผ่าตัดป้องกันกรดย้อนชนิดที่เหมาะสมที่สุดในการผ่าตัดกล้ามเนื้อหลอดอาหารโดยใช้กล้องของผู้ป่วยอะคาเลเซีย ยังคงมีข้อโต้แย้งกันอยู่ว่าควรเป็นชนิดไหน และจำเป็นหรือไม่*

***วัตถุประสงค์**: รายงานนี้เป็นรายงานแรกของประเทศไทยซึ่งแสดงผลการผ่าตัดกล้ามเนื้อหลอดอาหารส่วนปลายร่วมกับทำการผ่าตัดป้องกันกรดย้อนทางด้านหน้าหลอดอาหารโดยใช้กระเพาะอาหารมาเย็บปกคลุมโดยเป็นการผ่าตัดผ่านกล้องทั้งหมด ในผู้ป่วยทั้งหมด 11 ราย ระหว่างเดือนสิงหาคม พ.ศ. 2545 ถึง มีนาคม พ.ศ. 2549 ผู้ป่วยทั้งหมดได้ผ่านการตรวจพิสูจน์โดยการเอกซเรย์กลืนแป้ง วัดค่าความดันและแรงบีบตัวบริเวณหลอดอาหารส่วนปลายว่าเป็นโรคอะคาเลเซีย ผู้ป่วยบางคนเคยได้รับการรักษาโดยใช้บอลลูนขยายหลอดอาหารมาก่อนแต่ไม่ได้ผลในการลดอาการกลืนลำบาก*

***ผลการศึกษา**: ผู้ป่วยทั้งหมด 11 ราย มีอาการกลืนอาหารลำบากมานานเฉลี่ย 29 เดือน น้ำหนักลดเฉลี่ย 9 กิโลกรัม 63% ของผู้ป่วยทั้งหมด (7 ใน 11 ราย) เคยทำการรักษาใช้บอลลูนขยายส่วนปลายหลอดอาหารแล้วอาการไม่หาย ผู้ป่วยทั้งหมดได้รับการผ่าตัดโดยใช้กล้อง โดยผ่าตัดแยกกล้ามเนื้อหลอดอาหารส่วนปลายและนำกระเพาะอาหารส่วนต้นมาเย็บปกคลุมบริเวณที่ผ่าตัดกล้ามเนื้อหลอดอาหาร โดยเย็บกับขอบกล้ามเนื้อหลอดอาหารที่ตัดทั้งซ้ายและขวา ผลการผ่าตัดสำเร็จดีทุกราย ค่าเฉลี่ยของระยะเวลาการผ่าตัด 3 ชั่วโมง ค่าเฉลี่ยของการเสียเลือด 70 มิลลิลิตร ผู้ป่วยสามารถกลับมารับประทานอาหารได้ปกติในระยะเวลาเฉลี่ย 2.5 วัน (พิสัย 2-5 วัน) ไม่พบว่ามีภาวะแทรกซ้อนหลังผ่าตัดและในระยะเวลาค่ามัธยฐานที่ติดตามผู้ป่วย 24 เดือน (พิสัย 6-48 เดือน) หลังผ่าตัดผู้ป่วยทุกรายพบว่าอาการกลืนลำบาก อาการจุกแสบยอดอก อาการกรดย้อนหายดีอย่างชัดเจน ไม่มีผู้ป่วยรายใดจำเป็นต้องขยายหลอดอาหารหรือผ่าตัดอีก*

***สรุป**: การผ่าตัดกล้ามเนื้อหลอดอาหารส่วนปลาย รวมทั้งผ่าตัดป้องกันกรดย้อนทางด้านหน้าหลอดอาหารโดยใช้กล้องในผู้ป่วยอะคาเลเซียได้ผลดีมากในการรักษาอาการของผู้ป่วย และสามารถทำผ่าตัดผ่านกล้องโดยที่ไม่มีภาวะแทรกซ้อน*