

Usefulness of the Laparoscopic Heller-Dor Operation for Esophageal Achalasia: Introducing the Procedure to Our Institution

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Abstract

Our institution introduced laparoscopic surgery for esophageal achalasia in 2001. The present report summarizes 15 cases of achalasia treated with laparoscopic Heller myotomy and anterior fundoplication according to the method of Dor, and we have investigated the therapeutic effects on specific symptoms such as dysphagia, reflux, and chest pain. From February 2001 through January 2007, the laparoscopic Heller-Dor operation was performed in 15 patients, including 7 men and 8 women. Achalasia was classified morphologically on esophagography as spindle type in 11 cases, flask type in 3 cases and sigmoid type in 1 case. The degree of esophageal dilatation was classified as grade I in 8 cases, grade II in 6 cases, and grade III in 1 case. Dysphagia was the main symptom and was present in all cases. The mean disease duration was 4.3 years (range, 5 months to 20 years), and the mean weight loss was 4.2 kg. All patients underwent endoscopic dilatation preoperatively. Intraoperative blood loss ranged from 0 to 100 mL (mean, 21 mL). Adequate Heller myotomy was considered more than 6 cm and more than 3 cm in the esophagus and the stomach, respectively. Injury to the esophageal mucosa occurred during the myotomy in 3 cases but could be repaired in all cases during the laparoscopic procedure. All patients reported an excellent level of satisfaction postoperatively. In conclusion, the laparoscopic Heller-Dor operation for esophageal achalasia is a useful procedure because the postoperative satisfaction level of patients is excellent. Despite the risk of mucosal injury, adequate Heller myotomy should be achieved to obtain a good prognosis. It is, therefore, of utmost importance to obtain mastery over the surgical technique to repair any mucosal injury that might occur.

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Key words: esophageal achalasia, laparoscopic Heller-Dor

Introduction

Esophageal achalasia is a motor disorder caused by an irreversible degeneration of the esophageal

myenteric plexus and characterized by failure of lower esophageal sphincter (LES) relaxation and a loss of peristaltic contractions. Recently, laparoscopic myotomy and fundoplication has become the standard treatment for definitive management of

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Table 1 A patient status of all cases

Cases	Gender	Years	Dilatation (times)	Operation (min)	Blood loss (mL)	Hospital stay (days)	Weight loss (kg)	Type	Grade	Disease duration
1	Male	23	3	145	0	8	—	Sp	2	48 months
2	Male	12	2	210	75	9	0	FL	2	18 months
3	Female	24	2	288	28	9	10	Sp	1	48 months
4*	Female	27	2	313	100	11	8	FL	2	96 months
5	Female	36	1	170	0	8	0	Sp	1	10 months
6*	Female	37	1	235	0	9	3	Sp	2	36 months
7	Female	76	2	214	0	—	9	Sp	1	5 months
8*	Male	71	1	214	0	8	—	Sp	1	240 months
9	Female	65	1	135	0	9	3	Sp	2	16 months
10	Female	54	2	180	0	7	0	FL	2	12 months
11	Male	56	1	150	0	7	—	Sp	1	22 months
12	Male	26	2	145	0	7	5	Sp	1	84 months
13	Female	59	2	180	70	8	—	Sp	1	36 months
14	Male	11	1	160	0	8	2	Sp	1	24 months
15	Male	55	1	180	10	8	3	Sig	3	36 months

Sp: spindle type, FL: flask type, Sig: sigmoid type.

*; The cases with mucosal injury during the operation.

Case 7 complicated colonic cancer, and needed to continue hospitalization for chemotherapy.

esophageal achalasia¹⁻³. However, esophageal achalasia is a rare disease with an estimated annual incidence of 1 case per 100,000 persons in Western countries¹, and laparoscopic operations for patients with esophageal achalasia are difficult for unexperienced surgeons to perform. Therefore, there is a disparity between hospitals in the number of operative cases. Surgeons should be careful about introducing a new procedure to their institutions. Ideally, early cases should be supervised by an experienced surgeon. Accordingly, introducing laparoscopic operations for esophageal achalasia is difficult for many hospitals. Our institution introduced the laparoscopic esophageal achalasia operation in 2001. The present report summarizes 15 cases of achalasia treated with laparoscopic Heller myotomy and anterior fundoplication according to the method of Heller and Dor. We have investigated the therapeutic effects on specific symptoms, such as dysphagia, reflux, and chest pain. We also report on the introduction of this procedure to our institution.

Patients and Method

From February 2001 through January 2007, the laparoscopic Heller-Dor operation was performed in

15 patients, including 7 men and 8 women. Achalasia was classified morphologically with esophagography as spindle type in 11 cases, flask type in 3 cases, and sigmoid type in 1 case. The degree of esophageal dilatation was classified as grade I in 8 cases, grade II in 6 cases, and grade III in 1 case. Dysphagia was the main symptom and was present in all patients. The mean disease duration was 4.3 years (range, 5 months to 20 years), and the mean weight loss was 4.2 kg. All the patients underwent endoscopic dilatation preoperatively (**Table 1**). Treatment of the first and second cases was supervised by an experienced surgeon who had performed the laparoscopic Heller-Dor operation many times at other institutions. We usually place 5 trocars for this procedure (**Fig. 1**). The most difficult part of this operation is the Dor procedure. The intracorporeal suture technique was required for wrapping the fornix of the stomach around the esophagus.

Results

Intraoperative blood loss ranged from 0 to 100 mL (mean, 21 mL). Adequate Heller myotomy of more than 6 cm and more than 3 cm, as confirmed with laparoscopic measuring forceps, was in the

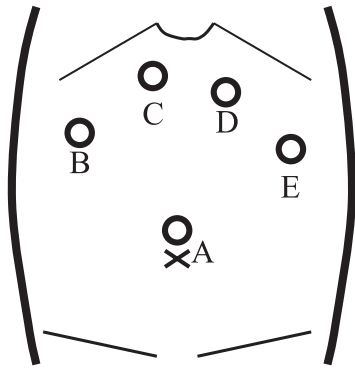


Fig. 1 Placement of trocars
A, D: 12mm; B, C, E: 5mm.

esophagus and stomach, respectively. Injury to the esophageal mucosa occurred during the myotomy in 3 cases but could be repaired during the laparoscopic procedure. Oral intake started on postoperative day 1 in patients without mucosal injury and on postoperative day 4 in patients with mucosal injury, after its safety had been confirmed with esophagography. All patients had an uneventful recovery, with a mean hospital stay of 8.3 days. All patients reported an excellent level of satisfaction postoperatively. To confirm the operative effects objectively, the patients underwent testing with barium swallow before and after the operation. Barium passage was markedly improved in all patients. We also measured the LES pressure after the operation. **Figure 2** shows the results of manometry in patient 3: the LES pressure was significantly reduced after the operation. One patient complained of chest pain after the operation; however, the pain was successfully treated with medication. One patient had aspiration pneumonia before the operation, it occurred during intratracheal intubation because of insufficient drainage of intraesophageal fluid; as a result, the operation was postponed for 1 week.

Discussion

The two main treatment options for achalasia are laparoscopic distal esophageal myotomy and pneumatic dilation. Calcium-channel blockers and nitrates, once used as the initial treatments for early achalasia, are now used only for patients who are

not candidates for pneumatic dilation or surgery⁴. Pneumatic dilation was performed before surgery for all our patients because it was the treatment of first choice for achalasia at our institution. However, surgical treatment after the pneumatic dilation is controversial because of the fear that preoperative treatments affect surgical outcomes. On the other hands, Bloomston et al. have reported that preoperative therapy does not correlate with esophageal fibrosis or postoperative outcomes⁵. Deb et al. have reported that preoperative bougie dilation, pneumatic dilation, and botulinum toxin injection do not affect the incidence of intraoperative perforation⁶. These reports support our policy to perform pneumatic dilation first; however, surgery is offered to young patients and those not responding to a single pneumatic dilation because repeated dilation only slightly improves the clinical response; patients younger than 40 years have significantly poorer outcomes than do older patients⁷. Regarding the efficacy of decreasing dysphagia, we obtained excellent results after the operation. The most important point is sufficient myotomy. In some institutions, the decrease in LES pressure after the myotomy is confirmed intraoperatively, and the myotomy can be immediately extended if the decrease in LES pressure is not sufficient⁸. Ideally, LES pressure should be measured intraoperatively in all cases; however, doing so difficult in many institutions because extensive effort is necessary. We judge the sufficiency of myotomy on the basis of operative findings that the esophageal mucosa rises gently in comparison with other parts of esophageal wall if myotomy has been performed completely (**Fig. 3**). Standard Heller myotomy for achalasia extends 1 to 2 cm on to the stomach. However, extensive myotomy of the gastric cardia (more than 3 cm) appears to reduce postoperative dysphagia and provides persistent and excellent dysphagia relief that is superior to that provided by standard Heller myotomy⁹. Regarding myotomy of the esophagus, there is general agreement that it should extend 6 to 7 cm above the gastroesophageal junction¹⁰. Our strategy has been to perform myotomy of more than 6 cm and and more than 3 cm in the esophagus and stomach, respectively, in all

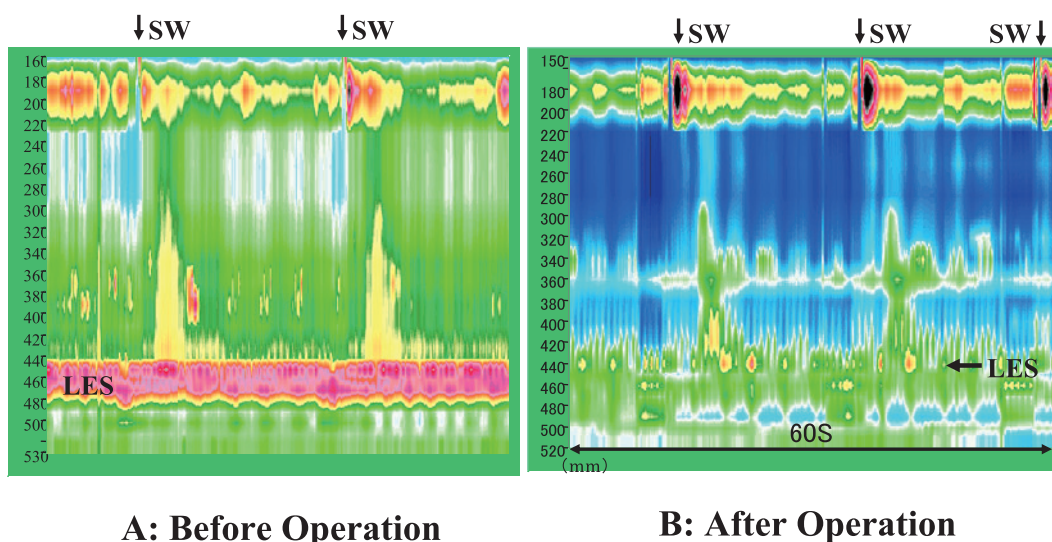


Fig. 2 Manometry findings of case 3. **A:** Before the operation: The lack of relaxation at the LES and propulsive waves upon swallowing are observed. **B:** After the operation: The pressure of the LES and the esophageal body decreased; however, the motility of the esophageal body did not change.
SW: swallowing

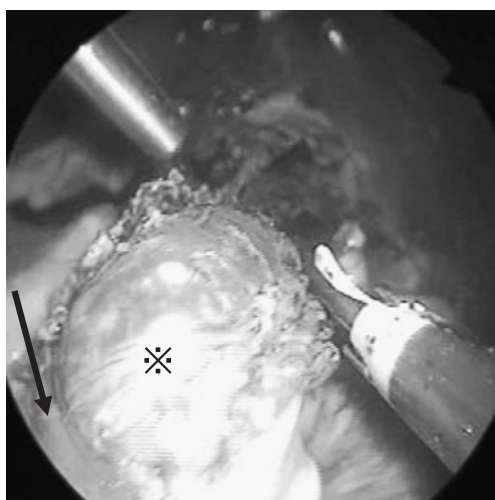


Fig. 3 Operative findings after myotomy
The mucosa of the esophagus and stomach rise gently (*), in comparison with other parts of the wall (arrow).

patients. Mucosal perforation occurred at Heller myotomy in 3 of our patients. Complete myotomy involves a perforation risk of 8% to 16%^{11,12}; however, severe complications do not result if the perforation is repaired intraoperatively. Insufficient myotomy, due to a fear of esophageal perforation, should be avoided considering the efficacy of the treatment. Therefore, the intracorporeal suture technique to

repair the esophageal perforation is required. We selected Dor fundoplication as an antireflux procedure in every patient. A goal of treatment for esophageal achalasia is to reduce LES pressure by means of myotomy; however, gastroesophageal reflux sometimes occurs postoperatively. Little has reviewed the literature and has reported that antireflux procedures can reduce postoperative heartburn rates by 80% and reduce risks of esophagitis and peptic stricture¹³. In a prospective randomized double-blind clinical trial to determine the necessity of an antireflux procedure, Heller myotomy plus Dor fundoplication was superior to Heller myotomy alone in regards to the incidence of postoperative gastroesophageal reflux¹⁴. There are many antireflux procedures to select after Heller myotomy; Dor or Toupet fundoplication (the partial wrap) reduces reflux as well as does Nissen (complete 360° wrap) fundoplication and tends to cause dysphagia less often¹³. Moreover, the technique of Dor fundoplication is less complicated than that of Toupet or Nissen fundoplication. Accordingly, we selected Dor fundoplication and achieved excellent results in our patients. We introduced laparoscopic esophageal achalasia operation into practice in 2001. The process for safe

introduction of a new procedure includes demonstration of the technique and supervision of the procedure by an experienced visiting surgeon¹⁵. Moreover, preoperative training is indispensable to perform the procedure without problems, improves intraoperative performance, and will ultimately translate into better patient care. We practiced the intracorporeal suture technique with a training box before the first operation. For training outside the operating room, virtual reality (VR) simulators for laparoscopic surgery were introduced in the mid-1990s¹⁶ and are widely used in the training of young surgeons. We can improve and assess psychomotor, perceptual, and visuospatial ability with a VR simulator. A VR simulator may be the optimal training tool for introducing new laparoscopic procedures to many institutions.

Conclusion

The laparoscopic Heller-Dor operation for esophageal achalasia is a useful procedure because the postoperative satisfaction level of patients is excellent. Despite the risk of intraoperative mucosal injury, adequate Heller myotomy should be achieved to obtain a good prognosis. It is, therefore, of utmost importance to obtain mastery over the surgical technique to repair any mucosal injury that might occur during the laparoscopic approach.

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