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Long-term functional results after laparoscopic surgery for esophageal achalasia

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Abstract

Background: Evidence on the long-term outcome of laparoscopic Heller–Dor surgery is limited. The aim of this study was to assess the long-term outcome of achalasic patients after surgery, particularly in relation to the radiologic preoperative stage of the disease.

Methods: Sixty-eight patients with achalasia were assessed clinically and by esophageal radiology, manometry, and 24-hour ambulatory esophageal pH monitoring before and at 3 months, 1, 1 to 3, 3 to 5, and 5 to 8 years after a laparoscopic Heller-Dor procedure.

Results: At 1 year after surgery the symptom score was significantly lower than the preoperative score ($P < .001$), and a satisfactory clinical outcome was seen in more than 90% of the patients with stage I, II, and III disease at the preoperative radiologic assessment. Only 50% of stage IV patients reported satisfactory results. An adequate opening of the lower esophageal sphincter (LES) and LES resting pressure of less than 8 mm Hg was achieved in all patients, and esophageal emptying was accelerated significantly ($P < .001$). At the consecutive follow-up evaluation (1–8 y), a satisfactory outcome was maintained in all stage I, II, and III responders. Stage IV patients with initially unsatisfactory results reported a worsening of symptoms ($P < .02$). Patients with pseudodiverticulum had a higher symptom score ($P < .01$). LES opening and resting pressure remained at levels of the 1-year follow-up evaluation. Esophageal emptying remained satisfactory in stage I, II, and III responders, but deteriorated in stage IV nonresponders and in 6 of the 10 patients with a pseudodiverticulum.

Conclusions: A satisfactory outcome of the laparoscopic Heller–Dor procedure in stage I, II, and III achalasic patients seems to last. Stage IV nonresponders tend to deteriorate over time. The development of pseudodiverticulum is associated with an increased symptom score.

Keywords: Esophageal achalasia; Laparoscopy; Heller Myotomy–Dor; Hemifundoplication; Long-term outcome; Esophageal emptying

Heller's myotomy has been the procedure of choice for the treatment of esophageal achalasia [1]. The transthoracic [2–4], the thoracoscopic [5,6], the transabdominal [7], and the laparoscopic [6,8–12] approaches all have been applied. Recently, the latter approach has been widely preferred because it offers results that are equal to those after open surgery, but with a faster recovery and less immediate postoperative morbidity.

Cardiomyotomy effectively relieves dysphagia and regurgitation in approximately 95% of patients with achalasia, provided that the postoperative lower esophageal sphincter (LES) resting pressure decreases substantially to less than 10 mm Hg above the intragastric pressure, preoperative esophageal body dilation is not excessive, distortion of the

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distal esophagus is absent, and the postoperative maximum width of the esophagus does not exceed 40 mm [1,9,12–15]. Furthermore, it has been reported that improvement of dysphagia after myotomy for esophageal achalasia seems to last for periods exceeding 15 years [4,7,11]. However, there is still a substantial percentage of patients who develop some degree of dysphagia, despite an initial improvement after surgery. This has been attributed to stasis as a result of esophageal obstruction, food retention in a pseudodiverticulum, or dilatation and distortion of the distal esophagus within the frame of the degenerative process of the disease [1–4,7]. The aim of the present study was to assess the long-term effect of laparoscopic esophageal myotomy with anterior hemifundoplication on dysphagia, esophageal emptying, and esophageal body configuration in patients with esophageal achalasia. In addition, an effort was made to identify any possible correlation between functional outcomes and preoperative imaging findings.

Patients and Methods

Patients with esophageal achalasia, undergoing laparoscopic Heller myotomy and Dor fundoplication at the surgical departments of different institutions during a 12-year period (1993–2005), were followed-up. The preoperative diagnosis was based on clinical presentation, barium swallow, upper alimentary endoscopy, and esophageal manometry. Some of the patients had previously had 1 or more sessions of pneumatic dilation. The surgical technique by the laparoscopic approach has been described previously [12].

Postoperative outcomes were assessed by responses to a standardized questionnaire for symptoms by telephone or outpatient clinic interview, barium swallow, and estimation of esophageal emptying, esophageal manometry, pH monitoring, and, if necessary, endoscopy. Outcomes assessment was performed at 3 months, 1 year, and within 3 to 5 years, 6 to 8 years, and 8 to 10 years postoperatively.

The clinical follow-up evaluation was focused on dysphagia, regurgitation, heartburn, and substernal pain. The incidence of each symptom was graded according to the proposal by Johnson and De Meester [16] as follows: grade 0, absence of the symptom; grade 1, occasional episodes of the symptom reported to occur less than once weekly; grade 2, frequent episodes of the symptom reported to occur more than once weekly; and grade 3, persisting daily symptoms. A score of 0 to 2 was considered excellent, 3 to 5 was considered good, 6 to 8 was considered fair, and 9 to 12 was considered poor. Excellent/good results were satisfactory, whereas fair/poor results were considered as failures.

Barium swallow for the assessment of esophageal configuration and emptying was performed in all patients as follows: with the patient in the upright position a solid bolus of bread with barium paste of 6 to 8 g of total weight was chewed and swallowed. The normal esophageal emptying time for the solid bolus was defined as less than 15 seconds [17]. Thereafter, the patients swallowed 150 to 200 mL of suspension of barium sulphate (.45 g/mL), and with the full-column technique maximal esophageal body width, gastroesophageal junction configuration, and the opening and the presence of pseudodiverticulum or stenosis were assessed. Depending on the esophageal diameter measured at a point 8-cm cephalad to the LES and the esophageal body configuration, the disease was staged as follows: grade I, diameter less than 4 cm; grade II, diameter of 4 to 6 cm; grade III, diameter grater than 6 cm; grade IV, s-type esophageal body of any diameter, or large-bowel type of esophagus [12]. From 1998 onward, esophageal emptying also was assessed on several occasions with a timed barium esophagogram [18]. According to that technique, patients swallowed the amount of suspension of barium sulphate they could tolerate without regurgitation (150–250 mL) over 45 to 60 seconds in the standing position. The length of the barium column over the gastroesophageal junction at 5 minutes after the end of barium consumption was measured. In normal subjects, barium has completely emptied out of the esophagus by that time point.

Esophageal manometry and pH monitoring data were assessed according to standard definitions [19].

Statistical analysis

Unless otherwise stated, all values are expressed as medians (range). Comparisons between preoperative values and several postoperative values of the variables were performed by applying the Mann–Whitney test for paired values, as appropriate. The clinical outcome curve was constructed according to the Kaplan–Meier method. P values of less than .05 were considered statistically significant.

Results

Of the 92 patients subjected to Heller's myotomy and Dor's fundoplication for esophageal achalasia, 68 completed the battery of follow-up tests, and were included in the study. There were 33 male and 35 female patients with a median age of 40 years (range, 10–80 y). All of them were assessed at 3 months and 1 year; 56 were assessed for 1 to 3 years; 35 were assessed for 3 to 5 years; 23 were assessed for 5 to 8 years; and 4 were assessed for more than 8 years postoperatively. According to the preoperative esophagogram, 26 patients were classified as stage I, 24 as stage II, 12 as stage III, and 6 as stage IV (Table 1).

Mortality was nil and morbidity was insignificant, with the exception of 1 patient who developed a late leak as a result of a desloughing scar at the anterior aspect of the lower esophageal mucosa after a thermal injury at surgery. The patient was treated conservatively with success. Another 4 patients developed atelectasis and lung infection, who also were treated with success (total morbidity, 7.5%). All but the 5 patients who developed complications were discharged on the second or third postoperative day.

Follow-up evaluation at 3 months and 1 year postoperatively

At 3 months postoperatively the median symptom score decreased significantly as compared with the preoperative value (median, 1 [range, 0–5] vs median, 5.5 [range, 2–6]; $P < .001$). The symptom score was improved further at the 1-year postoperative follow-up evaluation (median, 0 [range, 0–5], $P < .001$ vs the preoperative value), and only 1 stage I patient, 1 stage II patient, 1 stage III patient, and 2 stage IV patients reported improvement but were not fully satisfied with the outcome, although 1 additional stage IV