

## Relationship between subjective and objective data in achalasia patients after laparoscopic Heller-Dor procedure

Vladimir Vladimirovich Grubnik, Andrey Vladimirovich Malinovskiy, Alexandra Vladimirovna Grubnik

Chair and Department of Surgical Diseases of Odessa State Medical University, Odessa Oblast Hospital, Ukraine

Wideochirurgia i inne techniki małoinwazyjne 2006; 1 (4): 137–141

### Summary

**Introduction:** Goal of surgery – to relieve dysphagia without inducing gastroesophageal reflux. Whether postoperative reflux and dysphagia can be assessed by questionnaires, obviating the need of 24-h pH-testing and manometry is unknown.

**Aim** of study was to assess how subjective evaluation correlates with objective data after Heller-Dor procedure for different morphologic types of achalasia.

**Methods:** Laparoscopic Heller-Dor procedure was performed in 47 patients: in 24 spindle type, Sp, patients; in 16 flask type, Fk, patients; and in 7 sigmoid type, Sig, patients. Subjective evaluation was done preop and postop using Dysphagia four-point rating scale and Gastroesophageal Reflux Disease Health-Related Quality of Life scale. Every patient preop and postop was asked to undergo objective evaluation with manometry, 24-h pH testing, endoscopy and barium swallow. Mean follow-up was 4 years (range 1 – 10). The results of laparoscopic procedures were also assessed in operation time, intraoperative and postoperative complications and postoperative hospital stay.

**Results:** There were no conversions to open surgery. Mean operation time was  $110 \pm 23$  min. Median postoperative hospital stay was  $5.5 \pm 2.2$  days. Intraoperative and postoperative complications included 2 cases (4.2 %) of mediastinal emphysema and 1 case (2.1 %) of pneumonia. Degree of dysphagia relief was excellent in 39 (83 %) patients, good in 7 (14.9 %) patients and moderate in 1 patient (2.1 %). Mean lower oesophageal sphincter (LOS) resting pressure decreased from 25.2 mmHg (range 17.3 – 39.1) to 14.1 mmHg (range 11.2 – 18.0). There was poor correlation between median postoperative dysphagia score and median postoperative LOS pressure ( $r = 0.17$ ) and also no correlation between median change in dysphagia score from preop to postop and median change in LOS pressure ( $r = 0.03$ ). Median De Meester score decreased from 15.1 (range 3.1 – 94.4) to 5.9 (range 2.9 – 49.3). There was poor correlation between GERD-HRQL score and De Meester score ( $r = 0.25$ ).

**Conclusions:** Laparoscopic Heller-Dor procedure is an effective treatment of achalasia. Subjective evaluation can document symptomatic relief and health-related quality of life but does not accurately reflect postoperative reflux and LOS pressure, including the different morphologic types. 24-h pH study is required to assess gastroesophageal reflux adequately.

**Key words:** oesophageal achalasia, laparoscopic Heller-Dor procedure, dysphagia, gastroesophageal reflux.

### Introduction

The aim of cardiomyotomy in achalasia patients is to decrease the lower oesophageal sphincter tone [1]. Although this procedure improves dysphagia, it can in-

duce gastroesophageal reflux [2 – 5]. So, adding an antireflux procedure such as Dor or Toupet fundoplication is necessary. The primary goal of surgery is to relieve dysphagia without inducing gastroesophageal reflux. Whether the presence of postoperative reflux and dys-

#### Address for correspondence

Andrey Vladimirovich Malinovskiy, ul. Gaidara 17 kv. 50, Odessa, 65078, Ukraine, tel. +38 066 326 90 40, +38 048 761 43 45, +38 0482 55 22 86, +38 048 56 31 05, Email: avmalinovskiy@rambler.ru

phagia can be reliably ascertained using patient questionnaires, obviating the need for 24-h pH-testing and manometry, is unknown [2]. Furthermore, surgery outcomes (and therefore subjective and objective assessment data) depend on the stage of achalasia [6, 7].

## Aim of study

The purpose of this study was to assess the relationship between subjective and objective outcomes after laparoscopic Heller myotomy and Dor fundoplication in the different morphologic types of achalasia.

## Materials and methods

### Patients

47 consecutive achalasia patients underwent laparoscopic Heller myotomy and Dor fundoplication between 1996 and 2006 at the Odessa Oblast Hospital. They consisted of 20 men and 27 women ranging in age from 18 to 82 years, with a median age of 42 years. Mean duration of disease was 4 years (range 1 – 20). Breakdown by morphologic type was as follows: spindle type, Sp – 24 patients (51 %); flask type, Fk – 16 patients (34 %); and sigmoid type, Sig – 7 patients (15 %).

### Pre- and postoperative assessment

Patients' symptoms were subjectively evaluated pre- and postoperatively by such questionnaires:

1. Heartburn: The GERD-HRQL questionnaire was used [8]. This instrument consists of nine items, which is scored from 0 to 5: 0 – no symptoms, 1 – rare symptoms (monthly), 2 – frequent symptoms (weakly), 3 – every day bothersome symptoms, 4 – every day symptoms limiting daily activities, 5 – incapacitating symptoms, when patients are unable to do daily activities. The total score is derived by summing the scores of the nine items (0 – best score, 45 – worse score). For purposes of analysis, GERD-HRQL scores of < 5 were considered to be indicative of minimal reflux symptoms.
2. Dysphagia was assessed using a four-point symptom rating scale (0 – none, 1 – mild, 2 – moderate and 3 – severe) [9].

For objective evaluation preoperatively and postoperatively all patients underwent a barium swallow study, oesophagogastrosocopy, manometry and 24-h pH-testing. During barium swallow the speed of eva-

cuation of contrast medium (the time from the beginning of swallow until filling of stomach by first portions of dye) was calculated. During endoscopy the degree of oesophagitis (by Savary-Miller) was evaluated. During oesophageal manometry the resting lower oesophageal sphincter (LOS) pressure was the main criterion. After 24-h pH-testing the objective evidence of reflux was assessed by the De Meester score. The therapeutic effects of surgery were also assessed in terms of operation time as well as intraoperative and postoperative complications.

## Preoperative data

### Subjective data

#### *Dysphagia*

Every patient complained of dysphagia. Among patients with Sp type (n = 24) there were 10 patients with mild (1) dysphagia and 14 patients with moderate (2) dysphagia. In the Fk group (n = 16) there were 3 patients with mild (1) dysphagia, 5 patients with moderate (2) dysphagia and 8 patients with severe (3) dysphagia. Every patient with Sig type (n = 7) experienced severe (3) dysphagia. Overall, the median rating of dysphagia was 2 – moderate (range 1-3). The common distribution by the severity of dysphagia was as follows: 13 patients (27.6 %) had mild dysphagia, 19 patients (40.4 %) had moderate dysphagia and 15 patients (32 %) had severe dysphagia.

#### *Heartburn*

Preoperatively 15 patients (31.9 %) complained of heartburn: 10 patients with Sp type and 5 patients with Fk type. Median GERD-HRQL score was 14 (range 6 – 25). In Sp group it was 17 (range 9 – 25), in Fk group 12 (range 6 – 19). All of these 15 patients had a GERD-HRQL score >5.

### Objective data

#### *Barium swallow*

Every patient underwent barium swallow study. Distension of the oesophagus, decreased oesophageal motility, and slow evacuation of contrast medium through the narrowed gastroesophageal junction were revealed. Lesions were classified into three types (Sp, Fk, Sig) by the degree of oesophageal distension and shape of the oesophagus. Mean speed of evacuation of contrast medium was 15 sec (range 6 – 124).

In Sp group it was 11 sec (range 6–24), in Fk group 17 sec (range 8–65) and in Sig group 35 sec (range 21–124).

### **Endoscopy**

Fibre-optic oesophagoscopy was performed in every patient. Oesophagitis was noticed in every patient and classified into 4 stages by Savary-Miller grading. First degree of oesophagitis was revealed in every patient with Sp type of achalasia. In Fk group: 2nd degree was detected in 9 patients and 3rd degree in 7 patients. In Sig group: 1 patient had 3rd degree and 6 patients had 4th degree of oesophagitis. Overall, first degree of oesophagitis was detected in 24 patients (51 %), 2nd degree in 9 patients (19.1 %), 3rd degree in 8 patients (17 %) and 4th degree in 6 patients (12.9 %).

### **Manometry**

All patients underwent oesophageal manometry. Median resting LOS pressure was 25.2 mmHg (range 17.3–39.1). In Sp group it was 18.1 mmHg (range 17.3–27.7), in Fk group 24.8 mmHg (range 20.3–34.5) and in Sig group 35 mmHg (range 27.6–39.1).

### **24-h pH testing**

Every patient underwent 24-h pH testing. Median DeMeester score was 15.1 (range 3.1–94.4). In Sp group it was 18.9 (range 7.0–94.4), in Fk group 16.8 (range 5.3–64.5) and in Sig group 11.3 (range 3.1–14.6).

### **Surgical technique**

Laparoscopic Heller myotomy and Dor fundoplication was performed through four ports using one 10-mm trocar and three 5-mm trocars in the reversed Trendelenburg position. The 10-mm trocar was inserted 5 cm above the umbilicus for 30° laparoscope. Then, under laparoscopic guidance, the first 5-mm trocar was inserted into the right subcostal region on the mid-clavicular line for retraction of the left liver lobe. The second 5-mm trocar was inserted into the epigastric region on the midline for hook, clamps, bipolar coagulator and irrigator. The third 5-mm trocar was inserted into the left subcostal region on the mid-clavicular line for clamps and needle-holder.

First, the peritoneum leaf over the oesophagogastric junction was dissected. Then extramucosal myotomy was performed by hook from 8 cm proximal to 2 cm di-

stal the oesophagogastric junction. The muscular layer was separated from mucosa over 1/2 of oesophagus diameter. As an antireflux procedure, 180° fundoplication of the anterior wall (Dor procedure) was performed over a 56 Fr oesophageal bougie using three or four stitches between the gastric fundus and the cut edges of the oesophageal muscle. As a principle, several short gastric vessels were divided after bipolar coagulation to avoid tension on the wrap. A gastric patch was also sewn onto the right crus of the diaphragm.

### **Results**

The median follow-up was 4 years (range 1–20). The follow-up was performed for every patient ( $n = 47$ ). There were no conversions to open surgery. The median operative time was 110±23 min. In Sp group it was 86±18 min, in Fk group 108±21 min and in Sig group 117±22 min. The median postoperative hospital stay was 5.5±2.2 days. In Sp group it was 3.7±1.8 days, in Fk group 4.6±2.1 days and in Sig group 5.8±2.7 days. As a rule, the day after surgery patients were allowed to walk, drink and eat some liquid food.

Intraoperative complications consisted of 5 (10.6 %) oesophageal mucosal perforations (in 3 Fk patients and 2 Sig patients), which were all repaired by sewing the defect with absorbable monofilament suture; and 2 cases (4.2 %) of mild mediastinal emphysema. Median intraoperative blood loss was 40 ml (range 30–100). Postoperative complications included 1 case of pneumonia (2.1 %) in a Sig patient. No patients had subsequent postoperative interventions such as redo myotomies or pneumatic dilation during the follow-up period.

### **Subjective data**

#### **Dysphagia**

Every patient was assessed for dysphagia relief. Among patients with Sp type: 21 patients had no (0) dysphagia and 3 patients had mild (1) dysphagia. In the Fk group: there were 13 patients with no (0) dysphagia, 2 patients with mild (1) dysphagia and 1 patient with moderate (2) dysphagia. Among Sig patients there was 4 patients with no (0) dysphagia, 2 patients with mild (1) dysphagia and 1 patient with moderate (2) dysphagia. Overall, the median rating of dysphagia decreased from 2 – moderate (range 1–3) to 0 – no symptom (range 0–2) ( $p < 0.05$ ). The com-

mon distribution by the severity of dysphagia was as follows: 39 patients (83 %) were free of dysphagia, 7 patients (14.9 %) had mild dysphagia, 1 patient (2.1 %) had moderate dysphagia. Thus, excellent dysphagia improvement was obtained in 21 (87.5 %) Sp patients, in 13 (81.3 %) Fk patients, and 4 (57.1 %) Sig patients.

### Heartburn

Only 4 patients (8.5 %) complained of heartburn postoperatively: 1 patient with Sp type, 2 patients with Fk type and 1 patient with Sig type. Median GERD-HRQL score decreased from 14.3 (range 6.1 – 25.4) to 3.4 (range 0 – 8) ( $p < 0.05$ ). In Sp patients this score was 6, in two Fk patients 6 and 8, in Sig patient 7. All 4 patients (8.5 %) with heartburn had a GERD-HRQL score  $> 5$ .

### Objective data

#### Barium swallow

Reduction of the diameter of the oesophagus, reinforcement of oesophageal motility, acceleration of contrast dye evacuation and widening of the gastroesophageal junction was achieved in every patient. Mean speed of evacuation of contrast decreased from 15 sec (range 6 – 124 sec) to 5 sec (range 1 – 22). In Sp group it was 3 sec (range 1 – 7 sec), in Fk group 5 sec (range 2 – 13), and in Sig group 7 sec (range 5 – 22 sec).

#### Endoscopy

The endoscopic picture significantly improved. In Sp group: 8 patients had first degree of oesophagitis, the rest were free of oesophagitis. In Fk group: 5 patients were free of oesophagitis, 8 patients had first degree and 3 patients had 2nd degree of oesophagitis. In Sig group: 2 patients had first degree, 5 patients had 2nd degree of oesophagitis. Overall, a normal endoscopic picture was found in 21 patients (44.7 %), first degree of oesophagitis in 18 patients (38.3 %), 2nd degree in 8 patients (17 %). There were no patients with 3rd or 4th degree of oesophagitis.

#### Manometry

Every patient underwent manometry postoperatively. Median resting LOS pressure decreased from 25.2 mmHg (range, 17.3 – 39.1) to 14.1 mmHg (range 11.2 – 18.0) ( $p < 0.05$ ). In Sp group it was 12.9 mmHg (range 11.2 – 15.7), in Fk group 14.0 mmHg (range 12.7 – 16.9), and in Sig group 18.4 mmHg (range 17.3 – 18.0).

*There was poor correlation between mean postoperative dysphagia score and mean postoperative LOS pressure ( $r = 0.17$ ,  $p = 0.33$ ) and also no correlation between median change in dysphagia score from preop to postop and median change in LOS pressure ( $r = 0.03$ ,  $p = 0.94$ ).*

### 24-h pH testing

Every patient underwent 24-h pH testing. Median DeMeester score decreased from 15.1 (range, 3.1 – 94.4) to 5.9 (range 2.9 – 49.3). De Meester score was abnormal in 2 patients: 49.3 in one Sp patient and 25.9 in one Fk patient. But among them 1 patient had no heartburn (silent reflux), and one experienced moderate heartburn. They also had X-ray data for gastroesophageal reflux. Also, among 4 patients (8.5 %) with GERD-HRQL score  $> 5$ , only two had abnormal DeMeester score. Among patients with GERD-HRQL scores  $< 5$  none had an abnormal DeMeester score. The median DeMeester score in patients with GERD-HRQL scores  $< 5$  did not differ from that of patients with GERD-HRQL scores  $> 5$ , including all the different morphologic types.

*Thus, there was poor correlation between GERD-HRQL score and De Meester score ( $r = 0.25$ ,  $p = 0.19$ ).*

### Discussion

Our results show that laparoscopic Heller myotomy is highly effective at relieving the dysphagia and resting LOS pressure in achalasia patients. Other authors have had similar results; thus laparoscopic Heller-Dor procedure presently is the treatment of choice [1, 4, 10]. A special scale is used for evaluation of surgery outcomes in dysphagia relief [9]. LOS pressure is an objective gauge for treatment efficacy. But there are some reports in which no relationship between LOS pressure and dysphagia score was found [9]. It is known that Dor fundoplication greatly decreases the rate of postoperative gastroesophageal reflux [2, 3, 5]. A special questionnaire, the GERD-HRQL instrument, is used widely for assessment of postoperative reflux [8]. The 24-h pH-study with DeMeester score determination is the objective method for revealing the reflux [2]. But there are no data for the degree of correlation between DeMeester score and GERD-HRQL score in the different morphologic types of achalasia patients. We consider that such objective methods as 24-h pH-study and oesophageal manometry show more information about LOS pressure and gastroesophageal

reflux. For instance, up to 20 % of GERD patients may have silent reflux [2]. Postoperative reflux monitoring is very significant, because it may lead to the relapse of dysphagia due to peptic stricture of gastroesophageal junction. Thus, the aim of our study was to assess the relationship between subjective and objective data after laparoscopic Heller-Dor procedure to determine the necessity and priority of objective diagnostic tools. We have obtained results showing a poor correlation between GERD-HRQL score and De Meester score. So, 24-h pH study is absolutely required to assess gastroesophageal reflux after surgery for achalasia.

## Conclusions

1. Laparoscopic Heller myotomy and Dor fundoplication is an effective treatment mode of achalasia, characterized by a low rate of intra- and postoperative complications (minor complications in 10.6 % and 2.1 % respectively) and absence of mortality. Hence, laparoscopic Heller-Dor procedure is the treatment of choice.
2. Excellent symptomatic relief can be achieved in patients with Sp and Fk morphological types (excellent subjective and objective results were obtained in 87.5 % of Sp patients, in 81.3 % of Fk patients and 57.1 % of Sig patients). Classification by morphologic type is a useful parameter in predicting postoperative outcome in achalasia.
3. Subjective evaluation can document symptomatic relief and health-related quality of life but does not accurately reflect postoperative reflux and LOS pressure reduction, including the different morphologic types. 24-h pH study is required to assess gastroesophageal reflux for adequate further treatment.

## References

1. Costantini M, Zaninotto G, Giurolli E i wsp. The laparoscopic Heller-Dor operation remains an effective treatment for esophageal achalasia at a minimum 6-year follow-up. *Surg Endosc* 2005; 19 (3): 345–51.
2. Lyass S, Thoman D, Steiner JP i wsp. Current status of an antireflux procedure in laparoscopic Heller myotomy. *Surg Endosc* 2003; 17 (4): 554–8.
3. Ackroyd R, Watson DI, Devitt P i wsp. Laparoscopic cardiomyotomy and anterior partial fundoplication for achalasia. *Surg Endosc* 2001; 15 (7): 683–6.
4. Bonatti H, Hinder RA, Klocker J i wsp. Long-term results of laparoscopic Heller myotomy with partial fundoplication for the treatment of achalasia. *Am J Surg* 2005; 190 (6): 874–8.
5. Burpee SE, Mamazza J, Schlachta CM i wsp. Objective analysis of gastroesophageal reflux after laparoscopic heller myotomy: an anti-reflux procedure is required. *Surg Endosc* 2005; 19 (1): 9–14.
6. Grubnik VV, Malinovskiy AV, Grubnik OV. Laparoscopic treatment of achalasia. Abstracts of 10th World Congress of Endoscopic Surgery. Berlin 2006: 10.
7. Omura N, Kashiwagi H, Ishibashi Y i wsp. Laparoscopic Heller myotomy and Dor fundoplication for the treatment of achalasia. Assessment in relation to morphologic type. *Surg Endosc* 2006; 20 (2): 210–3.
8. Velanovich V, Vallance SR, Gusz JR i wsp. Quality of life scale for gastroesophageal reflux disease. *J Am Coll Surg* 1996; 183 (3): 217–24.
9. Gholoum S, Feldman LS, Andrew CG i wsp. Relationship between subjective and objective outcome measures after Heller myotomy and Dor fundoplication for achalasia. *Surg Endosc* 2006; 20 (2): 214–9.
10. Fernandez AF, Martinez MA, Ruiz J i wsp. Six years of experience in laparoscopic surgery of esophageal achalasia. *Surg Endosc* 2003; 17 (1): 153–6.