

Intraoperative Measurement, Classification, And Abbreviated Description Of Hiatal Hernias

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Citation

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Abstract

Aim: Classification of hiatal hernias should include the main parameters for intraoperative selection of the surgical treatment method. Abbreviated descriptions of hiatal hernias, such as HH I-IV are not complete and need further development. **Methods:** We have perfected a classification of hiatal hernias and used it in clinical practice to classify hernias in 75 patients who underwent surgical treatment. Four recognized types of hiatal hernias (HH) were used. Type I (sliding) hernias have the gastroesophageal (GE) junction above the level of the diaphragmatic hiatus. Type II (rolling) hernias have a normally positioned GE junction, but a portion of the fundus is above the hiatus. Type III hernias have displacement of the GE junction and fundus above the hiatus and type IV hernias are characterized by the presence of other viscera within the hernia sac. The width (W) defect between the right and left diaphragmatic crura is the most important size measurement that determines the difficulty of successfully repairing the hiatal hernia, with W1 < 3 cm; W2, 3-5 cm; W3, 5-8 cm; and W4 > 8 cm. The length (L) of the hernia defect was defined as the vertical distance in cm between the high and low point of hiatal orifice with L1 < 5 cm; L2, 5-8 cm; and L3 ≥ 8 cm. Measurement of the GEJ position was done immediately after hiatal opening to evaluate the grade of short esophagus (SE), with SE0, no shortening; SE1, shortening by ≤ 4 cm; and SE2, shortening by > 4 cm. We considered that hiatal hernia recurrence (R) after previous repair should be included in the classification with R0, no recurrence and R (n), the number of previous hernia repairs. **Results:** Our perfected classification was in the format: HH I-IV; W1-4; L1-3; SE 0-2; R 0-n. According to our data, the parameters of hiatal hernia were formulated in most cases (49/75) as HH I; W 2; L 2; SE 0; R 0, which represented the prevalence of patients with sliding hernia with secondary width and length of the esophageal orifice, without shortening esophagus or recurrence. **Conclusions:** Our classification allows abbreviated description of the main intraoperative parameters of hiatal hernia, which facilitates the choice of the surgical treatment method.

INTRODUCTION

There are three or four types of hiatal hernia (HH), with type I (sliding) HH accounting for approximately 90% of all HH. The less common types of HH, types II-IV are all varieties of “paraesophageal” hernias. Taken together, these account for at most 5–15% of all hiatal hernias [1]. Type I (sliding) HH results from laxity and loss of elasticity of the phreno-esophageal ligament. Currently, because of the inherent margin of error, HH is regarded as present if greater than 2-cm difference is detected in the physiological proximal movement of the gastroesophageal junction (GEJ, recognized as the Z line) during swallowing in relation to the diaphragmatic crura [2, 3].

Classification of hiatal hernias should include the main parameters important for intraoperatively selecting the method of surgical treatment. Abbreviated descriptions of hiatal hernia such as HH I-IV are not complete and need further development.

MATERIAL AND METHODS

The study included 75 patients with hiatal hernia who were examined and treated in the Department of Surgery at the National Research Medical Center from 2003 to 2008. A total of 35 men and 40 women aged 21 to 76 years (average 49.9 ± 12.3 years) were included.

All operations were performed laparoscopically. During laparoscopic antireflux surgery, we identified types of hiatal hernia, performed measurements of the hiatal aperture, and identified a metric value for shortening of the esophagus [4].

RESULTS

We have perfected a classification of hiatal hernias and used it in clinical practice to classify hernias in patients who had surgical treatment. Four recognized types of hiatal hernias (HH) were used (Table 1). Among all the patients, 54 (72%) had HH I and only two (2.7%) had HH II with manifestations of GERD, while HH III was detected in 16

(21.3%), and HH IV was seen in three (4%) patients.

Figure 1

Table 1: Types of Hiatal Hernias

HH I	HH II	HH III	HH IV
Sliding hernias have the GE junction above the level of the diaphragmatic hiatus	Rolling hernias have a normal position to the GE junction, but a portion of the fundus above the hiatus	Displacement of both the GE junction and fundus above the hiatus	Presence of other viscera within the hernia sac
n = 54 (72%)	n = 2 (2.7%)	n = 16 (21.3)	n = 3(4%)

We measured the width (W) of the defect between the right and left diaphragmatic crura and the results are shown in Table 2.

Figure 2

Table 2: Width of HH

W1 < 3 cm	W2 = 3-5 cm	W3 >5 and <8 cm	W4 > 8 cm
n = 4 (5.3%)	n = 26 (34.7%)	n = 31(41.3%)	n = 14(18.7%)

Four W1 patients had a small extension of the esophageal hiatus up to 3 cm (2.5 ± 0.6); 26 patients had an average extension of the esophageal hiatus from 3 to 5 cm (W2, 4.77 ± 0.5 ; n = 26); 31 patients had a large extension of the esophageal hiatus of 5 cm to 8 cm (W3, 6.8 ± 0.77 ; n = 31); and 14 patients had gigantic extension of the esophageal hiatus (W4, 10.1 ± 1.0 ; n = 14).

The length (L) of the hernia defect was defined as the vertical distance in centimeters between the high and low point of hiatal orifice (Table 3). L1 (< 5 cm) was identified in 14 (18.7%) patients, L2 (≥ 5 -8 cm) in 48 (64%) patients, and L3 (≥ 8 cm) in 13 (17.3) patients who underwent operation.

Figure 3

Table 3: Length of HH

L1 < 5 cm	L2 = 5-8 cm	L3 > 8 cm
n = 14 (18.7%)	n = 48 (64%)	n = 13 (17.3)

Measurement of the gastroesophageal (GE) junction position was done immediately after hiatal opening to evaluate the grade of esophageal shortening (SE; Table 4). No shortening of the esophagus (SE 0) was seen in 47 (62.7%) patients, first degree shortening (SE 1) was observed in 23 (30.7%), and apparent second degree shortening (SE 2) was observed in five (6.7%) patients (Table 4).

Figure 4

Table 4: Grade of short esophagus

SE0 No shortening	SE1 Shortening ≤ 4 cm	SE2 Shortening > 4 cm
n = 47 (62.7%)	n = 23 (30.7%)	n = 5(6.7%)

Shortening was observed in 10% of patients with small and medium-sized hernias and 55% of cases with large or giant size herniation ($r = 0.67$; $t = 7.66$; $P < 0.001$). This trend is associated with the grave violation of the anatomical relationship in the lower esophageal sphincter observed with large hernias.

Recurrence (R) after previous repair of a hernia should be included in the classification (Table 5). Most patients (98.7%) had no previous hiatal hernia repairs - R(0), with only one case (1.3%) denoted as R(1). If there were two previous hernia repairs, this case would be designated R(2) and so on, depending on the number of recurrences.

Figure 5

Table 5: Recurrence of HH

R(0) No recurrence	R(n) n - the number of previous hernia repairs
n = 74 (98.7%)	n = 1 R(1)

DISCUSSION

Our classification and abbreviated description is in the format: HH I-IV; W 1-4; L1-3; SE 0-2; R 0-n. According to our data, the parameters of hiatal hernia (49/75) were formulated as HH I; W2; L2; SE0; R0 in most cases, which represents the prevalence of patients with sliding hernia with secondary width and length of the esophageal orifice, without shortening of the esophagus or recurrence. HH I (sliding hernias) have the GE junction above the level of the diaphragmatic hiatus. This was the most common type of hernia in our study (72%), which confirms the well-known statistics [1].

The width (W) of the defect between the right and left diaphragm crura is the most important measurement of size, which influences the choice of the hiatoplasty method. Small size of the hernia allows use of posterior and/or anterior cruroraphy, whereas large defects require the use of a special mesh [5].

The length (L) of the hernia depends on the shape of the esophageal orifice and its size does not always correspond to the width (W) of the hiatal defect, especially with a slit-like

form of the hiatal aperture [3].

The incidence of short esophagus ranges from 0% to 60% [6-8]. In our study, reducible short esophagus was seen in 37.3% of patients. We are convinced that the shortened esophagus is not a contra-indication to laparoscopic approach to surgical repair. On the contrary, visualization is adequate in the lower mediastinum with a 45° lens, and dissection and lengthening of the retracted esophagus is relatively straightforward [9].

Laparoscopic technology provides the ability to manipulate not only the abdominal cavity; but through the hiatal opening, the posterior mediastinum is also accessible. Optimal visualization allows precise work next to the esophageal wall and access to dissection of the intrathoracic esophagus [10]. After maximum mediastinal dissection of the esophagus, adequate lengthening of the esophagus is confirmed by displacement of marker clips to the desired distance below the diaphragm. If the elongation of the esophagus is such that it would be impossible for a short esophagus to be reducible, then extended surgery such as Collis procedure would be required [11]. Cases of irreducible apparent (acquired) shortening, as described by Horvath et al. [8] were not seen in our patients.

Reoperation after failed antireflux surgery is not a rarity [12]. Repeated surgery is a difficult technical problem and should therefore be taken into account in the current classifications of HH.

CONCLUSION

We have perfected a classification of hiatal hernia and used it in clinical practice for the classification of hernias in patients who had surgical treatment. Our classification format: HH I-IV; W1-4; L1-3; SE 0-2; R 0-n, allows abbreviated description of the main intraoperative

parameters of hiatal hernia to facilitate the choice of the method of surgical treatment.

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