

Recurrent Achalasia after Surgical Treatment

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Abstract

Background: Laparoscopic Heller myotomy with a partial fundoplication is the mainstay of surgical treatment of achalasia of the cardia. The failure of surgical therapy in the treatment of achalasia is related to different causes that have not yet been conclusively defined in the literature.

Aim of Study: To analyze different predictors of recurrence of achalasia after surgical treatment.

Patients and Methods: This is a retrospective study that was conducted to patients who underwent surgical interventions for achalasia at Gastrointestinal Surgical center (GISC), Mansoura University, Egypt during the period between January 2007 and December 2017. The aim of this study is to analyze different predictors of recurrence of achalasia after surgical treatment.

Results: 191 patients underwent Heller cardiomyotomy with a mean age of 37.08 ± 14.98 years and mean body mass index of $24.78 \pm 6.98 \text{ kg/m}^2$. Recurrence of achalasia occurred in 33 (17.3%) patients. Surgical remyotomy was performed in 14 (42.42%) patients while balloon dilatation was performed in 19 (57.6%) patients. Factors associated with higher recurrence rate were higher Eckhardt Score and younger age ($p < 0.05$).

Conclusion: Age was negatively correlated with recurrence. However, Eckhardt score was positively correlated with it. Moreover, binary logistic regression revealed that younger age is a strong predictor of recurrence after surgical management of achalasia.

Key Words: Achalasia – Heller’s cardiomyotomy – Surgical treatment failure.

Introduction

ESOPHAGEAL achalasia is motility disorder characterized by the absence of esophageal peristalsis and failure of the lower esophageal sphincter to relax in response to swallowing. Treatment of achalasia aims to release of esophageal outlet obstruction, while minimizing gastroesophageal reflux. Laparoscopic Heller myotomy with a partial

fundoplication is a reasonable option to treat achalasia and can be performed with minimal morbidity and almost zero mortality when patients are appropriately selected [1].

The failure of surgical therapy in the treatment of achalasia is related to different causes that have not yet been conclusively defined in the literature. The causes include gastroesophageal reflux, late development of carcinoma, excessively tight fundoplication, pre-existence of a decompensated sigmoid-shaped megaesophagus, and inadequate myotomy [2].

Even though the operation has a very high success rate, some patients eventually experience recurrence of symptoms and need further treatment, particularly if the first operation was done at an early age. When this happens, it is important to perform a careful work-up to try to identify the cause and to have a tailored treatment plan [3].

The aim of this study is to analyze different predictors of recurrence of achalasia after surgical treatment.

Patients and Methods

This is a retrospective study that was conducted to patients who underwent surgical interventions for achalasia at Gastrointestinal Surgical center (GISC), Mansoura University, Egypt during the period between January 2007 and December 2017. Data for this study were retrieved from the internal web-based registry system supplemented by medical records of the patients included in the medical archive. A written consent was obtained from all cases before the operation after the explanation of advantages, and drawbacks of surgical intervention. The study was approved by the local ethical committee.

Data collected included, complete history regarding age, sex, pre-existing medical co morbid-

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ities, and special habits. Besides, achalasia symptoms were discussed in details with every patient including dysphagia, regurgitation, chest pain, heart burn, and weight loss. Physical examination was performed for all study cases. Routine preoperative laboratory investigations including CBC, renal functions tests, liver function tests, bleeding profile, and viral markers were ordered for all study cases. Barium swallow and upper gastrointestinal endoscopy were done in all cases. Esophageal manometry was ordered for every case.

Surgical technique entailed long esophageal myotomy was extended to 7cm above cardia and down to 2-3cm below it. Dor fundoplication was done after that to protect against reflux. All cases were called for follow up and to assess the recurrence symptoms in these cases. Patients were asked about the degree of relief of symptoms after operation. Patients with persistent or recurrence symptoms were assessed by endoscopy, barium study, and manometry. Recurrent cases were managed either by endoscopic balloon dilatation, or surgical re-myotomy.

Categorical data will be presented as number and percentage. Continuous data will be presented

as mean and standard deviation or as median and range. Evaluation of predictors of recurrent achalasia will be done by bivariate correlation for univariate analysis and binary logistic regression for multivariate analysis. Data management will be done by program SPSS v-20 for windows. A p -value <0.05 will be considered significant.

Results

During the study period, 191 patients with achalasia were surgically managed. Patient demographics and manometric features are listed in Tables (1,2). Surgical details of the studied population are summarized in Table (3). Follow-up results are shown in table 4. Univariate analysis of predictive factors of recurrence is summarized in Table (5). A binary logistic regression was run to determine possible predictors in the studied variables of the recurrence among the patients in the study population. There was homoscedasticity and normality of the residuals. The binary logistic regression model was statistically significant ($\chi^2=9.22$, df 1, $p=0.002$). Among all variables, only age was significant as a predictor of recurrence ($F=8.49$, df 1, $p=0.004$), As illustrated in Table (6).

Table (1): Demographics, medical and surgical history of the studied patients.

	All patients (n=191)				
	Mean \pm SD	Median	Minimum	Maximum	IQR
Age (years)	37.08 \pm 14.98	36	1	75	28, 48
BMI (kg/m ²)	24.78 \pm 6.98	23.74	8.33	49.26	20.07, 28.91
<i>Gender:</i>					
Male			43.5% (83)		
Female			56.5% (108)		
History of DM			2.6% (5)		
History of HTN			4.7% (9)		
Surgical history			2.6% (5)		
Previous balloon dilatation			14.7% (28)		
Interval between dilatation and surgery (month)			4 (2.25, 18)		
Presenting signs & symptoms					
Dysphagia			90.1% (172)		
Weight loss			0.5% (1)		
Both			4.2% (8)		
Regurgitation			5.2% (10)		

Table (2): Results of the preoperative esophageal manometry in the studied subjects.

	Esophageal manometry patients (n=191)				
	Mean \pm SD	Median	Minimum	Maximum	IQR
LES Pressure	46.37 \pm 19.63	45.00	4.00	107.40	29.70, 56.63
Relaxation	59.13 \pm 20.97	56.20	2.00	100.00	43.85, 73.00
Spontaneous Movement	92.77 \pm 22.06	100.00	0.00	100.00	100.00, 100.00
Normal movement	2.26 \pm 11.12	0.00	0.00	100.00	0.00, 0.00
LES length	3.62 \pm 1.20	3.75	1.00	8.00	2.50, 4.20

Data is expressed as mean and standard deviation, Median, Minimum, Maximum and Inter-quartile range.

Table (3): Operative details.

All patients (n=191)					
<i>Type:</i>					
Open					31.9% (61)
Laparoscopy					63.9% (122)
Failed Laparoscopy					4.2% (8)
Dor fundoplication					96.9% (185)
Crural fixation					8.4% (16)
	Mean \pm SD	Median	Minimum	Maximum	IQR
Length of esophageal myotomy	5.87 \pm 1.38	6.00	2.00	10.00	5.00, 7.00
Length of myotomy below Cardia	1.71 \pm 0.66	2.00	0.00	4.00	1.00, 2.00
Operative time	1.80 \pm 0.58	2.00	1.00	4.00	1.50, 2.00
Hospital Stay	3.07 \pm 1.94	2.00	1.00	15.00	2.00, 4.00
<i>Intraoperative complications:</i>					
Mucosal Perforation					15.2% (29)
Port site Bleeding					0.5% (1)
Injury to surround structures					1% (2)
<i>Management of intra-operative complications (n=32):</i>					
Laparoscopic repair					68.8% (22)
Convert to open					6.3% (2)
Open Repair					25% (8)
Chest infection					0% (0)
Pleural effusion					1% (1)
Leak					0% (0)
Pneumothorax					2.6% (5)
Abdominal collection					0.5% (1)

Tables (4): Follow-up results of the studied patients.

All patients (n=191)					
Follow-up patients					
	Mean \pm SD	Median	Minimum	Maximum	IQR
Duration (months)	23.38 \pm 19.76	18.00	1.00	96.00	9.00, 33.00
Eckhardt Score	4.11 \pm 3.05	3.00	0.00	12.00	2.00, 7.00
LES Pressure	35.66 \pm 17.16	34.50	9.40	81.80	22.20, 43.95
Relaxation	44.69 \pm 20.09	39.60	15.00	88.00	27.55, 60.53
Recurrence					17.3% (33)
<i>Intervention for recurrence (n=33):</i>					
Balloon dilatation					57.6% (19)
Open Surgical Redo					42.42% (14)
<i>Findings on exploration (n=14):</i>					
Short myotomy					10 (71.42%)
Disrupted wrap					2 (14.29%)
Fibrosis					2 (14.29%)

Data is expressed as percentage and number.

Table (5): Correlation between recurrence and quantitative data.

	Correlation Coefficient	P
Age	-0.216	0.003
BMI	-0.064	0.383
Duration of symptoms	0.104	0.151
Interval between dilatation and surgery	0.109	0.581
Number of dilatation sets	0.223	0.255
LES Pressure	-0.014	0.873
Relaxation	-0.049	0.568
Normal movement	-0.102	0.239
Length of esophageal myotomy	0.018	0.838
LES length	0.097	0.183
Length of myotomy below Cardia	-0.065	0.369
Eckhardt Score	0.875	<0.001
Female gender	0.01	0.896
Positive surgical history	-0.099	0.175
Dysphagia	-0.079	0.275
Dysphagia & weight loss	0.112	0.123
regurgitation	-0.045	0.534
Balloon dilatation	0.046	0.532
Dilated esophagus by barium	-0.042	0.568
Manometry	0.107	0.140
Spastic cardia	0.119	0.1
Pinpoint cardia	-0.039	0.607
Normal cardia	-0.078	0.303
Dilated esophagus by Endoscopy	0.031	0.681
Open surgery	-0.105	0.148
Laparoscopic surgery	0.113	0.119
Failed laparoscopic surgery	-0.026	0.717
Dor fundoplication	0.003	0.968
Crural fixation	0.025	0.729
Presence of intra-operative complications	-0.020	0.788

Table (6): Age as a predictor of recurrent achalasia after surgery.

Variable	B	F	p	Constant
Age	-0.041	8.49	0.004	-0.176

Table (7): Eckardt score (clinical scoring system for achalasia).

Score	Weight loss (kg)	Dysphagia	Regurgitation	Retrosternal pain
0	None	None	None	None
1	<5	Occasional	Occasional	Occasional
2	5-10	Daily	Daily	Daily
3	>10	Each meal	Each meal	Each meal

It ranges from 0 to 12.

Discussion

The pathophysiology of achalasia is still mysterious, and the methods of management which are presently accessible are planned only to palliate its characteristic symptoms through disturbing, weakening or cutting the LES muscle. Surgery is possibly the most valuable procedure to reach this goal and that myotomy by using laparoscopy is as

efficient as open surgery, on the other hand this management could moreover be unsuccessful in some cases [4]. Risk factors for lesser rates of success subsequent to surgical treatment are severe preoperative dysphagia, low LES pressures and severe esophageal dilation [5].

About 89% (77% to 100%) of patients report symptom improvement after laparoscopic Heller myotomy [6]. Long-term follow-up shows that symptom and quality of life improvement are maintained [7]. A long-term follow-up by Csendes et al., shows that failure rates after surgical treatment for achalasia are 7% after 10 years and 35% after 30 years of follow-up. The authors of this study conclude that this may be due to a progressive increase in esophageal exposure to abnormal gastric reflux, which they demonstrated using pH-metry [8] while in our study, recurrence was encountered in 33 cases (17.3%).

In our study, the mean age of the included cases was 37.08 years (range, 1-75 years). On performing correlation, age was significantly associated with recurrence after surgery ($p=0.003$). Besides, binary logistic regression model was statistically significant ($p=0.002$) on contrary Zaninotto et al., found that patient age was not a significant predictor of recurrence after surgery [9].

In the current study, BMI was not a significant predictor of recurrence after surgery ($p=0.383$). The mean value of BMI in our study cases was 24.78kg/m² cases having BMI 30 or more were documented to be more probable to develop choking and vomiting prior to myotomy and to have heartburn events subsequent to myotomy. However, achalasia symptom enhancement was not influenced by the BMI before operation [10].

In our study, patient symptoms (dysphagia, weight loss, and vomiting) did not constitute a significant risk factor for recurrence after myotomy ($p>0.05$). Another study has reported that the presence of severe dysphagia was a significant risk factor for poor surgical outcomes and recurrence [11].

In the current study, the median duration of symptoms was 24 months (range, 1-240 months). Duration of symptoms was not a significant predictor of recurrence in the current study ($p=0.151$). In another study, the duration of symptoms had a mean of 24 months in both recurrence and non-recurrence groups ($p>0.05$). Consequently, duration of symptoms was not a significant variable between the two groups [9].

In this study, neither balloon dilatation, time interval between dilatation and surgery, nor number of dilatation sessions were a significant predictor for recurrence after surgery ($p>0.05$).

On the contrary, another studies have reported that preoperative balloon dilatation was a significant risk factor for poor post-operative outcomes [12]. In addition, LES length did not constitute a significant risk factor of recurrence in the current study ($p=0.183$). The study cases had a mean LES length of 3.62cm (range, 1-8cm). Zaninotto et al., also reported that LES length was not statistically significant factor for recurrence [9].

When it comes to the barium findings in our study, it was evident that neither esophageal dilatation, nor delayed emptying constituted a significant predictor of recurrence after surgery ($p=0.568$ and 0.824 respectively). Previous studies have stated that sever esophageal dilation with sigmoid esophagus was significantly associated with poor surgical outcomes [13]. Another study showed that patients with stage I-III disease on preoperative evaluation had 90% satisfactory clinical outcome that was maintained during long-term follow-up, whereas patients with stage IV disease responded only 50% of the time and even the responders demonstrated symptom deterioration over time [14].

The mean value of post-operative Eckhart Score [a clinical the grading system most frequently used for the evaluation of symptoms of achalasia and of the efficacy of treatment [16], Table (7)], was 4.11 ± 3.05 in our study. It was significantly correlated with recurrence after surgery ($p<0.001$) and it is agree with the study of Zaninotto et al., which revealed that post-operative symptom score was significantly higher in the recurrence groups ($p=0.005$) [9].

In our study, an extremely tight fundoplication was improbable to be the reason of obstruction of esophageal flow since most cases who underwent pneumatic dilation showed a good response, 19 recurrent cases (57.6%) were managed via endoscopic balloon dilatation, whereas the rest of recurrent cases were managed by open surgical re-myotomy (14 cases - 42.42%). In a study by Patti et al., documented a greater rate of resolution of dysphagia subsequent to redo myotomy (90% of cases) while following the pneumatic dilation (15% of cases) for unsuccessful 1ry myotomy [15].

In our study, during surgery for recurrent cases, short myotomy was the commonest cause of recurrence (10 cases - 71.42%), followed by disrupted

wrap (2 cases - 14.29%), and fibrosis (2 cases - 14.29%). Our study had several limitations; firstly it is a retrospective single center experience which is liable to selection bias. Secondly, it included a small number of patients duo to rarity of the disease. A future multicenter study including larger number of patients is needed to confirm our finding.

In conclusion, it was evident that age was negatively correlated with recurrence. However, Eckhardt score was positively correlated with it. Moreover, binary logistic regression revealed that younger age is a strong predictor of recurrence after surgical management of achalasia.

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ارتجاع تعذر ارتخاء عضلة الفؤاد بعد العلاج الجراحي

مقدمة: تعد عملية هيلر لشق عضلة الفؤاد مع تورية جزئية بجزء من المعدة عن طريق منظار البطن الجراحي هي العملية الأساسية لعلاج الجراحي لمرضى تعذر ارتخاء عضلة الفؤاد. يرتبط فشل العلاج الجراحي لأسباب مختلفة لم يتم تحديدها بشكل قاطع.

الطرق: هذه دراسة بأثر رجعي أجريت على المرضى الذين خضعوا لتدخلات جراحية لمرضى تعذر ارتخاء في مركز جراحة الجهاز الهضمي، جامعة المنصورة، مصر خلال الفترة بين يناير ٢٠٠٧ وديسمبر ٢٠١٧.

الهدف من هذه الدراسة: هو تحليل تنبؤات مختلفة تكرر الإصابة بمرضى ارتجاع تعذر ارتخاء عضلة الفؤاد بعد العلاج الجراحي.

النتائج: خضع ١٩١ مريضاً بضع عضلة القلب هيلر بمتوسط عمر 14.98 ± 37.08 سنة ومتوسط كتلة الجسم 6.98 ± 24.78 كجم/م^٢. ارتجاع تعذر ارتخاء عضلة الفؤاد بعد العلاج الجراحي في ٣٣ (١٧.٣٪) من المرضى. تم إجراء إعادة جراحة شق عضلة الفؤاد طولياً في ١٤ مريضاً (٤٢.٤٢٪) بينما تم إجراء توسيع البالون في ١٩ (٥٧.٦٪) مريضاً. كانت العوامل المرتبطة بارتفاع معدل التكرار أعلى نقاط إيكهاردت والعمر الأصغر ($p < 0.05$).

الخلاصة: ارتبط العمر ارتباطاً سلبياً بالتكرار. ومع ذلك، ارتبطت نتيجة إيكهاردت بشكل إيجابي بها. علاوة على ذلك، أظهر الانحدار اللوجستي الثنائي أن العمر الأصغر هو مؤشر قوي للتكرار بعد العلاج الجراحي ارتجاع تعذر ارتخاء عضلة الفؤاد بعد العلاج الجراحي.