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Dissatisfaction after laparoscopic Heller myotomy: The truth is easy to swallow

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ABSTRACT

Background: Although laparoscopic Heller myotomy has been shown to well palliate symptoms of achalasia, we have observed a small subset of patients who are "Dissatisfied". This study was undertaken to identify the causes of their dissatisfaction.

Study design: Patients undergoing laparoscopic Heller myotomy from 1992 to 2015 were prospectively followed. Using a Likert scale, patients rated their symptom frequency/severity before and after the procedure. Patients graded their experience from "Very Satisfying" to "Very Unsatisfying."

Results: 647 patients underwent laparoscopic Heller myotomy. Fifty (8%) patients, median age 57 years and BMI 24 kg/m^2 reported dissatisfaction at follow-up subsequent to myotomy. "Dissatisfied" patients were more likely to have undergone prior abdominal operations ($p = 0.01$) or previous myotomies ($p = 0.02$). "Dissatisfied" patients had a greater incidence of diverticulectomy ($p = 0.03$) and had longer postoperative LOS ($p = 0.01$). Symptom frequency/severity persisted after myotomy for dissatisfied patients ($p > 0.05$).

Conclusion: Dissatisfaction after laparoscopic Heller myotomy is directly related to persistent/recurrent symptoms. Previous abdominal operations/myotomies, diverticulectomies, and longer LOS are predictors of dissatisfaction. With this understanding, we can identify patients who might be more prone to dissatisfaction.

1. Introduction

Achalasia is a rare esophageal motor disorder of unknown etiology that is characterized by disorganized or absent esophageal peristalsis and abnormal lower esophageal sphincter (LES) relaxation, secondary to destruction of the myenteric plexus of the esophagus. It affects 1 in every 100,000 people in the U.S.[1] With such low incidence, few centers have accumulated enough patients to fully understand the disease process and management. Today, there is no known cure for achalasia; palliation of symptoms has been the primary aim of therapy and has been approached through medical, endoscopic, and surgical treatment modalities.[2] Beginning in the 1970s, pneumatic balloon dilation of the LES became a principle treatment modality for achalasia.[3,4] In the 1990s, Botox® injection became an alternative therapy to balloon dilation; it blocks the release of acetylcholine from cholinergic neurons, leading to reduction in lower esophageal pressure.[5,6] More recently, per oral endoscopic myotomy (POEM) has acquired some limited application. Advances in minimally invasive surgery throughout the 1990's and through the new millennium made laparoscopic Heller myotomy a preferred treatment option.[7–12] With the routine addition of anterior fundoplication, this operation has become the 'gold standard' definitive treatment modality for achalasia[13–16]

Since the focus of therapy for achalasia is on the symptoms of achalasia, it is sensible to focus on the frequency and severity of symptoms after myotomy to judge the adequacy of myotomy. Although minimally invasive myotomy provides durable and effective symptom amelioration, symptoms rarely disappear completely, generally because of esophageal dysmotility, the sine-qua-non of achalasia. Since only a small proportion of patients have persistent significant ongoing swallowing complaints after myotomy, it is difficult to predict which patients may not sufficiently benefit from a Heller myotomy.

The purpose of this study was to delineate possible explanations

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for patient dissatisfaction following laparoscopic Heller myotomy by comparing patients who underwent the procedure and noted their overall experience as "dissatisfied" to patients who noted their overall experience as "satisfied". In undertaking this study, we hypothesized that we would not be able to predict dissatisfaction after myotomy.

2. Materials and methods

With Institutional Review Board (IRB) approval, all patients undergoing laparoscopic Heller myotomy at our institution between 1992 and 2015 were prospectively followed. From 1992 to 2009, Heller myotomies were undertaken via a conventional laparoscopic approach, utilizing 5 trocar sites. Initially, anterior fundoplications were applied selectively to patients with a patulous hiatus, a notable hiatal hernia, or to buttress an esophageal perforation.[17] Beginning 2004, anterior fundoplications were routinely applied to all patients undergoing laparoscopic Heller myotomy to prevent postoperative reflux symptoms.[13,18–20] Since 2009, we have applied the Laparo-Endoscopic Single Site (LESS) approach to all Heller myotomies. Both of these procedures are described in detail in our previous studies.[21]

Heller myotomy is undertaken to palliate symptoms of achalasia. Thereby, symptom resolution has been the cornerstone of our follow-up. Utilizing a Likert scale ranging from 0 (never/not bothersome) to 10 (always/very bothersome), patients completed pre- and post-operative surveys noting their symptom frequency and severity. Postoperatively, patients also reported symptom resolution and overall experience with laparoscopic/LESS Heller myotomy. Symptom resolution was rigorously scored as: excellent (completely resolved symptoms), good (greatly improved symptoms/symptoms less than one per month), fair (improved symptoms/symptoms less than once per week), or poor (no improvement/worsened symptoms/new troublesome symptoms). Patients reported "Overall Satisfaction" as: very satisfying, satisfying, neither satisfying nor unsatisfying, unsatisfying, or very unsatisfying. Finally, patients were asked if they would undergo the operation again considering what they now know.

Patients answering either "Very Satisfying" or "Satisfying" were placed in the group of patients codified as "Satisfied". Patients answering "Very Unsatisfying" or "Unsatisfying" were placed in the group of patients codified as "Dissatisfied". Patients grading their experience as "Neither Satisfied nor Unsatisfied" were excluded from this study.

For this manuscript, we have defined the term "complication" very inclusively. We have included under this term, events which may not have extended hospitalizations or caused morbidity to avoid the erroneous impression we were not forthcoming. Some "complications" are clear and obvious, while others, with our attempts at full disclosure, are not; an uneventful cardiac dysrhythmia is potentially serious and this must, in our opinion, be documented. As well, an intraoperative gastrostomy is certainly unplanned and potentially morbid (though it may not have been), and thus we have included such events herein as "complications".

Data was maintained and analyzed on Microsoft Excel (Excel, Microsoft®, Redmond, WA). Statistical analysis was undertaken utilizing the Wilcoxon matched-pairs test, Mann-Whitney *U* test, or Fisher's exact test. Significance was accepted with 95% probability. Where appropriate, data were presented as median (mean ± standard deviation).

3. Results

Six hundred forty-seven patients (53% men) underwent laparoscopic Heller myotomy. Patients had a median age of 50 years (51 ± 18.1), and a Body Mass Index of 24 kg/m^2 (25 ± 4.6). Of all patients, 39% had preoperative endoscopic therapy; of these patients, 14% underwent Botox® (Allergan, Parsippany, NJ, USA) therapy alone, 33% underwent dilation therapy alone, and 53% had both. Duration of operation was 108 min (117 ± 59.6) (Table 1). Of the 647 patients, 432 (67%) self-declared themselves "Satisfied," and 50 (8%) self-declared themselves "Dissatisfied." The remaining 165 (25%) patients self-declared themselves "Neither Satisfied nor Unsatisfied" and were excluded from this study (Table 1). No patients were noted to develop esophageal cancer at their myotomy.

3.1. "Dissatisfied" patients

Of the 50 "Dissatisfied" patients, 38 (76%) underwent conventional laparoscopic Heller myotomy, and 12 (24%) underwent LESS laparoscopic Heller myotomy. Regarding their background, 46% had previous abdominal operations and 14% had a previous myotomy. Regarding their intra-operative course, 16% had intraoperative complications and 14% underwent intraoperative esophageal diverticulectomy. Median postoperative follow up was 94 months (105 ± 47.2). Postoperative length of stay was 2 days (3 ± 4.3) (Table 2). After their operations, dissatisfied patients did not have significant amelioration of symptom frequency, with the exception of "Regurgitation" ($p = 0.01$) (Table 3, Fig. 1). These patients also did not have significant amelioration of symptom severity, with the exception of "Food Stuck in Throat" ($p = 0.0177$) (Table 4, Fig. 2). Ninety-four percent of "Dissatisfied" patients rated their symptom resolution as "Fair" or "Poor" (Fig. 3), 60% rated their overall experience as "Unsatisfying", and 40% rated it as "Very Unsatisfying" (Fig. 4); 60% reported that they would not have undergone Heller myotomy, knowing what they know now (Fig. 5).

3.2. "Satisfied" patients

Of the 432 "Satisfied" patients, 326 (75%) underwent conventional laparoscopic myotomy, and 106 (25%) underwent LESS approach. Regarding their background, 27% had previous abdominal operations and 5% underwent a previous myotomy. Regarding their intra-operative course, 9% had intraoperative complications, and 5% underwent intraoperative diverticulectomy. Median postoperative follow up was 112 months (113 ± 53.2). Postoperative length of stay was 1 day (2 ± 2.3) (Table 2). After their operations, satisfied patients had significant and meaningful amelioration of both symptom frequency and severity ($p < 0.0001$ for all) (Tables 3 and 4, Figs. 6 and 7). Ninety-two percent of "Satisfied" patients

Table 1
Demographic information for all patients undergoing laparoscopic Heller myotomy.

		Dissatisfied patients (n = 50)	Satisfied patients (n = 432)	p-value (Dissatisfied vs Satisfied)
Procedure type	Conventional Lap. Heller	38 (76%)	326(75%)	
	LESS Heller	12 (24%)	106(25%)	
Gender M/F		24/26	225/207	0.65
Age (years)		57(53 ± 19.6)	50(51 ± 17.3)	0.29
BMI (Kg/m^2)		24(25 ± 5.0)	25(25 ± 4.2)	0.55