Laparoscopic Treatment of Giant Ventral Hernia: Experience of 35 Patients

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ABSTRACT

Background: Minimal access surgery for incisional hernia repair is still debated, especially for giant wall defects. Laparoscopic repair may reduce pain and hospital stay. This study was designed to evaluate the feasibility of the laparoscopic technique in giant hernia.

Materials and Methods: From 2007 to 2013, 35 consecutive patients with giant ventral hernia, according to the Chevrel classification, underwent laparoscopic repair. Fourteen patients were obese, with a body mass index>30 and in 21 patients the mean BMI was 24 (range 22–28). In all patients, the wall defect was larger than 20 cm.

Results: Mean operative time was 159±30 minutes, and, for defects larger than 25 cm, it was 210±20 minutes. Patient conversion did not occur. In 29 patients, the mean wall defect was 20 x 25 cm, and in six patients mean wall defect was 26x31 cm, and, as measured from within the peritoneal cavity, the mean overlap was 5 cm

(range 3–6). Short-term antibiotic prophylaxis consisted of Cefazolin 2 g IV (intravenous) the day of surgery. All patients were discharged within 72–96 hrs. The mean follow-up was 24 months. No infection occurred and no chronic pain was recorded. However, three seroma were observed (outpatient treatment) and two xiphoid recurrences were observed.

Conclusions: Laparoscopic hernia repair is technically feasible and is safe in patients with giant fascial defects as well as obese patients. This operation decreases postoperative pain, hastens the recovery period, and reduces postoperative morbidity and recurrence. This approach should be reserved for patients with no history of previous hernia repair. Further studies are expected to confirm these promising results

INTRODUCTION

Incisional hernia occurs after laparotomy in 2–20% of patients, generally within three years after surgery, more frequently after long median abdominal incisions were created for aortic aneurysm and peritonitis. Incisional hernias have been classified by Chevrel et al.[1] as small (< 5 cm), medium (5 – 10 cm), large (> 10 cm), and giant or very large (> 20 cm), based on the diameter of the wall. The surgical management of incisional hernias before the use of prosthesis meshes had a 12–54% rate of recurrence, but in the last two decades the use of meshes has dramatically reduced the recurrence rate.[2] The open approach is the standard technique for repair of ventral hernias. However, the rate of hernia recurrence is high, especially if the hernia defect has been repaired with sutures. The laparoscopic repair of ventral hernias is an emerging technique that has been applied with potential to replace open repair.

Laparoscopic ventral hernia repair (LVHR) was first introduced in 1993 by LeBlanc and Booth.[3] Recurrence rates have been reported to be similar to open repair with mesh, but with shorter hospital stay as it does not require the wide dissection area or routinely require the subcutaneous drains which accompany open repair. A summary of the evidence of the efficacy, safety, and cost-effectiveness of laparoscopic repair compared with open repair is lacking.[4] It is unclear whether laparoscopic technique may be more appropriate for giant incisional hernia and if the severity and types of complications differ or are similar than open approach.[5] Indications for laparoscopic surgery for the so-called giant hernias are controversial, as well as in obese patient. The aim of this study is to analyze the outcomes of the laparoscopic incisional hernia repair (LIHR) for fascial defect larger than 20 cm.

MATERIALS AND METHODS

Between February 2007 and April 2013, a total of 35 patients underwent LVHR in our institution for primary incisional hernia. According to the Chevrel classification,[1] we defined giant as a fascial defect with a diameter > 20. The hernia size was measured in an outpatient clinic however this may led to misinterpretation of defects. Therefore, all patients underwent pre-operative CT scan to identify those fit for this study. The demographics are shown in Table I.

Comorbidities affected many patients in this study and included hypertension (n=10), insulin-independent diabetes mellitus (n=28), and chronic cardiac disease (n=16). None of the patients had chronic bronchopneumopathy. As many as 14 patients in this series were obese (40%), with a body mass index (BMI) > 30 kg/m^2, in 21 patients the mean BMI was 24 kg/m^2 (range 22–28). The mean BMI was 28.4 kg/m^2.

The general conditions were classified according to the criteria of the American Society of Anaesthesiology (ASA), and the score was ASA I in 13 patients, ASA II in 17 patients, and ASA III in five patients. Patients with recurrent incisional ventral hernia were excluded from the study. Once discharged, the patients were monitored by clinical examination with echography (with a 7.5 MHz probe) on the 10th, 30th, and 60th postoperative day. Later, they were followed-up by clinical examination or telephone call. The study was approved by the local ethics committee. All patients were asked for consent before minimal access surgical repair and all patients were treated by the same surgeon (MG).

Table I
Demographics

Variable	N = 35
Gender M/F	25-oct.
Age (years)	57.5 (range 40 – 75)
BMI kg/m^2	28.4 (range 21.89 – 35)
ASA	2.1 (range 1 – 3)

***N** number of patients; **BMI** Body Mass Index; **ASA** American Society of Anesthesiologist*

STATISTICAL ANALYSIS

The data were collected retrospectively from the database of 35 patients according to the BMI of the patients. Analysis of the data was done using the

Table II
Characteristics, operative and postoperative data of 35 patients

Patient	Age (Years)	Sex	ASA	BMI	OT (min)	Morbidity	Hospital Stay (days)
1	40	M	2	21.8	160		4
2	43	M	2	22	170		4
3	47	M	2	22.4	159		4
4	40	M	2	21.5	161		2
5	51	F	3	25.7	209		4
6	69	M	3	26.8	199		4
7	41	F	3	35.4	230	Seroma	4
8	70	M	2	33.2	221		4
9	67	F	2	27.2	175		4
10	69	M	2	22.2	160		4
11	75	F	3	34.5	188	Recurrence	3
12	71	M	3	32.8	190		3
13	49	M	2	28.6	173		3
14	48	M	2	29.5	189	Seroma	2
15	51	M	2	27.5	164		4
16	57	M	2	23.9	189		3
17	68	F	3	31.3	191		3
18	62	M	3	34.5	201		4
19	61	F	2	29.7	169		4
20	56	M	3	33.3	230		3
21	45	F	2	27.4	168		4
22	41	M	2	24.8	153		4
23	44	M	3	32.8	185		4
24	72	F	2	24.2	153	Recurrence	3
25	64	M	3	33.9	226		3
26	67	F	2	31.5	199		3
27	52	M	2	22.1	161		4
28	59	F	2	27.6	163		3
29	68	M	2	23.9	200		3
30	75	M	3	31.2	192		4
31	40	M	3	32.5	229	Seroma	4
32	44	M	3	33.6	230		3
33	49	M	3	31.6	187		3
34	57	M	2	23.1	157		4
35	61	M	2	26.7	153		4

ASA American Society of Anesthesiologist; **BMI** Body Mass Index; **OT** Operative Time

SPSS 11.0 statistical analysis software package (SPSS Inc., Chicago, IL). For continuous variables, student's t test was used and the χ^2 test was used for discrete variables. A variable of $p < 0.05$ was considered statistically significant.

RESULTS

Thirty-five patients underwent laparoscopic ventral hernia repair for primary incisional hernia (Table II). Short-term antibiotic prophylaxis consisted of Cefazolin 2 g IV the day of surgery. Covidien Parietex™ Composite Mesh (Medtronic Inc., Minneapolis, Minnesota) was used in all patients, although, in the literature, different types of ventral hernia mesh have been used, it was the prosthesis supplied to our hospital. In 29 patients, the mean wall defect was 20 x 25 cm, and in six patients mean wall defect was 26x31 cm—as measured from within the peritoneal cavity—and there was no difference with the CT measurement. The mean operative time was 159±30 minutes for defects larger than 20 cm, and it was 210±20 minutes for defects larger than 25 cm. Zero patient conversions occurred. The mean overlap was 5 cm (range 3–6). All patients were discharged home within 72–96 hours.

None of the patients returned to work until one month after surgery. All patients used a compression dressing for six months after surgery. Morbidity in the other 14 obese patients (40%), and in 21 non-obese patients (60%), showed no statistically relevant difference with the χ^2 test ($p > 0.05$).

During the follow-up, no mesh infections occurred. No chronic pain was recorded; however, two very small xiphoid recurrences (<2 cm) were observed. The differences between outcomes in obese and non-obese patients were not statistically relevant ($p > 0.05$).

Seroma superficial to the mesh were seen in three patients (8.5%) during immediate postoperative follow-up. In no case was surgical drainage of the seroma required, but a needle aspiration was eventually repeated in time with pressure dressing (Table III).

Table III
Laparoscopic worldwide experience with giant ventral hernia repair

Author [ref]	Pts	Mean FU (months)	Recurrence (%)	Complications (%)
Present study	35	24	2 (5.7)	3 (8.5)
Ferrari et al.[4]	25	24	3 (12)	12 (48)
Ferrari et al.[5]	36	28	3 (8)	3 (8)
Kirshtein et al.[6]	103	26	4 (3.9)	2 (1)

***Pts** Patients; **FU** Follow up*

DISCUSSION

The management of giant incisional ventral hernia using laparoscopy is still controversial, and the diameter of the wall defect seems to be the main limitation preventing this procedure from gaining wider acceptance.[6,7] The indications for the laparoscopic approach in large incisional hernias included having enough abdominal surface to insert trocars, enough working chamber, and adequate overlap (a minimum of 5 cm).[8] Obesity does not seem to be a contraindication for a minimal access approach for treating incisional hernia,[9] and, in our study, 14 patients were obese. Laparoscopic division of adhesions represents a very important step in incisional hernia repair. Intestinal injury during adhesiolysis ranges from 0–6%, and such a complication is more frequent during the learning phase and can jeopardize the procedure when not recognized intraoperatively.[10,11] We currently use laparoscopic scissors and avoid coagulation by both ultrasonic scalpel and bipolar forceps close to the intestinal loops.

The overall mean duration of surgery was 159 minutes; comparable with other studies that included smaller sized hernias. All patients were discharged home within 72–96 hours, so the mean hospital stay was consistent with the stay from 0–64 days reported in the literature. In the present study, we have had two xiphoid recurrences (5.7%). According to the literature, the recurrence rate with open intraperitoneal underlay is equal to the recurrence rate of intraperitoneal LVHR, that is, approximately 4.5%.[12-14]

The existing literature does not document the superiority of any one mesh fixation technique in relation to recurrence. Concerning the side of the recurrence (xyphoid), some authors[15] used a mesh overlap of at least 5 cm. In the present study, we have used a mean overlap of 4 cm.

Conze et al.[16] stressed the importance of the appropriate landmarks for dissection of the retroxiphoidal space. In agree with Conze et al., we believed these techniques may be useful to have a sufficient overlap.

We have had three cases of seroma (8.5%). There is no agreement in the literature about the need for draining a seroma. A seroma does need to be drained in case of infection or symptoms, or if it still be present after six to eight weeks.[17,18] Seroma were not routinely aspirated and were noted to resolve in the early postoperative period. Three patients underwent seroma outpatient aspiration because of prolonged discomfort at the site. Postoperative seroma formation in the previous defect site has been well documented in other studies.[19-21]

The International Endohernia Society (IEHS) guidelines[22] reported an incidence of seroma after LVHR from 3–100%. In this article, Bittner et al., suggested to attempt cauterization of the hernia sac to prevent seroma formation, Bingener et al.[23] showed a decrease from 25% to 4% when cauterizing the hernia sac by electrocautery or ultrasonic energy. However, despite these promising results, there are no randomized studies confirming this hypothesis and there is no consensus about it. In our group of patients, we have not systematically applied this technique, however, we have observed that the seroma was formed independently of the cauterization of the hernia sac. But, since our sample was not numerically consistent and we were not particularly focused on this issue, we did not feel able to express our own assessment about it.

It should also be emphasized how LVHR, in contrast with traditional surgery, has the advantage of identifying small wall defects, which may be missed during open repair.[24,25] Therefore, it is possible, as indeed we have found in our experience in three cases, that a defect in the wall considered large has become giant during surgery for the detection—especially in the case of median laparotomy xipho-pubic—of small defects on the line etching. Despite these improvements resulting from use of LVHR, most surgeons still prefer to repair giant incisional hernias with an open approach.[26]

This study seems to confirm the validity of a minimal access approach for management of defect size > 20 cm in transverse dimension. However, to date, giant incisional hernias are considered a contraindication to minimal invasive surgery, but, in this study, wall defects larger than 20 cm were successfully repaired by laparoscopy with noticeable short-term results.

CONCLUSION

Laparoscopic ventral hernia repair seems to be a safe procedure in the management of giant incisional hernias, and this approach could be reserved for patients with no history of previous laparoscopic hernia repair. Further studies with a longer follow-up, and with a greater number of patients, are necessary to confirm this promising result. STI

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All authors read and approved the final version of the manuscript.

AUTHORS' DISCLOSURES

All authors have no conflicts of interest to disclose.

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