

Original Research Article

A comparative and prospective study of ventral hernia repair by laparoscopic and open technique

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ABSTRACT

Background: Ventral hernia repair is becoming more common through laparoscopic techniques; however, there is a lack of comprehensive data on the associated complication rates. We undertook a prospective study to contrast the early establishments of laparoscopic and open ventral hernia surgeries in order to fill this gap. The aim of the study was to assess and contrast the efficiency and reliability of open and laparoscopic techniques for the treatment of ventral hernias.

Methods: A prospective study was carried out at All India Institute of Medical Science, New Delhi, India between 2011 and 2014 to assess the dissimilarities between open and laparoscopic approaches in ventral hernia repairs. The study included a total of 40 cases each for open/laparoscopic ventral hernia repair procedures.

Results: Eighty cases were investigated, forty of which underwent open repairs and forty of which underwent laparoscopic procedures. In this study, the oldest patient was 77 years old, and the youngest patient was 25 years old. The vast majority (49%) of patients were in their fourth to sixth decades of life. Incisional hernias were in bulk, that had formed from earlier midline lower scars. In both open and laparoscopic surgery, there were 40 patients- 43 females and 37 males.

Conclusions: Ventral hernia repair via laparoscopic surgery is showing encouraging results and is currently a widely used technique. When compared to open repairs, it has benefits like decreased postoperative pain, shorter hospital stays, and fewer short-term problems. Laparoscopic hernia surgery also results in a lower risk of wound infections, an earlier restoration of bowel function, and a quicker return to regular activities.

Keywords: Laparoscopic mesh hernia, Ventral hernia, Incisional hernia

INTRODUCTION

The treatment of ventral hernias has progressed over time, moving from basic suture closure to the application of prosthetic mesh, and more recently, the adoption of laparoscopic techniques. Laparoscopic ventral herniorrhaphy (LVH) was introduced in the year 1993.¹ Subsequently, minimally invasive procedures have gained increasing popularity, primarily attributed to better patient outcomes as indicated in various studies.^{2,3} ‘Ventral hernia’ repair is a frequently executed surgical intervention. While the majority of ‘ventral hernias’ involve small umbilical and epigastric hernias, nearly 29.9% of these procedures are dedicated to addressing

incisional hernias, with approximately half of them being carried out through laparoscopic techniques.⁴ Extensive collections of laparoscopic ventral hernia repair cases have demonstrated highly favorable results.^{5,6} Nevertheless, conflicting findings in published comparisons have underscored the necessity for further research in this area.^{7,8}

‘Laparoscopic ventral hernia’ repair has experienced a surge in popularity and success among both surgeons and patients since its inception by Leblanc and Booth at al.⁶ This method has many benefits, including shorter hospital stays, less post-operative discomfort, and better cosmetic results. Several studies have demonstrated the clear

benefits of using prosthesis over traditional anatomical repair.⁷⁻⁹ However, it's important to note that in traditional approaches, this often involves long incisions and the creation of flaps, which are unnecessary in laparoscopic techniques. Hernias that are exceptionally large and exhibit skin alterations or ulceration are also classified as complex or complicated cases. This study compares and contrasts laparoscopic and open techniques for ventral hernia repair in terms of efficacy and safety.

METHODS

A study contrasting the results of laparoscopic and open ventral hernia repair techniques was carried out at the All India Institute of Medical Science, New Delhi, India between 2011 and 2014. In total, 40 cases of open repair and 40 cases of laparoscopic surgery were included in this study.

Factors posing risk to patients

Large incisions, prostatism, chronic wound infections, morbid obesity, and malnutrition are recognized as threat for the development of 'ventral hernias' and incisional hernias.

Assessment of ventral hernia laparoscopic repair

In the duration when 'laparoscopic appendectomy' and 'cholecystectomy' had previously proven to have significant advantages over open procedures, laparoscopic repair of ventral hernias was carried out. Despite being time-consuming and technically challenging, it has become safe and practical as a result of the development of numerous prosthetic devices and substantial advancements in laparoscopic procedures. It is expected that these enhancements will result in a decrease in the complication rate linked to this surgical procedure. The growing adoption of laparoscopic surgery worldwide suggests that these goals may indeed be attainable. Despite ongoing controversies, laparoscopic surgery continues to advance, particularly in the context of ventral hernia repair, and there is now a wealth of data in the literature, reflecting its increased popularity in recent times.

Operative procedures

Open technique

The surgeries were conducted with the patients positioned supine under spinal anesthesia, with their arms resting at their sides. The placement of a Ryle's tube and urinary catheter depended on the hernia's location. A single prophylactic antibiotic dose was administered half an hour prior to making the incision in the skin.

Hernioplasty of ventral laparoscopy

Full-thickness fixation sutures are used in conjunction with the placement of tacks to increase the strength of

mesh fixation. 'Trans-fascial fixation' sutures are 2.50 times firmer than using just tacks, according to a study.⁹ Making sure that the mesh stays firmly in place and has enough overlap over the hernia defect is the key to preventing recurrence. But it's crucial to remember that 1-3% of patients experience persistent pain as a side effect of trans-fascial sutures, which is a prevalent problem. Thankfully, this soreness should subside in 6-8 weeks.

During laparoscopic surgery, general anaesthesia is delivered, necessitating careful preservation of fluid and electrolyte balance as well as thorough observation of vital signs. The patient is resting on his or her back in the supine posture.

Operation characteristics and ventral hernia

Fortunately, there were no intraoperative difficulties, such as bowel or vascular damage, that would have required switching to an open method because the omentum was the most frequently discovered contents in the hernia sac. A minor amount of blood was also lost, and no patients needed blood transfusions. Open procedures used closed suction tubes more frequently. It is noteworthy that ventral hernias (primary) were commonly observed in or around the umbilical area, while the majority of incisional hernias in the lower abdomen were attributed to gynecological surgeries.

Visual analogue scale (VAS) was used to measure the severity of the pain. Patients were told to annotate an image with a point to represent the level of pain they were feeling at the time. The scale had two ends: one for 'no pain', the other for 'worst pain'. Based on the level of discomfort reported on various post-operative days, scoring was done.

RESULTS

A total of 80 cases were examined, with 40 undergoing open repairs and 40 undergoing laparoscopic repairs. The youngest patient in this study was 25 years old, while the oldest patient was 77 years old. The majority of patients (49%) fell within the age range of the fourth to sixth decades of life.

The bulk of the cases were incisional hernias/ para-umbilical hernias which had formed from earlier midline scars (lower). There were 40 patients, 43 girls and 37 males.

The average score of pain for all patients in the open surgery category was 5.73, while in the laparoscopy group, it was 3.13. The p value obtained when comparing both groups was 0.0005, indicating statistical significance.

The mean duration of hospital stay for the open surgery group was 7.54 days, while for the laparoscopy group, it was 3.97 days. From the day of surgery the length of hospital stay was calculated. When comparing both

groups, the p value was 0.0005, signifying statistical significance.

Resuming daily activities

In our study, patients who had laparoscopic surgery were able to resume their normal activities 11 days after the procedure, whereas individuals who had open surgery needed 25 days. When comparing the two groups, a p value of 0.0005 was found, suggesting statistical significance.

Table 1: Sex of the patients.

Sex	Frequency	Percent
Male	37	46.25
Female	43	53.75

Table 2: Characteristic aspects of laparoscopy/open surgery.

Duration of surgery	Frequency	Mean	SD
Mean operative time laparoscopy/open surgery			
Open	40	123.67	25.773
Laparoscopy	40	135.77	49.371
Mean pain score in open/laparoscopic surgery			
Open	40	4.13	0.679
Laparoscopy	40	3.25	0.521
Duration of stay in hospital			
Open	40	7.54	1.507
Laparoscopy	40	3.97	1.731
Resuming daily activities			
Open	40	11.73	3.913
Laparoscopic	40	7.31	1.357

DISCUSSION

The methods for doing laparoscopic surgery to repair ventral hernias are constantly improving. In this study, 40 open ventral hernia repairs and 40 laparoscopic repairs were contrasted.

Surgery duration

The operating time for laparoscopic repairs was typically reported to be longer than for open repairs in the majority of earlier research that compared open and laparoscopic ventral hernia repairs.⁹⁻¹³ However, compared to other research, the time needed for laparoscopic repair in the current study is noticeably longer. The complication of the hernias in the cases treated in this study may be to blame for the discrepancy.

In conclusion, laparoscopy indeed takes a longer time in comparison to open repair in this particular study. The p value obtained is significant at 0.0005, confirming this difference as statistically significant.

Assessment of pain

In contrast to the present study, previous research that were contrasted to our study consistently reported significantly less post-operative pain in patients who underwent laparoscopic repairs compared to those who had open repairs.¹⁴⁻¹⁵ In our study, pain levels were assessed using the VAS, with a score of 2.51 in the open surgery group and 4.13 in the laparoscopic surgery group. The p value obtained is significant at 0.0005, reinforcing the difference as statistically significant.

Additionally, laparoscopy enables the direct visualisation of hernia flaws that might not otherwise be visible clinically. Through a single incision, it allows for the treatment of many hernias that are distributed among the abdominal quadrants, which is not possible with the open procedure. More post-operative pain, longer hospital stays, and a higher incidence of complications are frequently seen with open hernia procedures. Furthermore, because anatomical planes are extensively dissected during open procedures, seroma development is more prone to occur.

Hospital stay duration

Patients who underwent laparoscopic treatments were consistently released sooner than those who underwent open repair procedures across all studies that were examined.

Complications

One patient underwent laparoscopic surgery and two underwent open surgery. In five of the open cases and one laparoscopic case, seroma collection was seen. 3 patients in the open group were found to develop flap necrosis

Single patient in the laparoscopic repair group had abdominal wall cellulitis, which was effectively treated with conservative measures. There is undeniable proof that laparoscopy is related with fewer complications because the open repair group's complication rates were consistently higher across all investigations.

But there are some circumstances in which a specific course of action is recommended. Cases with a large defect or in patients with a slack abdominal wall, open surgery performs better than laparoscopy because the cuts can be repaired more successfully *via* open procedure. In addition, laparoscopy cannot be used for some procedures, such as abdominoplasty.

CONCLUSION

Ventral hernia repair via laparoscopic surgery is showing encouraging results and is currently a widely used technique. When compared to open repairs, it has benefits like decreased postoperative pain, shorter hospital stays, and fewer short-term problems. Laparoscopic hernia surgery also results in a lower risk of wound infections, an

earlier restoration of bowel function, and a quicker return to regular activities.

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