

A Comparative Study Between Laparoscopic Versus Open Incisional Hernia Repair

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Abstract

Aims: This study aims to compare between laparoscopic and open incisional hernia repair.

Methods and Materials: The study was conducted in different tertiary hospitals of Dhaka between January 2011 to December 2012 and in 96 patients with incisional hernia. Among them, 68 patients underwent open repair and 28 underwent laparoscopic repair. Both procedures usually consisted of applying a synthetic mesh overlapping the defect. They were followed up for one year to observe the clinical outcome.

Results: Mean operative time was shorter in laparoscopic group in comparison to open procedure and mean post operative hospital stay was less than 3 days in laparoscopic group and above 7 days in open group. In the laparoscopic

group return to normal activities/work after surgery was less than 2 weeks but after open procedure it was more than 3 weeks. Analgesics requirement was also lower in the laparoscopic group. Post operative complications were observed in 33.82% (23) patients in open hernioplasty group and in 7.14% (2) patients in laparoscopic group which showed significant difference ($p < 0.05$). There was no recurrence in the laparoscopic group during one year follow-up.

Conclusion: Data suggest laparoscopic repair is superior to open repair because of less complications, relapses and short hospital stay but long term follow up is required.

Keyword: Incisional hernia, Laparoscopic repair.

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Introduction

Incisional hernia is one of the common surgical complication after laparotomy. Up to 30% of all patients undergoing laparotomy develop an incisional hernia. This is associated with discomfort, pain, respiratory restriction and dissatisfactory cosmetic results.¹⁻⁶ The associated morbidity often results in subsequent hernia repair.^{7,8} Although significant improvements have

been achieved in the field of incisional hernia concerning operative technique and the use of prosthetic materials, recurrence rates remain high at 32% to 63%.⁹ Risk factors associated with recurrence, such as hernia size, unfortunately cannot be influenced.¹⁰

The introduction of minimally invasive surgery in the early 1990s enabled the possibility of laparoscopic incisional hernia repair.¹¹ Laparoscopy has proved to be a safe, effective, efficient and less painful technique for many types of surgery and has become the current "gold standard" for cholecystectomy, for example.¹² Laparoscopic incisional hernia repair is a widely used and accepted operative technique, assuming general advances of laparoscopy are also valid for this group. Recent studies have shown that in the short term, laparoscopic repair is superior to open repair in terms of less blood loss, fewer perioperative complications and shorter hospital stay.^{13,14} Long-term outcomes such as recurrence rates are yet unknown.

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Materials and methods

This was a cross-sectional study between laparoscopic and open hernioplasty with a mean follow-up for one year. Patients with incisional hernia who were eligible for surgery were enrolled. Twenty eight patients underwent laparoscopic hernioplasty and 68 patients underwent open hernioplasty. The mean body mass index (BMI) and other comorbidity were almost similar in both groups (Table-I). Exclusion criteria were cardiopulmonary disorders, contraindications for laparoscopy and American Society of Anesthesiologists (ASA) score 5. All enrolled gave a written informed consent. Preparation consisted of laxatives on the day before surgery for both laparoscopic and open techniques. Ultra carbon tablets were given on the day before surgery to reduce gas content for laparoscopic approaches. General anaesthesia was the mode of anaesthesia for all the cases.

Table-I

<i>Patients characteristics</i>		
Variables	Laparoscopic group	Open group
Number of patients	28	68
Sex (Male vs Female)	7 vs 21	19 vs 49
Median age (years)	31	34
Mean BMI (kg/m ²)	29.4	28.8
Diabetes Mellitus vs Non diabetic	18 vs 10	42 vs 26

Laparoscopic incisional hernia repair technique:

Pneumoperitoneum was established with a Verres needle placed as far distally as possible from the previous incision. A 10 mm port was placed lateral to the hernia for a zero degree laparoscope to provide the best view of the inner side of the abdominal wall. Two other 5 mm ports were placed in the same side of the abdomen for the dissecting instruments. Adhesiolysis was done first followed by detachment of the entire hernial content from the abdominal wall. The peritoneal sac was not reduced or resected. Prolene mesh was rolled and introduced into the abdominal cavity through the 10 mm port and unrolled inside. It was applied over the hernia with multiple trans-parietal stitches overlapping the margins by 3-4 cm in all directions. Spiral tacks were

used to fix the mesh to the margins. The trans-parietal stitches were removed later. No drain was used. The patient was on soft diet after 6-8 hours and discharged on the 2nd or 3rd postoperative day.

Open incisional hernia repair technique:

Elliptical skin incision was made over the previous scar to remove the redundant skin. A wide dissection was done to remove sub-cutaneous fat and scar tissue from the abdominal wall near the hernia. The sac was not opened or resected. Prolene mesh was placed as Onlay in 58 cases (85.3%) and Mayo's double breasting repair was done in 10 cases (14.7%), (Table-II). The mesh was fixed with prolene stitches. Drains were placed in all cases except for small hernias. Patients were on soft diet from the first post-operative day. They were usually discharged on the 5th or 6th post-operative day with the drains and instructions on how to manage them. The drains were removed when the discharge reduced below 5cc in the outpatients department.

Table-II

<i>Size of hernial neck in open surgical repair</i>		
Neck size (cm)	Method of repair (n=68)	%
>4	Mayo's repair (10)	14.7
<4	Onlay repair (58)	85.3

Statistical analysis:

Student's t-test was used to assess differences between study groups. A p-value of < 0.05 was considered significant. Chi-square test was used for categorical variables.

Results

Total 96 patients were enrolled in this study. Among them 68 underwent conventional open surgery and 28 patients underwent laparoscopic repair. Only 54 cases could be followed up for 12 months. There were no differences in age or hernial neck diameter statistically. Only two patients had recurrent incisional hernia in the open group and in rest 94 patients repair was attempted first time. Only one patient had second time recurrence following prolene mesh repair. Operative findings are shown in table-III.

Table-III

<i>Operative findings</i>			
Variables	Open group n=68	Laparoscopic group n=28	p-value
Mean operative time (min)	88.2 (45- 125)	70.7 (50- 90)	<0.05
Use of drains (%)	98.4	0	NS
Analgesics	Opoids	NSAIDs	NS
Mean length of post-operative hospital stay (days)	7.17 (5-28)	2.89 (2- 6)	<0.05
Complications (%)	33.82	7.14	<0.05
Return to normal activities (days)	23.97(15-45)	11.78(10- 15)	<0.05
Recurrence (%)	4.41	0	NS

Values expressed within the parenthesis are range of the respective row; NS = Non-significant

Mean operative time was shorter in laparoscopic group in comparison to open procedure which was 70.7 minutes and 88.2 minutes respectively. In addition, mean post-operative hospital stay was less than 3 days in laparoscopic group and above 7 days in open group. Both mean operative time and mean post-operative hospital stay were significantly shorter ($p < 0.05$). In the laparoscopic group return to normal activities/work after surgery was less than 2 weeks but after open procedure it was more than 3 weeks. Significant statistical difference has been observed in return to normal work after surgery ($p < 0.05$). Analgesics requirement was also lower in the laparoscopic group.

Post-operative complications were observed in 33.82% (23) patients in open hernioplasty group and in 7.14% (2) patients in laparoscopic group which also differed significantly ($p < 0.05$). In the open group, post-operative complications were seroma (n=6), minor wound infection (n=4), haematoma (n=3), chest infection (n=2), sinus (n=2) and paralytic ileus (n=2). There were also 3 (4.41%) cases of recurrence after open surgery and 1 (1.47%) patient needed removal the mesh due to infection.

On the other hand, only 7.14% patients developed complications in laparoscopic hernioplasty group, which were seroma (n=1) and port site wound infection (n=1) and resolved with conservative management. There was no recurrence in the laparoscopic group during one year follow-up.

Discussion

There have been very few studies on this topic in our country. According to studies outside our country, 13% of patients who undergo incisional hernia repair by open method have a relapse free survival shorter than 5 years in general.¹⁵ Laparoscopic repair of incisional hernia is thought to be better than open approach because it does not need extensive tissue dissection and post-operative drainage. Open repair seems to be associated with a higher complication rate, probably due to extensive lateral dissection and subcutaneous drainage placement, both increase the infection rate.¹⁶ Infection is one of the major risks in the development of recurrent incisional hernia.¹⁷ Mesh placement in the inner layer of the abdominal wall (beneath the peritoneum) seems to be the most physiological method of hernia repair, allowing the lowest relapse rate.¹⁸

All laparoscopic hernia repair included in this study underwent the same repair technique. The mesh was positioned over the defect initially with trans-parietal stitches and then fixed to the abdominal wall with spiral tacks, even though it was suggested that tacks alone allow a higher relapse rate.^{17,19,20} The mesh overlapped the border of the defect by at least 3-4 cm in all the study cases. The study results showed a significant decrease in operative time. Mean post-operative hospital stay was also significantly lower in laparoscopic group than the open. The study also took into consideration

the analgesics used for post-operative pain. More potent analgesics e.g. opioids with relatively longer duration of use was required for the open group. On the other hand, less potent NSAIDS was sufficient for the laparoscopic group. Time required for return to normal activity was also significantly less for the laparoscopic group. Some other authors did not report such findings.^{21,22}

One of the main advantages of laparoscopic repair is lack of need for drains. Drains are often a source of infection. Approximately 98.4% of the open repairs required drains. The complication rate was higher in open repairs (n=23; 33.82%) than in laparoscopic repairs (n=2; 7.14%). No major complication occurred in the laparoscopic group.

In the open group, six patients developed seromas and in one patient seroma persisted for more than 4 weeks which required drainage while others resolved on conservative management. Four patients had minor wound infections that were controlled with specific antibiotics. Haematoma was observed in 3 patients and one patient required drainage. Chest infection and paralytic ileus were common after general anaesthesia and abdominal surgery. Both were observed in 2 patients respectively. Discharging sinus was observed in 2 patients which required surgical intervention. Unfortunately, three patients

had recurrence within 3-6 months after surgery and one patient required removal of mesh as a result of hypersensitivity reaction.

Compared to open surgical group complications rate were few in the laparoscopic group. Only 2 patients had minor complications. Minor seroma observed in one patient and haematoma in 3, which were managed conservatively. The incidence of infection in the laparoscopic port site (3.57%) had lower rate than the open group (5.88%) in this study. Some authors reported of zero infection rates in laparoscopic procedures.^{23,24,25}

One obvious advantage of laparoscopic repair regards obesity. Morbid obesity is not a contra-indication to laparoscopic repair and represents an advantage both for the patient and the surgeon.²⁶ The recurrence rate in this study was 4.41% in the open group compared to nil in the laparoscopic group. All the patients could not be followed up due to lack of patient's interest.

The results of our study are quite comparable with other studies as shown in table IV, which supports our strong recommendation that laparoscopic ventral hernia repair should be the procedure of choice in an experienced laparoscopic surgeon's hand. Comparison of our study with other studies is as follows:

Table-IV

Comparison with other studies

Observation	Holzman ²⁷		Park ²⁸		Carbajo ²⁹		Ramshaw ³⁰	
	Lap/Open	Lap/Open	Lap./Open	Lap./Open	Lap./Open	Lap./Open	Lap./Open	
Operating time (min)	128	98	95	78	87	112	58	82
Length of stay (days)	1.6	05	3.4	6.5	2.2	9.1	1.7	2.8
Post-operative complication rate (%)	23	31	18	37	20	50	15	26
Infection Rate (%)	05	06	00	02	00	18	00	03
Seroma rate (%)	05	00	04	02	13	67	00	00
Recurrence rate (%)	10	13	11	35	00	07	03	21

Lap - Laparoscopic repair, Open - Open repair

Conclusion

Laparoscopic incisional hernia repair appears to be a better procedure than the open repair. However, a prospective randomized control study is necessary to ascertain superiority of laparoscopic approach.

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