### **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-2902.isj20172769

## Laparoscopic versus open incisional hernia repair: comparative nonrandomized study

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Received: 20 April 2017 Accepted: 18 May 2017

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#### **ABSTRACT**

**Background:** One of the most common complications of laparotomy is Incisional hernia, with an estimated incidence of 3-20%. The objective of this study was to compare the outcome of patients after laparoscopic and open incisional hernia repair.

**Methods:** This was a prospective observational comparative study, in Sohag University Hospital, Sohag, Egypt. All adult patients who fulfilled our inclusion criteria underwent laparoscopic or open incisional hernia repair from September 2013 to September 2016 were included in the study. Primary outcome measure of this study was recurrence rate, wound infection. And secondary outcome measure of this study was operative time, postoperative complications and hospital stay.

Results: Between September 2013 and September 2016, 60 patients with incisional hernia had fulfilled our inclusion criteria were operated at the general surgery department at Sohag university hospitals, Sohag, Egypt. 31 patients had open incisional hernia repair and 29 had laparoscopic incisional hernia repair. The mean age for laparoscopic repair group was  $45.69\pm7.66$  years and for open repair group was $46.94\pm8.08$  years p value 0.543. In laparoscopic group male to female ratio 20/9 was while in open group it was16/15 p value 0.197.the mean body mass index for laparoscopic group was $29.83\pm3.56$ kg/m2 and for open group $30.00\pm3.32$ kg/m2 p value= 0.873. the most significant finding was hospital stay which was significantly shorter in laparoscopic incisional hernia repair group p value was 0.000 as well as wound infections were significantly lower in laparoscopic incisional hernia repair group p value was 0.05. there was no significant difference between both groups as regard operative time, bowel injury intraoperative complication postoperative complications as well as recurrence rate. The mean follows uptime was  $27.24\pm3.04$  months for laparoscopic incisional hernia group and  $27.12\pm3.06$  months for open group.

**Conclusions:** Laparoscopic incisional hernia repair is a safe alternative to laparoscopic incisional hernia repair with a shorter hospital stay and a lower wound complication.

Keywords: Incisional hernia repair, Laparoscopic surgery

#### INTRODUCTION

One of the most common complications of laparotomy is Incisional hernia, with an estimated incidence of 3-20%.

Multiple studies compare effectiveness of the laparoscopic and open incisional hernia repair. And there

was no difference in recurrence rates or postoperative pain between the techniques, but significantly fewer wound infections occurred after laparoscopic hernia repair.<sup>2</sup> Laparoscopic incisional hernia repair appears to have the advantages of minimally invasive surgery (fewer wound complications, less pain, and shorter hospital stay), but there is no evidence of a clear benefit regarding

recurrences in comparison with open incisional hernia repair.<sup>3,4</sup>

The objective of this study was to compare the outcome of patients after laparoscopic and open incisional hernia repair.

#### **METHODS**

This was a prospective observational comparative study, in Sohag University Hospital, Sohag, Egypt. All adult patients who fulfilled our inclusion criteria underwent laparoscopic or open incisional hernia repair from September 2013 to September 2016 were included in the study.

#### Inclusion criteria

- Age -> 18 years
- Uncomplicated incisional hernias only included
- Medically fit for general anesthesia
- Patient consent for either type of operation
- Defect size between 4-10 cm
- Body mass index less than 40.

#### Exclusion criteria

- primary ventral hernia
- Age <18 years</li>
- Complicated incisional hernia
- Mentally ill patients/Any cognitive impairment (Psychiatric disorder, Alzheimer's disease etc.)
- Loss of abdominal domain.
- obese patients BMI more than 40.

Our Institutional Ethical Committee approval to conduct the study was obtained prior to the commencing enrollment of patients. Written and informed consent was obtained from all the patients who participated in the study.

The decision for laparoscopic or open hernia repair for ventral hernia was left for the choice of patient and the attending consultant. All operations were performed by the tow consultant surgeons participated in this study the two surgeons can perform either laparoscopic or open hernia repair. Patient's demographic data, operative time operative, postoperative complication, hospital stay follow up time was recorded.

#### Primary outcome measure

Recurrence rate, wound infection.

#### Secondary outcome measure

Operative time, postoperative complications and hospital stay.

#### Operative techniques

Under general anesthesia, endotracheal intubation was done for all patients. Foleys catheter was put for all patients with lower abdominal incisional hernia repair and nasogastric tube for upper abdominal hernia repair. With perioperative single dose of prophylactic single dose of 1st generation cephalosporin antibiotic was given to all patients with ventral hernia one hour before operation.

#### Open incisional hernia repair technique

Skin incision made according to site and size of defect, subcutaneous flap raised up to 3 to 5 cm around the defect, the hernia sac found, Adhesiolysis was done then reduction of the contents back to the abdomen and the sac was excised. The margins of the sheath were defined for about 3-5 cm from the edge of the defect. The peritoneum and posterior rectus sheath was dissected from the rectus muscle. Polypropylene mesh of appropriate size was placed in a retro muscular fashion, the mesh was fixed to the overlying tissue using 2/0 non-absorbable polypropylene suture. A Suction drain was routinely inserted and repair of the anterior rectus sheath with continuous polypropylene number 1 suture was done then in layer closure of the wound was done.



Figure 1: Open incisional hernia repair.

# Surgical technique of laparoscopic incisional hernia repair

Pneumoperitoneum was established with use of a Veress needle inserted in either the left or right subcostal space. A direct view trocar was inserted laterally in a window between the iliac crest and costal margin. A 30- degree 10-mm laparoscope was used. Most hernias could be repaired with one 10-mm for telescope another 12-mm port for the stapler and two 5-mm ports placed laterally in the upper and lower quadrant, respectively. Adhesiolysis was performed, and the margins of the defect were clearly delineated measure the diameter of the incisional

hernia neck; and tailor the size the prosthesis to overlap the defect by at least 30 mm on all sides, use a bi-surface prosthesis with expanded an appropriately sized mesh (proceed mesh® Ethicon Inc.) interpose the omentum between the prosthesis and the small intestines whenever possible. Mesh orientation with non-adhesive surface facing the viscera, Mesh centralization and fixation Using 4 long trans fascial polyproline 1/0 suture, marginal sutures to permit adequate orientation followed by placement of a double crown of staples.

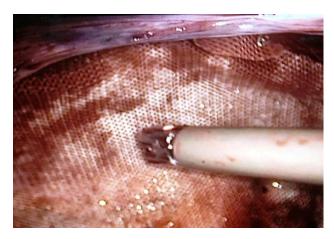


Figure 2: Laparoscopic incisional hernia repair.

#### Statistical analysis

SPSS (IBM, SPSS) Statistics, Version 16 was used for Statistical analysis. The groups were compared using the Chi-squared or Fisher's Exact Test for the categorical variables and the T-test for the continuous variables. A P value < 0.05 was considered significant.

#### **RESULTS**

Between September 2013 and September 2016, 60 patients with incisional hernia had fulfilled our inclusion criteria were operated at the general surgery department at Sohag university hospitals, Sohag, Egypt. 31 patients had open incisional hernia repair and 29 had laparoscopic incisional hernia repair. Patients demographic were presented in (Table 1).

Table 1: Patient demographic.

	LIHR	OIHR	P value
Age	45.69± 7.66 years	46.94±8.08 years	0.543
Sex Male/female	20/9	16/15	0.197
BMI	29.83±3.56 kg/m2	30.00±3.32 kg/m2	0.873

The operative and postoperative results were presented in (Table 3). The most significant finding was hospital stay which was significantly shorter in laparoscopic incisional hernia repair group as well as wound infections were

significantly lower in laparoscopic incisional hernia repair group (Table 3, 4).

Table 2: Location of hernia and previous incision.

	LIHR	OIHR
Upper midline	7	6
Lower midline	8	9
Lower paramedian	5	4
Upper paramedian	6	6
Rt iliac fossa oblique	2	3
Rt subcostal	1	3
total	29	31

Table 3: Operative and postoperative results.

	LIHR	OIHR	P value
Defect size mean (cm)	7.76±1.15cm	8.03±1.04 cm	0.340
Operative time, mean (minutes)	124.82±14.04 minutes	117.26±20.20 minutes	0.118
Intraoperative complications	1/29	0/31	0.483
Hospital stay mean (days)	3.03±0.82 days	5.25±0.98 days	0.000
Follow up time(months)	27.24±3.06 months	27.12±3.04 months	0.340
Recurrences	1/29	0/31	0.483

Wound complications were presented in (Table 4).

**Table 4: Wound complications.** 

	LIHR	OIHR	P value
Wound infections	1/29	7/31	0.05
seroma	6/29	5/31	0.745
Mesh infections	0/29	1/31	1.000

#### **DISCUSSION**

In the last two decades improvement in the hernia surgery had achieve but the results are still unsatisfactory as reported by many experts. The incidence of recurrence after repair of incisional hernia differ according to the technique that was used for repair.it was estimated that Primary repair with suture had a recurrence rate between 12% and 54%, whereas the mesh repair had a recurrence rate up to 36%. <sup>5-8</sup>

Blanc and Booth described the first laparoscopic repair of incisional hernia. In comparison with open incisional hernia surgery, laparoscopic incisional hernia repairs have many advantages such as, a lower incidence of surgical site infection, decreased hernia recurrence and shorter length of stay. It also had a number of disadvantages such as the longer operative times, the high

costs of the equipment's, laparoscopic tools and mesh used. The two techniques differ in two significant aspects in that LIHR is often performed without primary fascial closure and LIHR is invariably performed with intraperitoneal mesh placement. 10-13

The result of this study show, that the most significant difference between both group were the hospital stay which were shorter in laparoscopic incisional hernia repair and wound related complication which was also lower in laparoscopic incisional hernia repair.

Chalabi HA et al, in their review of literature and met analysis report, that no evidence to support one procedure over the other. Laparoscopic repair has been proven to be as effective and safe as open repair. The findings from the Meta-analysis shows no difference between the two procedures as regard length of hospital stay, hernia recurrence and operative time. However, it has shown that the laparoscopic technique is associated with less wound infections than the open repair.<sup>14</sup>

Zhang Y et al, show that, laparoscopic incisional hernia repair was found to have lower rates of wound infection and wound drainage, higher rates of bowel injury, and shorter l hospital stay compared to open repair. There was no significant difference between the two groups in the incidences of hernia recurrence and other postoperative complications.<sup>15</sup>

In our study, the operative time was shorter in open incisional hernia group however it doesn't reach significant level However, several studies have demonstrated that in experienced hands laparoscopic repair takes a similar amount of time compared to open repair. <sup>14,15</sup>

One case of bowel injury in laparoscopic group was detected in this study versus no case in open group and this was not reach statistically significant difference, some studies reported higher incidence of bowel injury in laparoscopic group.<sup>15</sup>

In this study one case of recurrence was detected in laparoscopic hernia group however no significant difference was detected between both groups, several studies detected no significant difference between both group as regard recurrence rate. 14,15

The main limitations of our study were small number of patient involved and it was non-randomized controlled study. We need a randomized controlled study from the developing country to detect the difference between both groups.

#### **CONCLUSION**

Laparoscopic incisional hernia repair is a safe alternative to laparoscopic incisional hernia repair with a shorter hospital stay and a lower wound complication provided that enough experience and equipment are present however, we need large randomized controlled study in the future in our hospital to detect this advantage as this study was small non-randomized study.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

institutional ethics committee

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Cite this article as: Mohamed WBA, Abdelmgeed MK. Laparoscopic versus open incisional hernia repair: comparative non-randomized study. Int Surg J 2017;4:2216-20.