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Original Research Article

An overview of laparoscopic versus open incisional hernia repair

D. Boopathy[1]*, P. K. Asokan[2], T. R. Yeshwanth[1]

[1]Department of Surgery, Sri Venkateshwaraa Medical College and Hospital, Redhills, Chennai, Tamil Nadu, India
[2]Department of Surgery, Ponneri Government Hospital, Chennai, Tamil Nadu, India

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***Correspondence:**
Dr. D. Boopathy,
E-mail: boopathy45564@gmail.com

ABSTRACT

Background: An incisional hernia is perceived as a morbidity following an abdominal wall operation. Risk factors that increase the chances of developing these hernias are wound infection, male sex, obesity, abdominal distension, underlying disease process and occasionally poor surgical closure. The aim of this study was to compare laparoscopic vs open incisional hernia repair with regard to postoperative pain and nausea, operative time, postoperative complications and length of hospital stay.
Methods: We conducted retrospective review of consecutive patients with hernia in department of surgery, Sri Venkateshwaraa Medical College and Hospital, Redhills, Chennai, Tamil Nadu between September 2022 to February 2023 (6 months). We analyzed 140 patients that met the inclusion criteria and their clinical data. The patients were divided into two groups: open incision hernia repair (OI=70) group and laparoscopic hernia repair (LR=70) group.
Results: In our study, the mean operative time of 99.64±13.1 min for the laparoscopic repair group was longer than the mean operative time of 74.64±9.14 min for open repair (p =0.264). Hospital stay was not significantly in the laparoscopic group with a mean of 2.4±0.6 days compared with 2.8±1.4 of the open repair group (p=0.0515).
Conclusions: Smaller incisional hernias with a transverse diameter <10 cm can be repaired successfully by a laparoscopic approach if a suitably skilled surgeon is available, although an ugly scar may remain on the anterior abdominal wall. Major defects >10 cm was best repaired by an open operation.

Keywords: Hernia repair, Laparoscopy, Open incision

INTRODUCTION

The incidence of these hernias can be as high as 13% following abdominal wall surgery.[1,2] An incisional hernia is perceived as a morbidity following an abdominal wall operation. Risk factors that increase the chances of developing these hernias are wound infection, male sex, obesity, abdominal distension, underlying disease process and occasionally poor surgical closure.[3,4] Incisional hernia is associated with significant morbidity such as pain, intestinal obstruction, strangulation, and ischemia of the hernia contents. Despite the improvement in the methods of repair, there is still significant morbidity and even mortality associated with repairs.[5] Surgical intervention is the only method of repair, with two techniques available: open repair with or without mesh, and laparoscopic mesh repair.[6]

It is estimated that over 120,000 laparotomies are carried out in the United Kingdom every year, with more than 7000 incisional hernia repairs subsequently performed. This represents almost 6%, but the actual incidence of incisional hernia development may be higher, as this figure does not take into account patients who opt not to consider or attend for surgery for either personal or medical reasons.[7] Considering this incidence and the

morbidity and mortality associated with the condition and the methods of repair, it is quite evident that selecting the ideal method of repair is crucial.[8]

Some early evidence showed that laparoscopic incisional hernia repair had a number of disadvantages: the longer operating times, the costs involved with equipment provision and the specialized tools and mesh used. However, several studies have demonstrated that in experienced hands laparoscopic repair takes a similar amount of time compared to open repair.[9,10] Cost benefit analysis has also demonstrated that laparoscopic incisional hernia repair is cost comparable to the open incisional hernia repair even without considering patients benefits such as early hospital discharge and early return to work.[11]

Laparoscopic incisional hernia repair was first described by Le Blanc and Booth in 1993.[12] They demonstrated the benefit of laparoscopic repair in hernia surgery, showing better results and lower complication rates compared to the open method.[13] In the current times, only massive tissue defect with complete loss of abdominal muscle structure is considered unsuitable for laparoscopic approach.[14]

But despite the improvement in the hernia repair in the last two decades in terms of the overall technique, results in the eyes of many experts are still unsatisfactory. Incisional hernias repaired with primary suturing have a recurrence rate between 12% and 54%, whereas the mesh repair recurrence rate can be as high as 36%.[15-18] The aim of this study was to compare laparoscopic vs open incisional hernia repair with regard to postoperative pain and nausea, operative time, postoperative complications and length of hospital stay.

METHODS

We conducted retrospective review of consecutive patients with hernia in Department of Surgery, Sri Venkateshwaraa Medical College and Hospital, Redhills, Chennai, Tamil Nadu between September 2022 to February 2023 (6 months). All the operations were performed in the two surgical units of the hospital. Pre operative diagnosis was made using history, clinical examination coupled with laboratory findings and imaging studies. Pregnant women and patients with severe medical disease (hemodynamic instability, chronic medical or psychiatric illness, cirrhosis, coagulation disorders) requiring intensive care were excluded. We analyzed 140 patients that met the inclusion criteria and their clinical data. The patients were divided into two groups: open incision hernia repair (OI=70) group and laparoscopic hernia repair (LR=70) group. The collected clinical data included demographic data, co-morbidities, initial laboratory findings, operation time, intraoperative findings and postoperative complications. Post operative hospital stay, in days, was defined as the time the patient left the operation theater up to the time of discharge from the hospital. Time of return to normal activity, in day, was calculated from the time of surgery.

Laparoscopic repair

Pneumoperitoneum was created using a Veress needle. A 10 mm port and two or three 5 mm working ports were placed based on the site of the hernia. After reduction of hernial contents, a dual mesh was placed with a 5 cm overlap beyond the margins of the defect. The mesh was secured to the anterior abdominal wall with metallic tacks. In larger defects, the mesh was first secured using transfascial sutures. The skin was closed by staples.

Open repair

The skin incision was made based on the site of the hernia. The hernial sac was dissected out and contents were reduced. The primary defect was closed with Prolene 1-0 suture. Subcutaneous flaps were raised to about 5cm beyond the defect. A Prolene mesh of adequate size was placed over the site of defect and was then secured to the anterior rectus sheath with Prolene sutures. The skin was closed with nylon sutures over a suction drain.

Statistical analysis

Data were analyzed using standard statistical method. Descriptive statistical including means, medians, standard deviation, percentages were used to describe study population on all variables.

For categorical variables X^2 test and Fisher exact test were used to make comparison. A p value of 0.05 was considered as significant. All calculations were performed by using the SPSS software package version 23.0 (SPSS Inc., Chicago, IL).

RESULTS

In our study we enrolled totally 140 patients and divided into two groups. Age group were followed as 50 patients were in 31-40 years, 40 patients in 41-50 years, 30 patients in 51-60 years and 10 patients in both >60 years and 18-30 years of age group.

The mean open repair was 41.94±12.24, mean laparoscopic repair was 39.64±14.14.

In our study patient, time taken to return to routine daily activities, which was less in the laparoscopic group with a mean 10.6±2.7 days compared with mean 15.4±3.1 days in the open repair group.

In our study shows main post operative complication is vomiting and wound infection.

Table 1: Age wise distribution.

Age group (years)	Open repair	Laparoscopic repair	Total
18-30	5	5	10
31-40	30	20	50
41-50	15	25	40
51-60	13	17	30
>60	7	3	10
Total	70	70	140

Table 2: Co-morbid conditions among patients.

Co-morbid	Open repair	Laparoscopic repair	Total
CAD	5	4	9
Hypertension	15	8	23
DM	7	5	12
COPD	11	5	16
Total	38	22	60

Table 3: Operative and post operative data among patients.

Data	Open repair (n=70)	Laparoscopic repair (n=70)	P value
Operating time	74.64±9.14	99.64±13.1	0.264
Hospital stay (day)	2.8±1.4	2.4±0.6	0.0515
Return to normal activity (day)	15.4±3.1	10.6±2.7	<0.0001

Table 4: Post operative complications for open incision and laparoscopic hernia.

Complications	Open repair (n=15)	Laparoscopic repair (n=15)	P value
Vomiting	4	3	0.3217
Wound infection	4	2	0.1404
Wound dehiscence	3	1	<0.001
Post operative bleeding	1	1	<0.001
Urinary tract infection	1	3	<0.001
Severe pain	2	5	0.4281

DISCUSSION

There are numerous surgical techniques to repair ventral hernias. In the past, simple suture repair was performed, which was associated with a high rate of recurrence.[19] The earliest report of the use of prosthesis for ventral hernia repair was in 1958.[20] Laparoscopic incisional abdominal wall hernia repair is a relatively new and evolving technique with the potential to replace open repair. The efficacy and safety of the laparoscopic incisional hernia repair is still unclear, as the available evidence comparing the two surgical methods of repair is limited.

In our study we enrolled totally 140 patients and divided into two groups. Age group were followed as 50 patients were in 31-40 years, 40 patients in 41-50 years, 30 patients in 51-60 years and 10 patients in both >60 years and 18-30 years of age group. Out of 140 patients, 70 patients underwent open repair and 70 patients underwent laparoscopic repair. In our study, the mean operative time of 99.64±13.1 min for the laparoscopic repair group was longer than the mean operative time of 74.64±9.14 min for open repair (p=0.264). Shorter operative time for laparoscopic incisional hernia repair was reported by a number of recently published studies, while other study showed no differences or longer operative times in the laparoscopic group.[21-23] Several other studies have reported no significant difference in operation duration between the two methods of repair, supporting our findings.[24,25]

Hospital stay was not significantly in the laparoscopic group with a mean of 2.4±0.6 days compared with 2.8±1.4 of the open repair group (p=0.0515). Several studies have shown a shorter length of hospital stay after laparoscopic incisional hernia repair (1.5 vs. 3 days) and previous studies have not shown significant differences in recurrence rates for laparoscopic and open incisional hernia repair.[24,26,27]

A highly significant difference existed between the 2 groups in time taken to return to routine daily activities, which was less in the laparoscopic group with a mean 10.6±2.7 days compared with mean 15.4±3.1 days in the open repair group. We observed a greater overall incidence of complications in open surgery than in laparoscopic surgery. A total of 15 complications occurred in the laparoscopic group, while 15 complications occurred in the open repair group. We observed a significant difference between groups in vomiting, post operative bleeding, urinary tract infection and wound infection ($p<0.001$). Several small randomized studies reported no differences in postoperative pain after laparoscopic and open incisional hernia repair.[21,22,26]

CONCLUSION

Smaller incisional hernias with a transverse diameter <10 cm can be repaired successfully by a laparoscopic approach if a suitably skilled surgeon is available, although an ugly scar may remain on the anterior abdominal wall. Major defects >10 cm is best repaired by an open operation. The simplest and most versatile technique is the only method. Hernias with loss of domain can only be repaired by an open method supplemented by components' separation.

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