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Original Research Article

A comparative study of open versus laparoscopic incisional hernia repair

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ABSTRACT

Background: Incisional hernia occurs in 5-11% of patients subjected to abdominal operations. Laparoscopic hernia repair has revolutionized the treatment of incisional hernia by reducing the morbidity and improved post-operative outcomes. The objectives of this study were to compare open incisional hernia repair with laparoscopic incisional hernia repair in our patient population with respect to Operating time, post-operative complications, post-operative recovery, duration of analgesic administration, and cosmetic results.
Methods: This is a prospective study of Forty patients who were admitted at Osmania General Hospital, Hyderabad, Telangana, India with a clinical diagnosis of incisional hernia, 20 patients in each group (open and laparoscopic).
Results: Both the study groups were comparable in terms of patient characteristics. The duration of laparoscopic repair was significantly more when compared to open repair (mean time 133.75 mins versus 85.8 min respectively). Analgesic requirement, wound infection rate and complication rate were higher in open group. The laparoscopic patients tolerated oral feeds earlier compared to open patients. The duration of hospital stay was significantly longer for open group than for laparoscopic group (mean 9.6 days versus 6.4 days respectively). The cosmetic end result was better in laparoscopic patients.
Conclusions: Though ours is a small study, with the benefits of laparoscopy it will be prudent to recommend laparoscopic repair as the first line of management for incisional hernia where the facilities and trained expertise were available. However, there is still a role for traditional open approach in patients who have a specific contraindication to laparoscopic repair or any additional procedures that are not amenable for laparoscopy.

Keywords: Incisional hernia, Laparoscopy, Mesh repair

INTRODUCTION

Incisional hernia occurs in 5-11% of patients subjected to abdominal operations.[1,2] Many factors are associated with incisional hernia like age, sex, obesity, chest infections, type of suture material used and wound infection.[1] All these present a challenging problem to the surgeon because of availability of various techniques and high incidence of morbidity and recurrence.

In an attempt to evolve an ideal technique, mesh repair has become the gold standard in the elective management of incisional hernias.[3] In our study a special focus is made in particular to laparoscopic mesh repair of incisional hernias in comparison to open repair. The concept of "key hole surgery" created an immediate disparity between the potential of new technique and training of surgeons to perform it. New modern surgical methods aimed at giving cure along with minimal invasive

techniques with patient in mind, safety never being compromised.

Laparoscopic technique of hernia repair has revolutionized the treatment of incisional hernia repair by reducing the morbidity, improved post-operative outcome, reduced duration of analgesic administration and reduced hospital stay to the patient.

The objectives of this study were to compare open incisional hernia repair with laparoscopic incisional hernia repair with respect to the following factors in our patient population.

- Operating time
- Post-operative complications like wound infection, seroma, haematoma, mesh infection
- Delayed complications like recurrence rate and abdominal sinus formation.
- Post-operative recovery
- Duration of analgesic administration
- Duration of antibiotic administration
- Cosmetic results

METHODS

This is a prospective study done over a period of 2 years in upgraded department of general surgery at Osmania General Hospital, Hyderabad, India. The study subjects consisted of 40 patients with a diagnosis of incisional hernia. Written informed consent was obtained from all the patients before their enrolment in the study. The study protocol was approved by ethical committee of this hospital. Patients were non-randomly distributed into 2 groups (laparoscopic incisional hernia repair and open incisional hernia) 20 each according to the discretion of operating surgeon. One group was subjected to laparoscopic incisional hernia repair and the other to open incisional hernia repair. Follow up period of these patients varied from 6 months to 18 months.

Inclusion criteria

All the patients admitted in surgical wards with a clinical diagnosis of incisional hernia who have consented were included.

Exclusion criteria

Patients with comorbid conditions who carries a high risk for general anaesthesia especially for laparoscopic incisional hernia repair and Patients who presented to acute surgical care unit in view of surgical emergency like acute intestinal obstruction.

For a proper record, a proforma was designed before the commencement of study. All patients involved in the study underwent thorough clinical examination and a detailed history of previous operation was taken according to the designed proforma. All the patients were also evaluated for any precipitating cause, which has been monitored pre-operatively and proceeded with operative procedure only after treating the precipitating cause. A part from routine surgical profile ultrasound abdomen was performed to assess the site, size of the defect and to rule out any other abdominal pathology.

All patients were asked to take scrub bath in the morning on the day of surgery. A ryles tube was placed and broad spectrum antibiotics were given to all the patients in the operation theatre during induction. Foleys catheterization was done. All operations were performed by consultant surgeon. In all 40 patients who were involved in the present study, mesh repair was done. Mesh of choice was polypropylene in open group and composite mesh in laparoscopic group.

Open technique

Operations were performed either under general or regional anaesthesia depending on the site of incisional hernia and associated comorbid conditions. In this study onlay repair with mesh is performed as most of the operating surgeons in our hospital prefer this technique over other methods.

Sac is not entered usually, but once opened peritoneum is closed after the reduction of the viscera and excision of redundant peritoneum. Full thickness subcutaneous flaps were raised in the suprafascial on either side of incision. Hernial defect is closed with interrupted sutures with polypropylene (No. 1). Then mesh bed preparation is done, 15 x 15 polypropylene mesh is now cut and placed in the subcutaneous plane anterior to rectus sheath according to the defect. Mesh is anchored to the underlying tissue using non-absorbable polypropylene suture (No. 2.0). Subcutaneous suturing done with interrupted 2.0 polyglactin. Skin closed. Antiseptic dressing done.

Laparoscopic technique

All patients were operated under general anaesthesia. The position of Patients and surgical equipment varies according to the site of hernia. Pneumoperitoneum created with a veress needle by inserting it in the palmers point, when the intra-abdominal pressure reaches 10 mm of Hg. A 10 mm port is created under vision for camera. 2 additional trocars were placed on the same side in the triangular fashion (3 trocar technique). Adhesiolysis was performed using dissecting scissors and ultrasound scalpel. Contents of the hernia sac were reduced and hernia defect was clearly delineated.

A large composite mesh with 4 corners tagged with 1.0 polypropylene suture is introduced into the abdominal cavity through 10 mm port after loading the folded mesh onto 10 mm reducer. After introducing mesh in to the abdominal cavity, it was anchored to the abdominal wall

either by trans fascial suturing, stapler, anchors provided it should overlap the defect by at least 4-5 cm. No drainage is used. Abdomen is deflated after checking bowel injury and bleeding. Trocars are removed under vision. Fascial defects are closed followed by skin closure.

Postoperative period

After completion of operation all wounds were infiltrated with local anaesthetic agent. All patients were administered with analgesics, antibiotics and antiemetics as required. All Patients were assessed for any possible postoperative complications. Patients were allowed liquids on clinical recovery.

A suction drain was placed till the drainage became less than 25 cc for a period of 24 hours in open group. Patients were discharged after the assessment by the operating surgeon. They were discharged once they are fully mobilized and able to tolerate normal diet. Pain in the postoperative period is rated by each patient using a visual analogue scale (grades 0-5).

Evaluation of postoperative complications were made during regular follow ups varying from 6 months to 18 months. Patients were advised not to lift heavy weights and asked to wear an abdominal corset.

Data collection

Data was collected prospectively and included patient's demographics, ultrasound findings, operative findings (defect size, any complication, type of repair), operating time, postoperative complications (wound infections, seroma, haematoma), duration of postoperative hospital stay, postoperative pain assessment including duration of analgesic usage and recurrence rate. The patients were also asked to grade their perception to the cosmetic results on a scale of 1-5.

Statistical analysis

Data was analyzed manually by comparing various parameters between open and laparoscopic repair in terms of percentages and number. Statistical tests used are chi-square test and student T test.

RESULTS

Though ours is a non- randomised study, the age group, gender, type of previous surgeries, number of previous suurgeris, previous site of incision, size of hernia defect and patient risk factors were comparable in both the groups. Table 1, Table 2, Table 3, Table 4, Table 5 and Table 6.

Table 1: Age group.

Age group (years)	No. of patients	
	Lap	Open
20-30	1 (5%)	1 (5%)
31-40	10 (50%)	9 (45%)
41-50	6 (30%)	5 (25%)
> 50 years	3 (15%)	5 (25%)

Table 2: Gender.

Gender	No. of patients	
	Lap	Open
Male	5 (25%)	7 (35%)
Female	15 (75%)	13 (65%)

Table 3: Type of previous surgeries.

Previous surgery	No. of patients	
	Lap	Open
Hysterectomy	6 (30%)	4 (20%)
LSCS	8 (40%)	8 (40%)
Tubectomy	1 (5%)	1 (5%)
Emergency laparotomy	4 (20%)	3 (15%)
Appendicectomy	1 (5%)	1 (5%)
Cholecystectomy	0	1 (5%)
Incisional hernia repair	0	2 (10%)

Table 4: Number of previous surgeries.

No. of previous surgeries	No. of patients	
	Lap	Open
1	12 (60%)	10 (50%)
2	7 (35%)	8 (40%)
>2	1 (5%)	2 (10%)

Table 5: Previous site of incision.

Incision	No. of patients	
	Lap	Open
Lower midline	14 (70%)	13 (65%)
Upper midline	2 (10%)	3 (15%)
Paramedian	2 (10%)	1 (5%)
Mc burneys	1 (5%)	0
Transverse	1 (5%)	2 (10%)
Subcostal	0	1 (5%)

Table 6: Size of hernia defect.

Size of hernia defect (sq cm)	No. of patients	
	Lap	Open
Up to 20	11 (55%)	13 (65%)
21-40	6 (30%)	5 (25%)
41-60	3 (15%)	2 (10%)

Operating time

All patients were operated under general anaesthesia in laparoscopic group and general or regional in open group. Mean duration of operative procedure was 85.8 minutes for open group and 133.7 minutes for laparoscopic group the difference was found to be statistically significant (Table 7).

Table 7: Operating time.

Operating time (minutes)	No. of patients	
	Lap	Open
≤60	0	2 (10%)
61-90	1 (5%)	12 (60%)
91-120	7 (35%)	5 (25%)
≥ 120	12 (60%)	1 (5%)

* P<0.00008.

Pain score and medication

Visual analogue scale was median grade 4 in open group as compared to median grade 3 in laparoscopic group. Duration of analgesic administration was more in open group (median - 7 days) as compared to laparoscopic group (median - 5 days) and the difference was statistically significant with P value less than 0.05 (Table 8).

Table 8: Pain score and medication.

Pain score	No. of patients	
	Lap	Open
VAS (grade 0-5) (range)	Grade 3 (1-5)	Grade 4 (2-5)
Analgesic usage (days) (range)	5 (3-7)	7 (5-7)

* P< 0.05; (T-Test).

Post-operative recovery

Laparoscopic group patients were started on oral feeds earlier (median-24 hours) as compared to open group (median - 12 hours). The difference was found to be statistically significant with a P value < 0.05. This is due to return of bowel sounds earlier in laparoscopic group (median - 12 hours) as compared to open group (median-24 hours) (Table 9).

Table 9: Post-operative recovery.

Post-op recovery	No. of patients		P value
	Lap	Open	
Time taken for return of bowel sounds (hours) (range)	12 (6-18)	24 (12-48)	*Cp value = 6.14, T = 2.02 P< 0.05
Resumption of oral feeds (hours) (range)	12 (12-18)	24 (6-18)	*Cp value = 6.14, T = 2.02 P< 0.05

*Cp = calculated P value; (T-test).

Table 10: Post-operative complications.

Post-op complication	No. of patients	
	Lap	Open
Wound infection	0	5 (25%)
Wound dehiscence	0	2 (10%)
Seroma	2 (10%)	3 (15%)
No complications	17 (85%)	10 (50%)
Recurrence	1 (5%)	0

* P< 0.04; (Chi-square test).

Post-operative complications

In our study 10 patients in open group and 3 patients in laparoscopic group had post-operative complications in the form of wound infection (25% in open and 0% Laparoscopic), and wound dehiscence (10% in open and 0% laparoscopic), which has been treated with antibiotics after culture sensitivity and secondary suturing respectively. 15% in open and 10% in laparoscopic group developed seroma who are treated by repeated aspirations and pressure dressing. One patient in laparoscopic group developed recurrence within 2 months of surgery. Overall complication rate was higher in open (50%) group as compared to laparoscopic (15%) group. Difference was found to be statistically significant (Table 10).

Post-operative hospital stay

19 patients in open group were discharged after one week as compared to 14 patients in laparoscopic group who were discharged in less than a week. Mean duration of hospital stay was 9.6 days in open group as compared to 6.4 days in laparoscopic group (Table 11).

Table 11: Post-operative hospital stay.

Hospital stay (days)	No. of patients	
	Lap	Open
< 1 week	14	1
≥ 1 week	6	19

* P< 0.005; (Chi-square test).

Cosmetic results

15 patients who underwent laparoscopic repair felt they had good cosmetic result while only one patient in open group felt good. 10 patients in open group felt that they had bothering scar as compared to one patient in laparoscopic group (Table 12).

Table 12: Cosmetic results.

Cosmetic results	No. of patients	
	Lap	Open
Unacceptable	1	10
Acceptable	4	9
Good	15	1

* P< 0.005; (Chi-square test).

DISCUSSION

Operating time was significantly higher in laparoscopic group which can be attributable to the learning curve of the surgeons. In 15% of our patients the size of defect is more than 40 square cms in laparoscopic group and the results were good and comparable with literature. Laparoscopic hernia repair is technically feasible and is safe in patients with giant fascial defects as well as obese patients.[4]

Pain scores were low in laparoscopic group and post-operative recovery was better in laparoscopic group and the difference was statistically significant when compared with open group. Post-operative hospital stay and early post-operative complications were significantly lower in laparoscopic group however we could not comment on recurrence rate as the follow up time is limited to 18months.The cosmetic results were also superior in laparoscopic group.

The beneficial effects of laparosopy in our study were in concordance with the literatature.[5-11] This study sample size was very small to make any formidable conclusions. However it has revealed the advantages of laparoscopic approach especially in terms of decreased pain, decreased early post-operative complications and improved cosmesis and increased patient acceptance without compromising the safety of patients in our setup.

CONCLUSION

Though ours is a small study, with the benefits of laparoscopy it will be prudent to recommend laparoscopic repair as the first line of management for incisional hernia where the facilities and trained expertise were available. However there is still a role for traditional open approach in patients who have a specific contraindication to laparoscopic repairs or any additional procedures that are not amenable for laparoscopy.

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