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Original Research Article

A comparative study of open preperitoneal versus laparoscopic mesh hernioplasty in cases of incisional hernia repair

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ABSTRACT

Background: Incisional hernias repair being done in large numbers there is still not a consensus about the best repair. Very few studies have been done on comparison open and laparoscopic incisional hernia repair.
Methods: A prospective, cross-sectional study was undertaken in Department of Surgery of Civil Hospital. The study included total 50 patients, out of which 25 patients underwent open approach and rest of 25 patients, underwent laparoscopic approach. Patients were assigned to both the groups randomly.
Results: Pain, duration of post-operative stay, and return to routine work is earlier in patients with laparoscopic repair mainly due to decreased pain, fewer complications, early mobility and faster return of bowel movements. Laparoscopic repair is more expensive and operative time is more as compared to open method.
Conclusions: Keeping in view the advantages and limitations of laparoscopic repair, the choice among two surgical modalities should be made on a case to case basis depending on patient preference and characteristics.

Keywords: Incisional hernia repair, Open preperitoneal hernioplasty, Laparoscopic mesh hernioplasty

INTRODUCTION

An incisional hernia, also called ventral hernia, is a bulge or protrusion that occurs near or directly along a prior abdominal surgical incision.[1] An incisional hernia usually starts as a symptomless partial disruption of the deeper layer of a laparotomy wound during immediate or early postoperative period, the event passing unnoticed if the skin wound remains intact.[2] Early short-term study showed that most postoperative hernia appears within the first year after the operation and that 80% appears within first 2 years. Recent studies show that about 2/3 appears within the first 5 years and another third takes 5 to 10 years to appear after surgery.[3] As hernia develops, patient present with following complaints – swelling or bulging at previous scar; pain and discomfort at site; often heavy sickening, dragging sensation aggravated by coughing and straining.[4] Pain is caused by adhesions, incarceration, obstruction or strangulation of contents, history of repeated mild attacks of colicky pain and vomiting suggest incomplete obstruction.[5]

Repair of incisional hernias always the challenging procedure for the surgeons because of the distorted anatomy following previous surgery.[6] Various surgical techniques varying from anatomical repair to mesh plasty have been used to repair the hernias.[7] With the advancement of laparoscopy, incisional hernias are being repaired laparoscopically in increasing numbers.[8] Laparoscopic incisional hernia repair can be accomplished in almost all patients with excellent results. The size of the hernia is a determining factor in the selection of type of repair.[9] Defects less than 3 cm are better done by conventional approach and laparoscopy is reserved for patients with larger defects.[10] In obesity and recurrent incisional hernias laparoscopy is indicated even in smaller sized defects. The “Swiss cheese” type of hernias (multiple smaller defects) is ideally managed by

laparoscopy as the defects are more clearly delineated when compared to open repair.[11]

In spite of incisional hernias repair being done in large numbers there is still not a consensus about the best repair.[12] Very few studies have been done on comparison open and laparoscopic incisional hernia repair. In this era of laparoscopy, the present study was planned with the objective to compare these two surgical modalities for incisional hernia.

METHODS

A prospective, cross-sectional study was undertaken in Department of Surgery, B J Medical College, Civil Hospital, Ahmedabad between May 2014 to June 2015. The protocol was approved by the Institutional Ethics Committee. The study included total 50 patients, out of which 25 patients underwent open approach and rest of 25 patients, underwent laparoscopic approach. Patients were assigned to both the groups randomly. The following conditions are not suitable for laparoscopic surgery, so as to remove bias in comparison; we excluded patients with following features from our study: (i) patients with co-morbid conditions who is not fit for general anaesthesia; (ii) patients with large incisional hernia with redundant skin; and (iii) patients with irreducible hernia, obstructed hernia, strangulated hernia. All the data of patients were recorded in case record form.

Pre-operative preparation

Prior written and informed consent for anaesthesia and surgery were obtained from patient. Patient was advised to nil by mouth from night prior to surgery. Preparation and shaving of abdomen. Urinary catheterization of patient was carried out. Prophylactic antibiotics given 15 minute before surgery preferably injection Cefotaxime 1 gm intravenously and repeated if surgery continues for more than 2 hours.

Anaesthesia

Open repairs were done in both general as well as spinal anaesthesia depending on site of hernia on anterior abdominal wall. Lower abdominal operations were carried out under spinal anaesthesia whenever possible. Laparoscopic repairs were done in general anaesthesia with endotracheal intubation.

Operative method

Open repairs were carried out by scar cutting incisions. Flaps were created of skin and subcutaneous tissue over anterior rectus sheath from virgin plane. Hernial sac were dissected out and opened. Contents were reduced and adhesiolysis of bowel loops done is necessary. Preperitoneal planes were created to achieve preperitoneal (underlay) meshplasty whenever possible. Peritoneum was closed and preperitoneal mesh was kept of adequate size (>5 cm in all directions from defect margins) and fixed to anterior rectus sheath by prolene sutures. Negative suction drain was placed in preperitoneal plane through separate stab incision. Rectus sheath was closed by prolene sutures. In cases of difficulty, in identification of preperitoneal planes, only meshplasty were done in subcutaneous plane. Negativesuction drain was kept in subcutaneous plane in either case through separate stab incision.

Laparoscopic hernia repair were carried out by 3 or 4 ports technique. Multi layered Tissue Separating mesh used in it. Laparoscopic meshplasty usually required no drains unless excessive dissection was carried out as in adhesiolysis of bowel loops.

Post operative period

Patient was put on intravenous drip as per the need. Intravenous antibiotic (Inj. Amoxicillin + Clavulanic acid) was given on day of surgery. Intravenous pain killer (Inl. Diclofenac sodium) was given on day of surgery. The patient was given oral antibiotics (Cap. Amoxicillin + Clavulanic acid) for 5 days and oral analgesics (Tab. Diclofenac sodium) as required. Dressing was done on the post-operative 3rd day and stitched were generally removed on 7^{th} – 10^{th} day. Patients were advised to follow up on the 1^{st}, 3^{rd}, 6^{th}, 12^{th}, 18^{th} month post-operatively. On follow up examination, any complication, particularly recurrence was checked. Patient was also evaluated for Chronic pain – pain persisting at 3 months (International society for study of pain).[13] Various pain scaling system available like – Visual analogue scale (VAS); Categorial Rating Scale (CRS)[15]; and Verbal Numerical Rating Scale (VNRS)[16] But for simplicity and better patient compliances we had selected VAS for pain evaluation. This scale ranges from 1(no pain) to 10(worst possible pain). The severity of pain was categorized as: (i) VAS score: 0 =P0 score (no pain); (ii) VAS score: 1-3 =P1 score (mild pain); (ii) VAS score: 4-6 =P2 score (moderate pain); and (iv) VAS score: 7-10 =P3 score (severe pain).[14]

The collected data were subjected to statistical analysis using Microsoft Office Excel. Data was expressed as absolute numbers with or without percentages, as means with standard deviation or as medians with ranges.

RESULTS

In the study, 50 patients were evaluated out of which 25 patients underwent open incisional hernia repair while 25 patients underwent laparoscopic incisional hernia repair. The most of the patients operated were in the 31-60 years age group (Table 1). None of the patients in both the group had intra operative complications like bowel or vascular injury.

Table 1: Distribution of cases according to age and type of hernia repair.

Age (years)	Laparoscopic repair	Open repair	Total
21-30	02	02	04
31-40	09	05	14
41-50	07	09	16
51-60	05	08	13
61-70	02	01	03
Total	25	25	50

Average operative time for laparoscopic method is 142 minutes as compared to open where operative time is much lower, that is 104 minutes (Table 2).

All the patients had complaint of pain on post-operative day 3. Patients with pain on post-operative day 3 received analgesics as required. On post-operative day 7 only few patients have mild pain and could be managed adequately with analgesics. Out of 25 patients in laparoscopic group, only 4 (16%) had pain on day 7 which was mild to moderate. Out of 25 patients in laparoscopic group, 0 patients had pain on day 7 which was at higher end of painscale (Table 3).

Table 2: Operative time.

Variable	Laparoscopic repair	Open repair
Mean operative time	142 minutes	104 minutes

Table 3: Post-operative pain Visual analogue scale at day 3 and day 7.

Post-operative day	Pain scale	Laparoscopic repair	Open repair
Day 3	P0	0	0
	P1	14	10
	P2	11	11
	P3	0	4
Day 7	P0	21	14
	P1	4	6
	P2	0	4
	P3	0	1

Seroma formation was seen none of the patients in laparoscopy group while it was seen is as high as 44% (11) of the patients in open group despite of using negative suction drains in all patients.[3] (12%) patients in laparoscopic group developed wound infection despite of no seroma formation. While only 4 (16%) patients in open group developed wound infection despite of high rates of seroma formation (Table 4).

Table 4: Post Operative Complications.

Complications	Laparoscopic repair	Open repair
Seroma formation	0	11
Wound infection	3	4

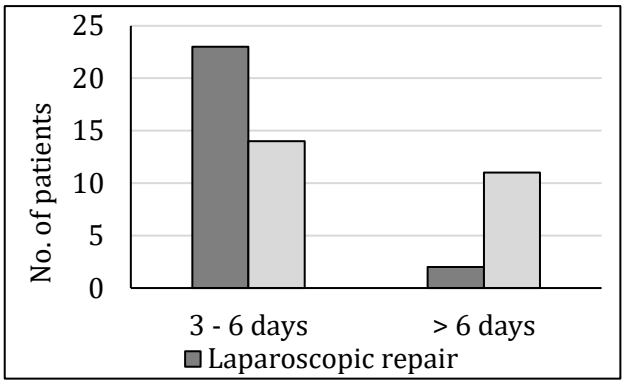

Figure 1: Duration of hospital stay

Mean hospital stays for most of the patients were between 3-6 days in our study. More than 90% (23) of the patients in laparoscopic group were discharged within 6 days while only 56% (14) of the patients in open group were discharged before day 6 (Figure 1).

Laparoscopic surgery requires high quality hospital set up with 30/45 degree telescope. In our study 15 X 15cm Multi layered tissue separating mesh was used whenever possible and available. (INR 35,000). The cost to the hospital per patient was around INR 40,000- 45,000 inclusive of hospital stay, drugs, surgical equipment and materials etc. In open study, 15×15 cm prolene mesh was used whenever possible and available. (INR 3,500). The cost to the hospital per patient was around INR 6,000-7,000 inclusive of hospital stay, drugs, surgical equipment and materials etc. As the study was done in civil hospital, there was no expenditure on part of the patient.

In our study patients were followed up at 1, 3, 6, 12 months. Clinical and radiological assessments were done and no recurrence was found in both the groups.

DISCUSSION

In present study, the most of the patients operated were in the 31-60 years age group. In Olmi et al study total of 100 patients were studied with 50 patients in each group. However, distribution of patients in different age group was not shown. Median age was 64.5 years in laparoscopic group while 68 years in open group.[17] Patients of any age group can be operated by laparoscopic surgery if there is no associated comorbid condition.[18]

None of the patients in both the group had intra-operative complications like bowel or vascular injury. Intra-operative complications of laparoscopic hernia repair are detachment of epigastric vessels, preperitoneal bleeding, and rupture of the peritoneal sac, subcutaneous emphysema, and problems with extending the mesh, visceral or deferential lesions, and rate of reconversion.[19]

Average operative time for laparoscopic method is 142 minutes as compared to open where operative time is much lower, that is 104 minutes. The results of study by Nicholson et al comparing overall laparoscopic repair to the open technique indicated that the laparoscopic repair had a longer surgical time by 29.38 minutes as well as longer recovery room time by 69.08 minutes.[20] There are several factors which can contribute to these differences. The laparoscopic approach requires general anaesthesia, causing longer operating room time, whereas the open technique can be performed under local anaesthesia. In laparoscopic approach, additional time needed to enter and dissect the pre-peritoneal space with the balloon. The length of time for our surgical laparoscopic procedures included early experience for the surgeon and staff.[20]

Regarding post-operative pain, literature reported that the laparoscopic repair is associated with less pain as compared to open herniorrhaphy as it was reflected in our study.[20-22] All the patients had complaint of pain on post-operative day 3. Out of 25 patients in laparoscopic group, only 4 (16%) had pain on day 7 which was mild to moderate. Out of 25 patients in laparoscopic group, 0 patient had pain on day 7 which was at higher end of painscale. Thus, incidence of post-operative pain was significantly lower in laparoscopic surgery. In Olmi S et al study, only 2% of laparoscopic group had persistent pain while 16% of patients in open group had persistent pain.[17]

Seroma formation was seen none of the patients in laparoscopy group while it was seen is as high as 44% (11) of the patients in open group despite of using negative suction drains in all patients.3 (12%) patients in laparoscopic group developed wound infection despite of no seroma formation. While only 4 (16%) patients in open group developed wound infection despite of high rates of seroma formation. Wellwood et al conducted a large (200 patients in each arm) randomized prospective trial comparing laparoscopic hernia repair to open hernia repair. They found that laparoscopic hernia repair led to a lower rate of wound infection, groin/thigh pain, genital swelling, local numbness, and constipation. Urinary retention did occur in a greater percentage of the patients undergoing laparoscopic hernia repair.[23]

Mean hospital stay for most of the patients was between 3-6 days in our study. More than 90% (23) of the patients in laparoscopic group were discharged within 6 days while only 56% (14) of the patients in open group were discharged before day 6. These findings are consistent with the many other studies carried out at different centersand also with Cochrane database review of 41 studies.[24-26]

An advantage of laparoscopic hernia repair is the quicker return to work. However, this is achieved with a longer surgical procedure time, longer recovery room time, and higher cost of management. In the present health care crisis, where cost effectiveness is carefully evaluated, the more costly laparoscopic procedure can be considered cost-efficient.

CONCLUSION

There is less post-operative pain and complication and shorter hospital stay after laparoscopic hernia repair in comparison with open hernia repair. Keeping in view the limitations of laparoscopic repair longer surgical procedure time, longer recovery room time, and higher cost, the choice among two surgical modalities should be made on a case to case basis depending on patient preference and characteristics.

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