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COMPARATIVE STUDY OF LAPAROSCOPIC VERSUS OPEN INCISIONAL HERNIA REPAIR USING POLYPROPYLENE MESH AT A TERTIARY HOSPITAL

General Surgery

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ABSTRACT

BACKGROUND: Incisional hernias are a complication of open abdominal surgery. Surgical repair is demanding with the goal of tension free repair. The use of prosthetic mesh has helped in reducing the recurrence rates. In present comparative study, we compared laparoscopic incisional hernia repair versus open incisional hernia repair using polypropylene mesh at a tertiary hospital. **MATERIAL AND METHODS:** Present study was single-center, comparative study, conducted in patients admitted in surgical wards with incisional hernia for surgical correction. In operation theatre patients were randomly allocated by chit method in open group (open method) & laparoscopic group. **RESULTS:** In present study 60 patients were randomly allocated in laparoscopic group (n=30) & open group (n=30), by alternate patient method. General characteristics such as age (years), gender wise distribution, types of hernia & co-morbidities associated were comparable in both groups & difference was not statistically significant. Defect size (cms) was comparable in both groups & difference was not statistically significant. We noted less duration of surgery, less requirement of analgesic, less stay at hospital & early return to daily activity in laparoscopic group as compared to open group & difference was statistically significant. Also, complications such as enterotomy, seroma, wound infection, mesh infection & post-operative ileus were common in open group as compared to laparoscopic group & difference was statistically significant. **CONCLUSION:** Laparoscopic incisional hernia repair has clear advantage over open repair were less duration of surgery, reduced length of hospital stay, less time for return to normal activity, better cosmesis & reduced postoperative pain.

KEYWORDS

Incisional hernia, Laparoscopic hernia repair, Open mesh repair, Laparotomy, polypropylene mesh

INTRODUCTION

An incisional hernia is defined as any abdominal wall defect with or without a bulge in the area of postoperative scar perceptible or palpable by clinical examination or imaging [1] Incisional hernias are a complication of open abdominal surgery. Surgical repair is demanding with the goal of tension free repair. The use of prosthetic mesh has helped in reducing the recurrence rates. Repair of incisional hernia is recommended to avoid complications such as incarceration and strangulation of intestines and improve severe disability due to loss of abdominal wall domain. Lasting surgical repair of these hernias continues to be elusive. Newly developed meshes proved to reduce the inflammatory response and therefore reduce the adhesion formation. Coatings added to newer meshes aim also to prevent bowel adhesion to the mesh surface [2]. The laparoscopic approach to incisional hernias can minimize the disadvantages of open herniorrhaphy without compromising the ability to implement a tension-free, mesh repair [3]. In present comparative study, we compared laparoscopic incisional hernia repair versus open incisional hernia repair using polypropylene mesh at a tertiary hospital.

MATERIAL AND METHODS

Present study was single center, comparative study, conducted in department of General surgery at Narayan Medical College and Hospital, Sasaram, Bihar, India. Present study period was from November 2018 to October 2019 (1Year). Study approval was obtained from institutional ethical committee.

INCLUSION CRITERIA

- All patients admitted in surgical wards with incisional hernia for surgical correction.

EXCLUSION CRITERIA

Patients with co-morbid conditions had a high risk for general anaesthesia.

- Patients undergoing non-mesh repairs for incisional hernia
- Patients >70 years
- Patients required conversion to open surgery due to various reasons like bowel injury, morbid obesity etc.,
- Patients with surgical emergency like acute intestinal obstruction.

All the patients were inquired about the duration of hernia, progression and the main associated symptoms like pain, vomiting, cough, dysuria, reducibility of the swelling, association with pregnancy. Past history pertaining to previous surgery- its nature, duration, type of surgery and closure, any complications associated with previous surgery like infections were noted. On physical examination, findings about the scar of the previous surgery, the hernia defect – its position, size, shape, cough impulse, reducibility and the overlying skin over the defect were made. Patients underwent relevant investigations for surgery & anaesthetic fitness was taken. Study was explained to patients & a written informed consent was taken for surgery & participation in study. In operation theatre patients were randomly allocated by chit method in open group (open preperitoneal method) & laparoscopic group.

In open technique hernia sac was identified and dissected. Sac was opened and if adhesions were present between the bowel/omentum and the sac, it was released. The content of the sac was reduced after adhesiolysis. The redundant sac wall was excised. A plane was created between the peritoneum and the posterior rectus sheath. Haemostasis was achieved in the layer. The peritoneum along with the sac was closed with Polyglycolic acid No. 2.0. Polypropylene mesh (larger than the size of defect) was placed over the closed peritoneum, under the posterior rectus and secured to the Musculo-aponeurotic layer by with Polypropylene No. 2.0 with minimum 4 cm margin from defect on each side with interrupted sutures. A negative suction drain (Romovac) was kept over the mesh, closure of the rectus was done with Polypropylene No. 1 in interrupted fashion. Another negative suction drain was kept over this layer, and excess redundant subcutaneous layer was excised. The subcutaneous layer was closed with Polyglycolic acid No. 2.0 in intermittent manner. Closure of skin was done with Polyamide No 2.0 intermittently.

In laparoscopic technique, intraperitoneal onlay mesh repair was undertaken, pneumoperitoneum is created by open technique by Hassan's technique & pneumoperitoneum was created. 10 mm telescope was used to visualize the abdominal cavity for adhesions of the bowel loops. Subsequently all ports are created. The adhesion were released with sharp scissors & nature and extent of defect was assessed thoroughly. The defect was clearly delineated after releasing the pneumoperitoneum and the site of the defect and the area of proposed placement of the mesh was marked on the skin. The polypropylene mesh was taken and the corners and sides are tagged with 1-0 polypropylene sutures leaving 2 long threads in each side for fixation & fixed properly. Once the suturing is completed, trocar sites checked for bleeding and the pneumoperitoneum is deflated, the ports closed.

STATISTICALANALYSIS:
Data was collected and compiled using Microsoft Excel, using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS
In present study 60 patients were randomly allocated in laparoscopic group (n=30) & open group (n=30), by alternate patient method. General characteristics such as age (years), gender wise distribution, types of hernia & co-morbidities associated were comparable in both groups & difference was not statistically significant.

Table 1: General Characteristics Of The Patients

	Laparoscopic group (n=30)	Open group (n=30)	p value
Mean age	45.12 ± 12.43	47.29 ± 14.17	0.32
Gender			0.61
Males	11 (36.67 %)	10 (33.33 %)	
Females	19 (63.33 %)	20 (66.67 %)	
Types of hernia			0.43
Incisional hernia	25 (83.33 %)	26 (86.67 %)	
Recurrent incisional hernia	5 (16.67 %)	4 (13.33 %)	
Co-morbidities associated			0.24
BMI > 25 kg/m^2	13 (43.33 %)	11 (36.67 %)	
Diabetes mellitus	4 (13.33 %)	3 (10.00 %)	
HTN	3 (10 %)	4 (13.33 %)	
Asthma	1 (3.33 %)	1 (3.33 %)	

In present study, defect size (cms) was comparable in both groups & difference was not statistically significant. We noted less duration of surgery, less requirement of analgesic, less stay at hospital & early return to daily activity in laparoscopic group as compared to open group & difference was statistically significant. Also, complications such as enterotomy, seroma, wound infection, mesh infection & post-operative ileus were common in open group as compared to laparoscopic group & difference was statistically significant.

Table 2: Comparative Analysis Of Parameters In Laparoscopic And Open Hernia Surgery

Parameter	Laparoscopy technique (n=30)	Open technique (n=30)	p-value
Defect size (cms)	3.51± 1.71	3.79 ± 1.42	0.428
Duration of surgery (hours)	1.05 ± 0.25	1.89 ± 0.47	0.0001
Requirement of analgesic (days)	2.76 ± 1.26	5.77 ± 2.34	0.0001
Stay at hospital (days)	2.71 ± 1.01	6.69 ± 1.79	0.0001
Return to daily activity (days)	4.16 ± 2.23	11.69 ± 3.71	0.0001
Complications			0.0001
Enterotomy	1 (3.33 %)	1 (3.33 %)	
Seroma	3 (10 %)	7 (23.33 %)	
Wound infection	1 (3.33 %)	8 (26.67 %)	
Mesh infection	0	2 (6.67 %)	
Post-operative ileus	2 (6.67 %)	5 (16.67 %)	

DISCUSSION
Incisional hernia is a common long-term complication of abdominal surgery and is estimated to occur in 11–20% of laparotomy incisions [4]. The widespread concept of tension-free repair of incisional hernia with mesh has resulted in a reduced recurrence rate compared with direct suture approximation. The next significant change has been the minimally invasive laparoscopic approach [5]. The laparoscopic approach affords the surgeon the ability to clearly and definitively define the margins of the hernia defect and to identify additional defects that may not have been clinically apparent preoperatively.

Complete visualization of the fascia underlying the previous incision allows for identification of smaller 'Swiss-cheese' defects that could be missed in an open approach [6]. Perioperative factors appear to have the most significant correlation to incisional hernia formation, with wound infection being the most consistently reported risk factor. Other perioperative factors include deep abscesses, perioperative gastrointestinal complications and early reoperations [7]. Arun Kumar et al. [8] noted that laparoscopic inlay mesh repair is associated with less intra operative blood loss (Mean intraoperative blood loss 26 ml versus 90.77 ml), less postoperative pain (Mean VAS at POD 0 was 5.35 versus 7.08, Mean VAS at POD 2 was 2.5 versus 4.1), shorter duration of hospital stay (Mean day of discharge 2.55 versus 5.38), quicker resumption of daily activities (Mean day of resumption of daily activity 2.0 versus 3.38), early return to work (Mean day of return to work 8.05 versus 13.67) and less postoperative complications (Total number of postoperative complications 0 versus 7) as compared to open onlay mesh repair. Similar findings were noted in present study.

In a similar study M.Anto et al. [9] noted that laparoscopic mesh repair have a positive effect on financial and human resources and apart from cost effectiveness laparoscopic incisional hernioplasty seems to be superior and has more advantages and a better alternative for open hernioplasty. Deceased incidence of post-operative wound infections, less postoperative pain, early post-operative enteral feeding , lesser duration of hospital stay , faster recovery , better visualization of hernial defect and hence better repair are all the extra added advantages found in laparoscopic incisional hernia mesh repair. Similar findings were noted in present study.

Badiger S et al. [10] noted that laparoscopic ventral hernia repair in our experience was safe and resulted in shorter operative time, fewer complications; shorter hospital stays, and earlier returns to daily activity. Hence, it should be considered as the procedure of choice for ventral hernia repair. One of the greatest benefits of the laparoscopic approach to incisional hernias is the reduction in complications related to wound and mesh infection. The open technique of hernia repair has been associated with a high rate of cellulites and mesh infection. Due to extensive tissue dissection that potentially devascularizes the fascia and causes hematoma formation, both of which contribute to wound and mesh complications [6, 11].

Mohammed Leithy et al. [12] noted that mean postoperative hospital stay was longer in the open group than laparoscopic group (2.72 ± 0.68 vs. 1.92 ± 0.69 days, P < 0.001). The total postoperative complications were more in the open group than laparoscopic group (23 vs. 13, P = 0.03). The mean operative time of laparoscopic repair was significant statistically longer than the open repair (151.9 ± 20.07 vs. 106.6 ± 13.77 min, P < 0.001). Short-term postoperative pain was more intense in the open repair group than the laparoscopic group (4.72 ± 1.10 vs. 3.78 ± 1.30, P < 0.001). Incisional hernia surgery is a complex surgical entity, which requires comprehensive assessment and planning prior to selecting the correct operative strategy to improve patient symptoms and quality of life whilst limiting morbidity and reducing the risk of recurrence.[3] We recommend increased application of laparoscopic repair of incisional hernia and a large multicentre randomized trial with long follow-up to measure the long-term results.

CONCLUSION:
Laparoscopic incisional hernia repair has clear advantage over open repair were less duration of surgery, reduced length of hospital stay, less time for return to normal activity, better cosmesis & reduced postoperative pain. Laparoscopic repair of incisional hernia have a long learning curve but it is a safe and feasible alternative to open repair.

REFERENCES:

1. Korenkov M, Paul A, Sauerland S, Neugebauer E, Arndt M, Chevrel JP, et al. Classification and surgical treatment of incisional hernia. Results of an experts' meeting. Langenbecks Arch Surg. 2001 Feb; 386(l):65- 73.
2. Eriksen JR, Gogenur I, Rosenberg J. Choice of mesh for laparoscopic ventral hernia repair. Hernia 2007;11(6):481–492.
3. Muysoms FE, Deerenberg EB, Peeters E, Agresta F, Berrevoet F, Campanelli G et al. Recommendations for reporting outcome results in abdominal wall repair: results of a Consensus meeting in Palermo, Italy, 28–30 June 2012. Hernia 2013;17:423–433
4. Mistakes EP, Patapis P, Zavras N, Tzanetis P, Machairas A. Current trends in laparoscopic ventral hernia repair. JSLS 2015; 19:3.
5. Asti E, Sironi A, Lovece A, Bonita G, Bonavina L. Open versus laparoscopic management of incisional abdominal hernia: cohort study comparing quality of life outcomes. J Laparoendosc Adv Surg Tech 2016; 26:249–255.
6. Cobb WS, Kercher KW, Henniford BT. Laparoscopic repair of incisional hernias. Surg Clin North Am. 2005;85:91-1036.
7. Chan G, Chan CK. A review of incisional hernia repairs: Preoperative weight loss and selective use of the mesh repair. Hernia 2005;9:37-41.
8. Dr. Arun Kumar, Dr. Renu Kannaujia, Dr. Prashant Gupta, Dr. Jogendar Pal Singh Shakya, Dr. Sangita Sahu, Dr. Deepak Kumar, A Comparative Study of Open versus and Laparoscopic Incisional Hernia Repair, International Journal of Science and Research, 7 (10), October 2018
9. M.Anto,.V.S.Venkatesan, A Comparitive Study of Laparoscopic Mesh Repair versus Open Mesh Repair for Incisional Hernia, IOSR Journal of Dental and Medical Sciences, 16(5) Ver. VII (May. 2017), PP 78-80
10. Badiger S, Koppad SN, Kulkarni A, Kodliwadmath H. Comparative analysis of Open versus laparoscopic ventral hernia repair. Int Surg J 2016;3:1167-72.
11. McGreevy JM, Goodney PP, Birkmeyer CM, Finlayson SR, Laycock WS, Birkmeyer

JD. A prospective study comparing the complication rates between laparoscopic and open ventral hernia repairs. Surg Endosc 2003;17:1778-80.
12. Mohammed Leithy, Ashraf A. Elhady, Asem Fayed, Ahmed Elghazaly, Comparative study of laparoscopic versus open repair of incisional hernia, Menoufia Medical Journal, 32 (2) April-June 2019.