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COMPARISON OF LAPAROSCOPIC VENTRAL HERNIAS REPAIR WITH AND WITHOUT TACKS

General Surgery

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ABSTRACT

Introduction: After the first report of laparoscopic incisional and ventral hernia repair (LIVHR) in 1993, several studies have proven its efficacy over open method. Among the technical issues, technique of mesh fixation to the abdominal wall is still an area of debate. This study was done to compare two techniques of mesh fixation: tacker with four corner transfascial sutures versus transfascial sutures alone. Aim: To compare the outcome of ventral hernia repair, using transfascial sutures only versus metallic tacks in addition to 4 corner sutures for mesh fixation in terms of postoperative pain, infection and early recurrence. Patients and methods: We evaluated 20 patients with ventral hernias between September 2014 to July 2016. It was a randomised controlled study that included two groups: Group-I: transfascial suture fixation only and Group-II: tacks and four corner transfascial sutures. Both groups were compared post-operatively in terms of pain, infections and recurrences. Results: Demographic profile and hernia characteristics were comparable. The pain score at 6hours, 24hours, 1week, 1month, 3months and 6months after surgery were lower in group II but was not statistically significant. There were no recurrence in any patients over a median follow up of 16months. Surgical site infection (SSI) was present in 0 and 20% in group I & II respectively. The mean operating time (OT) was 61±23.78 and 35±10.8 minutes in group I & II respectively. Conclusions: This study showed that both techniques of mesh fixation are equally effective in terms of postoperative pain, SSI and recurrences.

KEYWORDS

Laparoscopic incisional and ventral hernias, transfascial suture fixation, tacks fixation, pain score

Introduction

Laparoscopic incisional and ventral hernia repair (LIVHR) was first reported by Le Blanc and Booth in 1993.[1] Many studies in the literature have shown that laparoscopic repair of ventral hernia is preferred over open repair because of lower recurrence rates, lesser wound morbidity, lesser pain, and early resumption of work.[2-5] Randomised trials comparing laparoscopic versus open incisional hernia repair have confirmed the advantages of laparoscopic repair.[2-5] Various issues regarding the technicalities of laparoscopic repair of ventral hernia, such as access to the abdominal cavity, mesh size and extent of overlap have been resolved. However, issues such as ideal prosthetic material to be used, management of hernia defect, the technique and the accurate way of fixation of the mesh to the abdominal wall are still areas of debate.[2,6-9] Various studies in literature have used mesh fixation with tacks only[7], with transfascial sutures and tacks[8] or with sutures only.[9] Although mesh fixation with tacks is convenient and time saving, the tensile strength of fixation with transfascial sutures has been shown to be upto 2.5 times greater than tacks.[10] Transfascial sutures penetrate all the layers of abdominal wall, thereby enabling fixation of mesh to entire fascio-muscular layer of abdominal wall, whereas tacks penetrate upto a maximum of 5mm.[10,11] In various studies, both suture and tack fixation in ventral hernias have been evaluated and shown to have no significant differences regarding LIVHR outcomes.[12] However, no consensus has been reached till now. This randomised controlled study was conducted to examine the postoperative complication rates between suture and tack fixation of mesh in LIVHR.

Patients and Methods

This study enrolled 20 patients with incisional or primary ventral hernias between September 2014 to July 2016. It was a randomised controlled parallel study. All patients of age >18 years with uncomplicated ventral hernia of transverse defect size <10cm were included in the study. Patients who were pregnant, or had significant co-morbidity, or required other associated procedure to be done with the surgery were excluded from the study. Patients with recurrent hernia after previous laparoscopic repair were also excluded from the study. (**Figure 1.**)

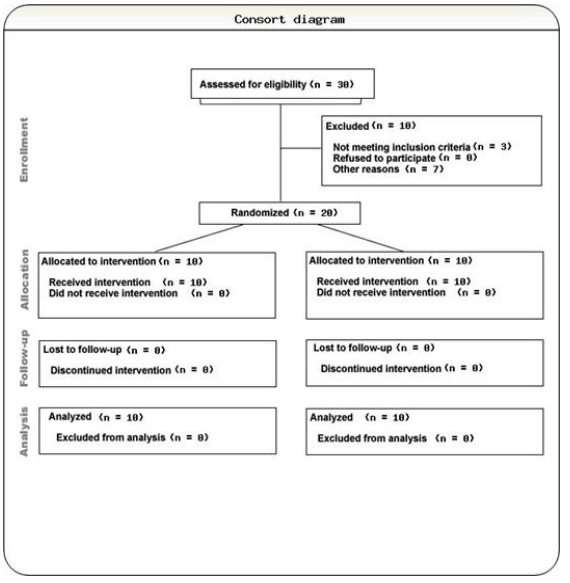

Figure 1. Consort diagram

The eligible patients were randomised to two groups just before surgery and were assigned as Group I being transfascial sutures fixation group only and Group II being patients undergoing mesh fixation with tacks apart from four corner transfascial sutures.

All cases were operated under general anaesthesia. Single dose intravenous antibiotic was given after the induction of anaesthesia. After creating pneumoperitoneum, a 10mm laparoscopic port was inserted for a telescope in the left or right flank at the level of umbilicus. Two additional 5mm ports were placed depending upon the location of hernia keeping in view the principle of triangulation.

Proceed® meshes were used in all cases. Mesh was folded and inserted through the 10 mm port into the abdominal cavity. Mesh positioning was facilitated by placing a centering suture through the center of the defect and then four corner 1-0 polypropylene transfascial sutures were placed. Mesh overlap of atleast 4-5 cm beyond the hernia defect was ensured.

Group 1: Subsequent transfascial sutures were placed all around. (single crown)

Group 2: Double crown technique was applied for the placement of spiral tacks, i.e. two circular rows of tacks, with the first row at the periphery of the mesh all around (single crown), and an inner row of tacks to reinforce the middle portion of the mesh closer to the margin of the defect (double crown).

Post operative: Patients were given tablet Diclofenac 75mg 12hourly for 3 days.

The two groups were assessed and compared post-operatively in terms of pain, infections and recurrences.

Post operative pain was assessed by Visual Analogue Scale (VAS). This was done 6 hours after surgery, and then 24 hours later. Any additional analgesic required was noted. After discharge they were followed up in the outpatient clinic at 1 week, 1 month, 3 months and 6months to determine VAS (0 = pain free, 10 = excruciating/worse pain).

Early hernia recurrence, defined as visible cough impulse after 7 days of surgery, was assessed upto minimum 7months postoperatively.
Surgical site infection (SSI) was considered as one occurring within 30 days of operation with atleast one of the signs/symptoms like local pain with redness, pus discharge, swelling or fever.

Statistical analysis was done by Chi-square test with Yates' correction, Fischer's exact test and unpaired Students' t test.

Results

The mean age (± SD) of the patients in the study was 40.2 ± 12 years in group I and 48.4±14.9years in group II. There were 4 men and 6 women in group I and 3 men and 7 women in group II with majority of the patients in both the groups having incisional hernia. The mean defect size in the suture group was 9.1 ± 12.09 cm^2while in tacks group was 9.4 ± 7.17 cm^2. Both the groups were comparable in terms of age, gender distribution and defect size (Table. 1).

Table 1: Demographic profile and Hernia characteristics

	Sutures only group (n=20)	Tacks group (n=20)	p-value
Age (yr), mean ± SD	40.2 ± 12	48.4 ± 14.9	0.19
Gender			
Male	4	3	
Female	6	7	
BMI (Kg/m2), mean ± SD	24.4 ± 2.67	26.8 ± 3.99	0.13
Type of Hernia			
Incisional	6	5	
Primary Ventral	4	5	
Defect size (cm^2), mean ± SD	9.1 ±12.09	9.1 ±12.09	0.95

The mean operating time (OT) in group I was 61±23.78 minutes (min) while it was 35±10.8 min in group II. The post operative pain score was calculated at 6hours, 24 hours, 1week, 1 month, 3 months and 6months after surgery, which were 6.9 ± 1.66, 5.1 ± 2.72, 2.6 ± 2.80, 1.7 ± 2.90, 1.4 ± 2.86 and 0.9 ± 2.18 in group I and 6.5 ± 1.27, 4.0 ± 1.41, 1.3 ± 1.25, 0, 0 and 0 in group II respectively. (Figure 2.)

Figure 2. Post-operative pain score (VAS) (mean only)

One patient in sutures only group had a VAS of 9 and 7 at the end of 3 and 6months respectively and was referred to pain clinic for better pain management. There were no cases of recurrence in any patient over a median follow up of 16months (7-23months). There were 2 cases of surgical site infections, both in group II patients. Both were diabetics, and 1 patient had mesh infection requiring its removal. The overall rate of SSI was 10% in the study- 0 and 20% in group I & II respectively. The average hospital stay in group I was 3.7 ± 1.89 days while it was 2.8 ±1.14 days in group II (Table. 2).

Table 2: Intra-operative and post-operative data

	Sutures only group (n=20)	Tacks group(n=20)	p-value
Operative time (min) mean ± SD	61±23.78	35±10.8	<0.01
SSI	0	2	0.43
Recurrences	0	0	
Hospital Stay (days) mean ± SD	3.7±1.89	2.8±1.14	0.21

Discussion

The various methods of mesh fixation used are staples, tacks in a single crown, tacks applied in a double crown, and transfascial sutures either alone or in combination with tacks.[1,2,6-8] Currently, the most popular method of mesh fixation used worldwide is the use of tacks along with four-corner transfascial sutures.[5] Mesh fixation with only transfascial sutures has not been used by many authors. The only large study where only transfascial suture fixation has been used is by Chelala et al.[6] They have shown excellent results with a recurrence rate of 1.5% at a mean follow-up of 28 months. Not many studies in literature compare various methods of mesh fixation in laparoscopic incisional and ventral hernia repair.

The use of only transfascial suture fixation has not become very popular because of certain drawbacks. Suture fixation is time-consuming, and it is difficult to insert these transfascial sutures in certain anatomical areas, such as the pelvis, above the subcostal margin, and laterally in the flanks. However, at other sites there is significant cost saving as the sutures are easily available. Different fixation techniques are associated with varying degrees of early postoperative and chronic pain, which may affect the quality of life postoperatively. The postoperative pain produced by the fixation techniques could play an important role in deciding between sutures and tacks for mesh fixation.

Post-operative pain score as observed in studies conducted by Beldi G et al. and Nguyen et al. was found to be more in sutures only group as compared to tacks group at all time intervals and similar observations have been found in this study also.[13,14] However, in the studies conducted by Bansal VK et al., the pain score in the sutures only group was lower than the tacks group at all time intervals,[15,16] but was not statistically significant. Pain score in sutures only group was found to be higher in this study as compared to studies conducted by Bansal VK et al., but was lower than the observations of Beldi G et al. and Nguyen et al. at all time intervals.[13,15,16] Similarly, the pain score in the tacks group in this study was found to be lower than the studies of Bansal VK et al, Beldi G et al., Nguyen et al. and Wassenaar et al. at all time intervals with pain score even being 0 at 1 and 3 months interval, except for at first 6 hours where pain score in study by Bansal VK et al. is lower than this study.[12-16]

There were no recurrences in our study over a median follow up of 16months (7-23months). While in studies of Beldi G et al., Bansal VK et al., Chelala et al., Kitamura et al. and Grubnik et al., the recurrence rate ranged between 0-6% over a follow up ranging from 15 to 44 months.[7,13,15,16,18,19]

In this study, the overall infection rate was 10% and all occurred in tacks group with one requiring mesh removal. All of these patients were diabetics and had incisional hernia. This was found to be higher than the studies of Chelala et al. (0.5%), Le Blanc et al. (2%), and McGreevy et al. (3.07% in laparoscopic group and 9.86% in open group).[7,20,21] It may be due to smaller sample size and may also be due to the presence of diabetes in the affected patients. This study was not designed to study the effect of diabetes on mesh infection, hence further inferences were not possible.

The operating time was found to be lower than the studies conducted by Bansal VK et al., Beldi G et al., Nguyen et al. and Kitamura et al.

However in all the studies the mean operating time was lower in tacks group than in sutures only group.[13-16,18] This may be a consideration where OT time is costly; the use of tackers can affect overall cost.

Conclusion

It was observed in the present study that average pain score in group II was lower as compared to group I at all follow up visits, but not statistically significant. The operating time in group II was significantly lower than group I. SSI was only found in group II patients but the difference was not statistically significant. However both the patients with surgical site infection were diabetics.

Hence, this study shows that both the techniques of mesh fixation are equally effective in terms of post-operative pain, surgical site infection and recurrences.

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