



OUTCOME OF INGUINAL HERNIA REPAIR BY MESH AND NON-MESH REPAIR

General Surgery

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ABSTRACT

Inguinal hernia is common, particularly in males (around 25% incidence) and less so in females (about 2%). Various procedures are used to repair inguinal hernias, each with different techniques and surgical approaches. The present study aimed to assess the efficiency of mesh tissue repair in comparison with non-mesh tissue repair. This prospective observational comparative study was conducted at Bokaro General Hospital, Jharkhand, over 18 months with institutional ethical approval. The study included 100 patients randomly assigned to either the mesh repair group (n=50) or the non-mesh repair group (n=50). All patients were assessed for duration of hospital stay, postoperative pain, complications, and return to work. Mesh repair was associated with shorter hospital stays (4.42 days vs 5.12 days, $P=0.001$) and lower postoperative pain scores at various intervals (Day 3: 2.64 vs 3.2; 1 month: 0.98 vs 2; 3 months: 0.74 vs 1.5; 6 months: 0.14 vs 0.16, all $P<0.05$). Rates of complications (hematoma, wound infection, recurrence) were comparable between groups ($P>0.05$). A significantly higher proportion of mesh repair patients returned to work compared to non-mesh repair patients (100% vs 88%, $P=0.011$). The study showed that mesh repair for hernias is associated with shorter hospital stays and comparable complication rates to non-mesh repair. Initial differences in return-to-work rates between the groups diminish over time, indicating both approaches are effective, though mesh repair may offer faster recovery.

KEYWORDS

Inguinal Hernia, Mesh Repair, Non-Mesh Repair.

INTRODUCTION

Inguinal hernia (IH) is a prevalent type of hernia, especially affecting males with an incidence of around 25%, and females with an incidence of about 2%. There exist several procedures available for repairing IHs, with a wide range of techniques and variations in surgical approaches.[1]

The goal of a hernia repair (HR) surgical procedure is to not only treat the existing hernia but also to minimize the chances of it recurring. Reappearance rates following initial HR vary from 0.5% to 15%, influenced by factors such as hernia location, repair type, and clinical settings. Groin HRs can include either mesh (hernioplasty) or non-mesh (herniorrhaphy). Meshes utilized in HR, classically prepared from artificial polymers like "polypropylene", are inactive and do not trigger abnormal inflammation. They are lightweight, flexible, and intended to evade obstructing local structures or restricting movement. Meshes can be anchored in place using moderately absorbable sutures or fibrin glue, with glue typically offering a more efficient closure.[2]

Mesh repairs entail covering the hernial flaw by introducing the mesh on a layer of the stomach wall, either through an open method or a minimally invasive laparoscopic procedure.[3] The choice of repair approach relies on features such as hernia type, patient characteristics, and surgeon preference. In open methods for inguinal HRs, tension-free mesh repairs like "Lichtenstein, plug and patch, and Kugel (preperitoneal) repairs" are common, alongside non-mesh tissue approximation repairs such as "Shouldice, Bassini, and McVay repairs".[2] Tension-free mesh repairs involve placing the mesh in front of or behind the transversalis fascia, while tissue approximation repairs like Shouldice involve suture-based reconstruction of the fascia transversalis.[4] By placing the mesh over the weakened area, a strong barrier is created that promotes tissue growth and decreases the risk of hernia reappearance. The mesh integration with surrounding tissue provides long-term support and durability, contributing to the low recurrence rates observed with mesh repairs. Tension-free repair with mesh offers advantages in reducing hernia recurrence rates, but it comes with potential risks such as chronic pain attributed to the mesh or surgical technique. Advances in mesh technology have improved outcomes by addressing concerns about mesh quality, size, and fixation methods.[5]

On the other hand, traditional tension repairs involve suturing the hernia defect without mesh, relying solely on tension to close the opening. While historically common, tension repairs have greater relapse rates than mesh repairs, often requiring additional surgeries for

recurrence. The choice between mesh and non-mesh techniques depends on patient factors and surgeon preferences to optimize outcomes and minimize risks.[5] To determine which approach yields better outcomes in terms of recurrence rates, post-operative pain, complications, and recovery time it is necessary to compare the results of mesh repair and non-mesh tissue repair. There is a lack of data regarding the comparison of the effectiveness of mesh and non-mesh methods in inguinal HR. Therefore, the present study was undertaken to assess the efficiency of mesh tissue repair in comparison with non-mesh tissue repair.

MATERIALS AND METHOD

The present prospective, observational, comparative study was conducted at the Department of General Surgery Bokaro General Hospital Bokaro Jharkhand for 18 months after institutional ethical committee approval. A total of 100 patients aged 30 years and above diagnosed with clinically evident IH, who were deemed suitable for spinal anesthesia and received NSAIDs in the postoperative period were included in the study. Whereas, individuals over 70 years of age accompanied with recurrent IH (Hernia which recurs after 6 months) and patients with obstruction irreducible IH were omitted from the study.

The eligible participants were randomly allotted to the mesh repair group (n=50) and the non-mesh repair group (n=50). Demographic variables such as age, sex, and baseline characteristics were noted. Post-operative outcomes including post-operative pain, recurrence rate, complications, duration of hospital stay, and return to normal activity were assessed. Postoperative pain was measured using a VAS score at various time intervals.

Recurrence of the condition was monitored over a defined follow-up period using clinical examination and imaging studies. Any complications such as infections or seroma formation were documented and compared between the two groups.

The length of hospital stay from the day of surgery until discharge was recorded for each participant. Additionally, the time taken for patients to resume normal activities and work was assessed through patient-reported data or clinical evaluation.

Statistical analysis

Descriptive statistics were used for all data, followed by appropriate comparative statistical tests. Continuous variables were assessed using the unpaired t-test, while categorical variables were analyzed using the

Fisher exact test. Statistical significance was defined as $P < 0.05$. Data analysis was performed using SPSS Version 16.

RESULTS

The mean age of mesh and non-mesh group subjects was comparable (52.8 ± 8.64 years vs 51.02 ± 9.16 years, $P = 0.32$). Male predominance was seen in either groups (96% and 94%). In the mesh group, 84% of patients had inguino scrotal swelling whereas, it was 72% in non-mesh group patients ($P = 0.14$).

The mean hospital stay was significantly shorter in mesh group subjects compared to non-mesh group patients (4.42 ± 0.5 days vs 5.12 ± 0.63 days, $P = 0.001$).

A substantial variance was detected in VAS scores when compared between groups at various time intervals ($P < 0.05$) (Table 1).

Table 1. Comparison of VAS score between groups

Time intervals	VAS score (mean $\pm$ SD)		P value
	Mesh	Non-mesh	
Day 3	2.64 ± 0.69	3.2 ± 0.53	0.001
1 month	0.98 ± 0.94	2 ± 0.9	0.001
3 months	0.74 ± 0.66	1.5 ± 0.54	0.001
6 months	0.14 ± 0.35	0.16 ± 0.37	0.77

The incidence of hematoma, wound infection, and recurrence was comparable between groups ($P > 0.05$). A substantial change was observed in the proportion of return to work (RTW) when compared between groups ($P = 0.011$) (Table 2).

Table 2. Comparison of outcomes between groups

Variables	Subcategories	Mesh %, (n)	Non-mesh %, (n)	P value
Hematoma	Yes	4 (2)	6 (3)	0.64
	No	96 (48)	94 (47)	
Wound infection	Yes	4 (2)	4 (2)	1.00
	No	96 (48)	96 (48)	
Recurrence	Yes	0 (0)	2 (1)	0.31
	No	100 (50)	98 (49)	
RTW	Yes	100 (50)	88 (44)	0.011
	No	0 (0)	12 (6)	

DISCUSSION

Mesh is commonly used during IH repairs, but some patients may prefer non-mesh repairs due to concerns about reported adverse events associated with mesh procedures. This study aimed to assess the efficacy of mesh tissue repair versus non-mesh tissue repair in patients undergoing IH repair.

Firstly, the demographic characteristics of patients in the mesh and non-mesh groups were comparable in terms of age and gender distribution, ensuring a balanced comparison between the two groups. The slight difference in inguinoscrotal swelling between the groups was not statistically substantial ($P = 0.14$), suggesting that this factor did not significantly influence the choice of repair technique. These results were similar to the findings of Rasu K. [6]

One notable finding was the significantly shorter hospital stay observed in subjects who undertook mesh repair than non-mesh repair (4.42 ± 0.5 days vs 5.12 ± 0.63 days, $P = 0.001$) which was similar to the outcomes of Lockhart K et al [4]. This highlights a potential advantage of mesh repair in terms of early recovery and reduced healthcare resource utilization.

The primary outcome of pain assessment using VAS scores revealed consistent and statistically significant differences favoring the mesh repair group at multiple time intervals post-surgery (day 3, 1 month, and 3 months). This suggests that patients who received mesh repair experienced less pain and discomfort during the early recovery period compared to those who underwent non-mesh repair. However, the difference in VAS scores became negligible by 6 months, indicating similar long-term pain outcomes between the groups. Contrary to these findings Mohamed HE et al [1] observed no significant variations in pain which may be due to small sample size used in the study.

Regarding complications, there were no significant differences in the

incidence of hematoma, wound infection, or hernia recurrence between the mesh and non-mesh groups, indicating similar safety profiles for both repair techniques. This aligns with previous literature suggesting that mesh repair is generally safe and effective in reducing recurrence rates compared to non-mesh repair.[7-9]

Interestingly, a substantial difference was noted in the proportion of subjects who returned to work post-surgery, favoring the mesh repair group (100% vs 88%, $P = 0.011$). This suggests that patients undergoing mesh repair may experience faster recovery and earlier resumption of daily activities compared to those undergoing non-mesh repair.

Overall, our findings support the use of mesh tissue repair as an effective approach for inguinal HR, offering advantages such as shorter hospital stays, reduced early postoperative pain, and improved RTW rates compared to non-mesh repair. While both techniques demonstrated comparable safety profiles in terms of complications and recurrence rates, the benefits of mesh repair in terms of recovery and patient outcomes warrant consideration in clinical practice. These results were supported by Finch DA et al. [7]

CONCLUSION

This study showed that Mesh repair was allied with a significantly shorter hospital stay and demonstrated comparable outcomes in terms of hematoma occurrence, wound infection rates, and recurrence rates at various post-operative intervals. Although an initial difference in RTW rates was observed in the 1st month post-surgery, this distinction diminished by the 3rd and 6th months. These findings suggest that both Mesh and Non-Mesh approaches are effective in HR, with Mesh repair potentially offering advantages in terms of expedited recovery. Further investigation with larger cohorts and longer-term follow-up is warranted to confirm these outcomes and guide clinical decision-making.

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