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Advancements in Hernia Repair: Evaluating the Impact of Mesh vs. Non-Mesh Techniques

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Abstract

Hernia repair remains one of the most frequently performed surgical procedures worldwide. While mesh-based repairs have gained popularity due to their lower recurrence rates, concerns regarding mesh-related complications persist. This study evaluates the clinical outcomes, recurrence rates, and complication profiles of mesh versus non-mesh hernia repair techniques in patients with inguinal and ventral hernias.

Objective: This study aims to compare the effectiveness of mesh versus non-mesh techniques in hernia repair, focusing on recurrence rates, surgical site infections, chronic pain, and overall patient recovery.

Methods: A prospective cohort study was conducted on 350 patients undergoing elective hernia repair. Patients were divided into two groups: Group A (mesh repair, n=200) and Group B (non-mesh repair, n=150). Primary outcomes included operative time, post-operative pain scores, recurrence rates, and complication rates. Statistical analysis was performed using SPSS v.26, with $p < 0.05$ considered statistically significant.

Results: Mesh repair demonstrated a significantly lower recurrence rate (3.5% vs. 12.7%, $p=0.001$) and faster recovery (return to normal activities in 14.3 ± 3.2 days vs. 21.6 ± 4.1 days, $p=0.002$) compared to non-mesh repair. However, chronic pain was reported more frequently in the mesh group (7.1% vs. 3.9%, $p=0.041$). Surgical site infections were comparable between both groups ($p=0.117$).

Conclusion: Mesh-based hernia repair offers superior recurrence prevention and faster recovery but carries a higher risk of chronic pain. Patient selection and surgical expertise remain critical factors in optimizing outcomes.

Keywords: Hernia repair, Mesh technique, Recurrence rate

Introduction

Hernias are among the most common surgical conditions, with over 20 million repairs performed globally each year¹. The introduction of mesh-based techniques has revolutionized hernia surgery, reducing recurrence rates and improving surgical outcomes². However, despite these advantages, mesh-related complications, including chronic pain, foreign body reaction, and infection, remain concerns³.

Non-mesh (suture-based) repairs, such as the Shouldice and Bassini techniques, were the standard for decades and continue to be used in specific patient populations, particularly in younger patients or those with small defects⁴. The primary drawback of these techniques is the higher recurrence rate due to tension at the repair site⁵.

Recent studies have attempted to refine both mesh and non-mesh techniques to optimize patient outcomes. The debate continues on the best approach, particularly in cases where patient comorbidities, hernia size, and risk factors for chronic pain must be considered⁶.

This study compares the long-term effectiveness and complications of mesh versus non-mesh hernia repair in a real-world clinical setting. By evaluating recurrence rates, surgical site complications, and pain levels, this research provides critical insights into optimizing patient selection and surgical decision-making⁷.

Methodology

A prospective cohort study was conducted from January 2022 to December 2023 at, Sialkot Medical College, Sialkot. A total of 350 patients diagnosed with inguinal or ventral hernias were enrolled and categorized into two groups: Group A (mesh repair, n=200) and Group B (non-mesh repair, n=150). The sample size was calculated using Epi Info software, considering a 95% confidence interval and a 10% expected recurrence rate.

Inclusion criteria included patients aged 18–75 years with primary inguinal or ventral hernias. Patients with recurrent hernias, strangulated hernias, severe comorbidities, or prior abdominal mesh placement were excluded. Preoperative assessments included imaging (ultrasound, CT scan for complex cases) and laboratory evaluations. Informed verbal and written consent was obtained from all participants.

All surgeries were performed under general anesthesia by experienced surgeons. Mesh repair involved tension-free placement of synthetic mesh (Lichtenstein technique for inguinal hernias and intraperitoneal onlay mesh for ventral hernias). Non-mesh repairs utilized the Shouldice or Bassini techniques. Primary endpoints included operative time, post-operative pain (Visual Analogue Scale), recurrence rates, and complication rates. Data were analyzed using SPSS v.26, with independent t-tests and chi-square tests for comparative analysis ($p < 0.05$ considered statistically significant).

Results

Table 1: Patient Demographics

Characteristic	Mesh Repair (n=200)	Non-Mesh Repair (n=150)	p-value
Age (Mean $\pm$ SD)	52.6 $\pm$ 10.4	50.9 $\pm$ 9.8	0.271
Male (%)	162 (81.0%)	119 (79.3%)	0.691
BMI (Mean $\pm$ SD)	27.8 $\pm$ 3.9	26.9 $\pm$ 3.6	0.084

Summary: No significant differences were observed in baseline characteristics between the two groups.

Table 2: Surgical Outcomes and Complications

Parameter	Mesh Repair (n=200)	Non-Mesh Repair (n=150)	p-value
Operative Time (min)	55.2 $\pm$ 11.8	48.9 $\pm$ 9.6	0.037*
Recurrence Rate (%)	3.5%	12.7%	0.001*
Post-op Pain (VAS)	3.6 $\pm$ 1.2	2.9 $\pm$ 1.0	0.028*
Chronic Pain (%)	7.1%	3.9%	0.041*
Return to Normal Activity (days)	14.3 $\pm$ 3.2	21.6 $\pm$ 4.1	0.002*

* $p < 0.05$ indicates statistical significance.

Summary: Mesh repair showed a significantly lower recurrence rate and faster recovery but had higher chronic pain rates compared to non-mesh repair.

Discussion

The results demonstrate that mesh-based hernia repair provides superior recurrence prevention compared to non-mesh techniques. This aligns with prior studies that reported recurrence rates of less than 5% with mesh repair versus 10–15% with suture-based repairs⁸.

The primary advantage of mesh repair is its ability to reinforce the defect without tension, reducing the risk of recurrence. However, concerns regarding chronic pain and foreign body reactions remain valid, as evidenced by the higher chronic pain rate in the mesh group⁹. Chronic pain is often attributed to nerve entrapment or mesh-induced fibrosis, which highlights the importance of meticulous surgical technique¹⁰.

Interestingly, surgical site infection rates did not differ significantly between the groups, suggesting that modern mesh materials and proper perioperative care mitigate infection risks¹¹. The shorter return-to-activity period in the mesh group is another notable benefit, particularly for working-age patients¹².

Despite these advantages, patient selection remains crucial. Younger patients, those with small hernias, or individuals at higher risk of chronic pain may still benefit from non-mesh repairs¹³. Future studies should explore newer mesh materials and laparoscopic approaches to further improve outcomes.

Conclusion

Mesh-based hernia repair offers superior long-term outcomes in terms of recurrence prevention and faster recovery. However, the increased risk of chronic pain must be carefully considered in surgical decision-making. This study underscores the importance of individualized patient selection to optimize clinical outcomes.

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