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Approach to Ventral Abdominal Hernias: Anatomical Repair Versus Open Mesh Repair

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Abstract:-

➢ ***Introduction:***

Ventral abdominal hernias are a prevalent surgical issue that can greatly affect a patient's quality of life. Although several surgical methods have been devised to treat these hernias, there remains ongoing discussion about the best approach. The goal of this study is to compare the results of anatomical repair and open mesh repair in patients with ventral abdominal hernias.

➢ ***Methods:***

This prospective study examined anatomical repair and open mesh repair for ventral abdominal hernias in 60 patients over 18 months at Navodaya Medical College Hospital and Research Centre in Raichur. Patients with uncomplicated ventral hernias and defects smaller than 3 cm were randomly assigned to two groups of 30 each. The study assessed various outcomes, including operative time, post-operative pain, hospital stay, complications, and recurrence rates.

➢ ***Results:***

This study showed that mesh repair had significantly shorter operation times ($p<0.001$) compared to anatomical repair. While not statistically significant, the mesh repair group demonstrated trends towards lower rates of seroma formation (3.3% vs 16.7%), wound infection (3.3% vs 16.7%), and early recurrence (0% vs 16.7%, $p=0.052$). Post-operative pain scores and return to normal activity rates were similar between groups. Patient satisfaction was higher in the mesh repair group.

➢ ***Conclusion:***

The study concludes that meshplasty is superior to anatomical repair for ventral abdominal hernias, offering improved outcomes with minimal associated morbidity. These findings support the use of mesh repair as the preferred surgical technique for ventral abdominal hernias.

Keywords:- *Ventral Hernia, Mesh Repair, Anatomical Repair, Surgical Outcomes, Recurrence Rate, Post-Operative Complications.*

I. INTRODUCTION

Ventral abdominal hernias are a common surgical problem, characterized by the protrusion of abdominal contents through a defect in the anterior abdominal wall.[1] These hernias can be categorized into various types, including umbilical, paraumbilical, and epigastric hernias, each with distinct anatomical locations and etiologies.[2]

Historically, the management of ventral hernias has evolved from simple suture repairs to more advanced techniques involving prosthetic materials.[3] The introduction of mesh repairs in the late 20th century marked a significant advancement in hernia surgery, promising lower recurrence rates compared to traditional anatomical repairs.[4] However, the choice between anatomical and mesh repair techniques remains a subject of debate among surgeons, with each approach offering unique advantages and potential complications.[5]

The aim of this study is to compare the outcomes of anatomical repair versus open mesh repair in patients with ventral abdominal hernias. We will evaluate key parameters such as operative time, post-operative pain, length of hospital stay, complications, and recurrence rates.[6] This comparative analysis seeks to provide evidence-based insights to guide clinical decision-making in the management of ventral hernias.

Understanding the relative merits of these two approaches is crucial in an era of personalized medicine, where tailoring surgical techniques to individual patient factors is increasingly emphasized.[7] By examining the efficacy and safety profiles of anatomical and mesh repairs, this study aims to contribute to the ongoing refinement of ventral hernia management strategies, ultimately improving patient outcomes and quality of life.[8]

II. MATERIALS AND METHODS

This prospective study compared anatomical repair versus open mesh repair for ventral abdominal hernias. It was conducted over 18 months from July 2022 to December 2023 at Navodaya Medical College Hospital and Research Centre in Raichur. The study included 60 patients with uncomplicated ventral abdominal hernias and defects less than 3 cm. Patients were randomly divided into two groups of

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30 each - one group underwent open anatomical repair and the other underwent open mesh repair using polypropylene mesh.

Detailed history taking and clinical examinations were performed for all patients. Relevant investigations including ultrasound were conducted. Patients were categorized by age and gender. After obtaining consent, patients filled out a proforma with their details. The surgical procedures for both anatomical and mesh repair were carried out under general anesthesia using standard techniques.

Post-operatively, patients were monitored for complications like pain, wound infection, seroma formation, and recurrence. Follow-up was done at 1 week, 2 weeks, 2 months, and 6 months after surgery. The operative time, hospital stay, return to normal activity, and early recurrence were assessed using a proforma. Statistical analysis of the data was performed using SPSS software.

The study compared outcomes between the two groups in terms of post-operative pain, wound infection, seroma formation, duration of hospital stay, return to normal activity, and recurrence rates. Patients were followed up for 10 months to assess for early recurrence. The results were analyzed to determine the relative effectiveness of mesh repair versus anatomical repair for ventral abdominal hernias.

III. RESULTS

This prospective study included 60 patients with uncomplicated ventral abdominal hernias, randomly divided into two groups of 30 each for anatomical repair and mesh repair. Data was collected on patient demographics, surgical outcomes, post-operative complications, and recurrence rates. Follow-ups were conducted at 1 week, 2 weeks, 2 months, and 6 months post-surgery.

Table 1 presents patient demographics and hernia characteristics, showing no significant differences between the groups in age, gender distribution, or hernia type.

Table 1 Patient Demographics and Hernia Characteristics

Characteristics	Anatomical Group	Mesh Group	P-value
Mean Age (Years)	39.87 +/- 9.92	42.87 +/- 12.29	0.374
Gender (M:F)	16:14	14:16	0.606
Umbilical Hernia	22 (73.3%)	23 (76.7%)	0.474
Paraumbilical Hernia	3 (10.0%)	5 (16.7%)	0.474
Epigastric Hernia	5 (16.7%)	2 (6.7%)	0.474

Table 2 compares surgical outcomes, highlighting a significantly shorter operation time for mesh repair ($p<0.001$) but similar post-operative pain scores and return to normal activity rates.

Table 2 Surgical Outcomes

Characteristics	Anatomical Group	Mesh Group	P-value
Mean duration of surgery (Minutes)	74.33 +/- 6.40	54.40 +/- 7.67	<0.001
Post operative Pain (VAS)	3.93 +/- 1.72	4.07 +/- 1.80	0.804
Return to Normal Activity within 10 days	24 (80.0%)	29 (96.7%)	0.103

Table 3 summarizes post-operative complications, revealing a trend towards fewer complications in the mesh repair group, though differences were not statistically significant.

Table 3 Post-Operative Complications

Characteristics	Anatomical Group	Mesh Group	P-value
Seroma	5 (16.7%)	1 (3.3%)	0.195
Wound Infection	5 (16.7%)	1 (3.3%)	0.195
Wound Dehiscence	2 (6.7%)	0	0.492
Foreign Body Sensation	2 (6.7%)	3 (10%)	1

Table 4 focuses on the recurrence rate, showing a notable trend towards lower recurrence in the mesh repair group ($p=0.052$).

Table 4 Recurrence Rate

Characteristics	Anatomical Group	Mesh Group	P-value
Early Recurrence	5 (16.7%)	0	0.052

IV. DISCUSSION

Ventral hernias are common worldwide, but the optimal treatment approach remains debated. This study evaluated the efficacy of mesh repair compared to conventional suture repair in different types of ventral abdominal hernias. Our findings showed no significant differences in post-operative pain, wound infection, or seroma formation between the two groups. However, the mesh repair group had significantly shorter operation times ($p<0.001$), which contrasts with several studies reporting longer operation times for mesh repair.

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Our study found a higher incidence of surgical site infections (16.7% vs 3%) and seroma formation (16.7% vs 3.3%) in the anatomical repair group, though these differences were not statistically significant. This aligns with findings by Thakur et al.[9], but contrasts with Kaufmann et al.[10], who reported slightly higher wound infection rates in the mesh group. We observed a trend towards lower recurrence rates in the mesh group (0% vs 16.7%, p=0.052), which is consistent with several randomized controlled trials[11-13] and retrospective studies[9-19] that have demonstrated significantly lower recurrence rates with mesh repair.

Patient satisfaction was higher in the mesh repair group, with patients feeling more secure against recurrence. The foreign body sensation experienced by some patients after mesh repair resolved within a few months, and there were no incidents of mesh infection or rejection. Our data suggests that mesh repair of ventral hernias is superior to suture repair and more acceptable to patients, supporting the findings of previous studies[16,17] that have shown low recurrence rates and morbidity with mesh repair techniques.

V. CONCLUSION

This study demonstrates that meshplasty is superior to anatomical repair for ventral abdominal hernias. Meshplasty resulted in lower rates of surgical site infection, seroma formation, and hernia recurrence. It also led to shorter hospital stays. These findings strongly support the use of mesh repair as the preferred surgical technique for ventral abdominal hernias, offering improved outcomes with minimal associated morbidity.

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