

Early Outcomes of Large pores vs. Small pores for Ventral Mesh Hernioplasty

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ARTICLE INFO	ABSTRACT
*Correspondence to Maaz Bin Ayub^a, Ahmed Zaman^b ^{a,b}Lady Reading Hospital, MTI, Peshawar, Pakistan ^aEmail: maazbinayub@gmail.com ^bEmail: ahmadzaman66@gmail.com Article History Received: 13-08-2026 Revised: 19-09-2026 Accepted: 25-09-2026 Published: 30-09-2026 How to Cite Faraz A, Ayub MB, Zaman A, Gul A. Early outcomes of large pores vs small pores for ventral mesh hernioplasty. Pak J Clin Res. 2026;3(9):1-5. doi:10.65761/pjcr.2026.327 DOI: https://doi.org/10.65761/pjcr.2026.327	Background: Ventral hernia repair is a commonly performed procedure, and mesh selection may influence postoperative recovery and complications. Large-pore polypropylene meshes are designed to facilitate tissue integration and reduce foreign body reaction compared with small-pore meshes. This study compared early outcomes of large-pore and small-pore meshes in patients undergoing ventral mesh hernioplasty. Methods: This comparative study was conducted in the Department of Surgery, Lady Reading Hospital, Peshawar, Pakistan, from January 2026 to August 2026. A total of 120 patients undergoing elective ventral mesh hernioplasty were enrolled and divided into two groups: Group A received large-pore mesh (n=60), while Group B received small-pore mesh (n=60). Outcomes included postoperative pain, seroma formation, surgical site infection, hospital stay, and early recurrence. Data were analysed using SPSS version 23.0, with p<0.05 considered statistically significant. Results: Mean age was 46.8 ± 11.2 years in Group A and 48.1 ± 10.7 years in Group B. Large-pore mesh was associated with significantly lower pain scores at 72 hours (3.1 ± 1.2 vs. 4.0 ± 1.4; p=0.002) and shorter hospital stay (2.8 ± 0.9 vs. 3.5 ± 1.1 days; p=0.001). Seroma formation (6.7% vs. 16.7%) and surgical site infection (5.0% vs. 13.3%) were less frequent in Group A. Early recurrence occurred in 1.7% and 5.0% of patients, respectively. Conclusion: Large-pore polypropylene mesh was associated with improved early postoperative outcomes, including less pain, shorter hospitalization, and fewer complications. Larger prospective studies with longer follow-up are needed to establish long-term outcomes

Keywords: Ventral Hernia; Hernioplasty; Polypropylene Mesh; Postoperative Pain; Surgical Site Infection; Hernia Recurrence.

INTRODUCTION

Ventral hernias represent a significant proportion of abdominal wall defects encountered in surgical practice and encompass primary hernias, including umbilical, epigastric, and Spigelian hernias, as well as incisional hernias resulting from previous abdominal surgery.^{1,2} The global burden of ventral hernias continues to increase due to rising rates of obesity, advanced age, diabetes mellitus, and prior abdominal procedures.^{3,4} It is estimated that millions of abdominal wall hernia repairs are performed annually worldwide, making hernioplasty one of the most common operations undertaken by general surgeons.⁵ Despite advances in surgical techniques, postoperative complications and hernia recurrence remain important clinical challenges.⁶

The introduction of prosthetic mesh has revolutionized ventral hernia repair by substantially reducing recurrence rates compared with primary suture repair.^{7,8} Since the landmark work of Lichtenstein and subsequent mesh-based approaches, prosthetic materials have become the standard of care for most ventral hernias.^{9,10} Polypropylene mesh, in particular, is widely used owing to its strength, affordability, biocompatibility, and ease of handling.¹¹ However, the characteristics of mesh materials, including weight, pore size, elasticity, and filament structure, have been shown to influence postoperative outcomes significantly.^{12,13}

Mesh pore size has emerged as an important determinant of host tissue response following implantation.¹⁴ Large-pore meshes are

generally defined as meshes with pore diameters exceeding 1 mm and are designed to permit improved tissue integration, enhanced vascularization, and reduced foreign body reaction.^{15,16} In contrast, small-pore meshes possess a denser structure that may contribute to increased fibrosis, stiffness, and chronic inflammatory responses.¹⁷ Experimental and clinical studies have suggested that larger pores facilitate better collagen organization and reduce mesh shrinkage over time.^{18,19}

Postoperative pain remains one of the most frequently reported complications after ventral hernioplasty and can adversely affect quality of life and patient satisfaction.²⁰ Chronic pain has been associated with mesh contraction, nerve entrapment, and excessive scar tissue formation, factors that may be influenced by the physical properties of the implanted material.²¹ Several studies have demonstrated that lightweight, large-pore meshes are associated with lower pain scores and improved abdominal wall compliance when compared with heavyweight, small-pore alternatives.^{22,23} Similarly, mesh design may impact the incidence of seroma formation, surgical site infection, and postoperative recovery.²⁴

Although numerous investigations have evaluated different mesh materials in inguinal hernia repair, evidence specifically comparing large-pore and small-pore meshes in ventral hernioplasty remains limited, particularly in low- and middle-income countries.²³ Furthermore, differences in patient populations, operative techniques, and follow-up protocols have resulted in inconsistent findings across the literature.²³ In

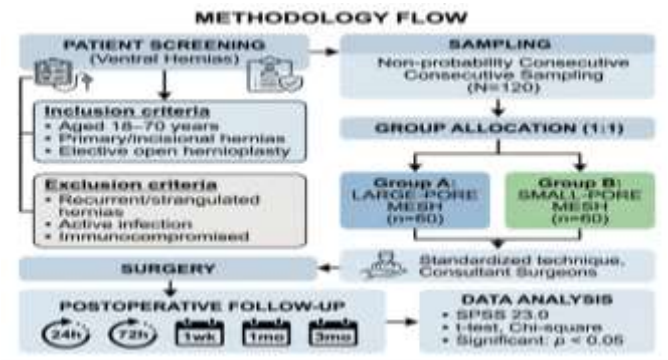


Pakistan, published data examining the impact of mesh pore size on early postoperative outcomes are scarce, highlighting the need for locally generated evidence to guide surgical decision-making.^{25,26} Lady Reading Hospital, Peshawar, is one of the largest tertiary care centres in the region and manages a substantial number of patients requiring ventral hernia repair each year. Evaluating the effectiveness of different mesh types in this setting is essential to optimize patient outcomes and inform evidence-based practice. Therefore, the present study was undertaken to compare the early outcomes of large-pore versus small-pore polypropylene mesh in patients undergoing ventral mesh hernioplasty, with particular emphasis on postoperative pain, seroma formation, surgical site infection, duration of hospital stay, and early recurrence.

METHODOLOGY

This comparative study was conducted in the Department of Surgery, Lady Reading Hospital, Peshawar, Pakistan, from January 2026 to August 2026 to evaluate the early outcomes of large-pore versus small-pore mesh in patients undergoing ventral mesh hernioplasty. After obtaining approval from the Institutional Review Board and the hospital ethical committee, all eligible patients presenting with ventral hernias during the study period were screened for inclusion. Patients aged 18–70 years of either gender with primary or incisional ventral hernias who were planned for elective open ventral mesh hernioplasty were included in the study. Patients with recurrent hernias, strangulated or obstructed hernias requiring emergency intervention, active surgical site infections, immunocompromised status, malignancy, or significant comorbidities precluding surgery were excluded. A non-probability consecutive sampling technique was employed. Patients were allocated into two groups based on the type of polypropylene mesh used during surgery: Group A received large-pore mesh, while Group B received small-pore mesh. All procedures were performed by consultant surgeons with a minimum of five years of post-fellowship experience using a standardized operative technique under general or regional anaesthesia. Preoperative demographic and clinical characteristics, including age, sex, body mass index, hernia size, and comorbid conditions, were documented using a structured proforma. The primary outcome measures included postoperative pain, seroma formation, wound infection, length of hospital stay, and early recurrence within the follow-up period. Postoperative pain was assessed using the Visual Analogue Scale (VAS) at 24 and 72 hours following surgery. Patients were followed in the outpatient department at one week, one month, and three months after the procedure to assess early postoperative complications and clinical outcomes.

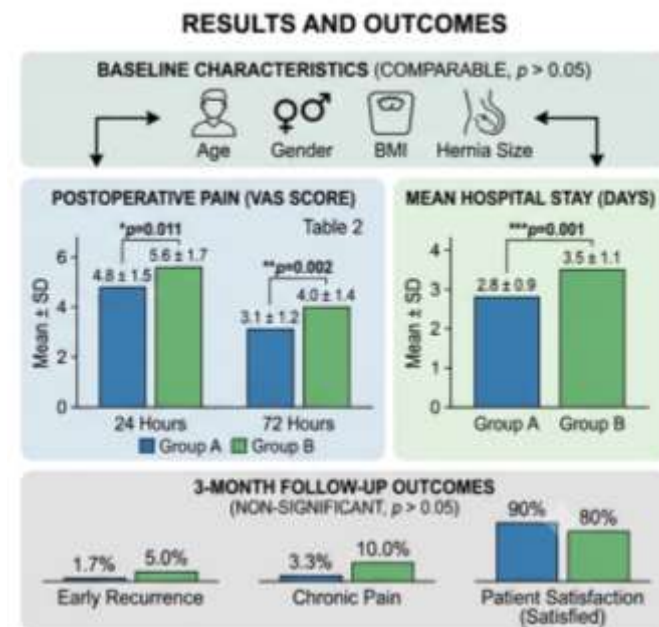
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RESULTS

A total of 120 patients undergoing ventral mesh hernioplasty were included in the study, with 60 patients allocated to the large-pore mesh group (Group A) and 60 to the small-pore mesh group (Group B). The mean age of the participants was 46.8 ± 11.2 years in Group A and 48.1 ± 10.7 years in Group B. There was no statistically significant difference between the groups regarding age, gender distribution, body mass index (BMI), or hernia size (p > 0.05), indicating comparable baseline characteristics.

Figure 2. Study flow diagram and summary of comparative early postoperative outcomes for large-pore versus small-pore ventral hernia mesh repair.



Patients in the large-pore mesh group demonstrated more favourable early postoperative outcomes. The mean postoperative pain scores at 72 hours were significantly lower in Group A compared with Group B (3.1 ± 1.2 vs. 4.0 ± 1.4, p = 0.002). Similarly, the incidence of seroma formation and surgical site infection was lower among patients receiving large-pore mesh. The average duration of hospital stay was shorter in Group A (2.8 ± 0.9 days) than in Group B (3.5 ± 1.1 days), which was statistically significant (p = 0.001). During the three-month follow-up period, early recurrence was observed in one patient (1.7%) in the large-pore mesh group and three patients (5.0%) in the small-pore mesh group; however, this difference did not reach statistical significance.

Table 1. Baseline Characteristics of the Study Participants

Variable	Group A (Large-Pore Mesh) n=60	Group B (Small-Pore Mesh) n=60	p-value
Age (years), Mean ± SD	46.8 ± 11.2	48.1 ± 10.7	0.521
Male, n (%)	38 (63.3)	40 (66.7)	0.702
Female, n (%)	22 (36.7)	20 (33.3)	-
BMI (kg/m ²), Mean ± SD	28.4 ± 3.7	28.9 ± 4.1	0.486
Mean Hernia Size (cm)	4.6 ± 1.3	4.8 ± 1.5	0.437

Table 2. Early Postoperative Outcomes

Outcome	Group A (Large-Pore Mesh) n=60	Group B (Small-Pore Mesh) n=60	p-value
VAS Pain Score at 24 Hours	4.8 ± 1.5	5.6 ± 1.7	0.011
VAS Pain Score at 72 Hours	3.1 ± 1.2	4.0 ± 1.4	0.002
Seroma Formation, n (%)	4 (6.7)	10 (16.7)	0.084
Surgical Site Infection, n (%)	3 (5.0)	8 (13.3)	0.119
Mean Hospital Stay (days)	2.8 ± 0.9	3.5 ± 1.1	0.001

Table 3. Three-Month Follow-up Outcomes

Outcome	Group A (Large-Pore Mesh) n=60	Group B (Small-Pore Mesh) n=60	p-value
Early Recurrence, n (%)	1 (1.7)	3 (5.0)	0.309
Chronic Pain, n (%)	2 (3.3)	6 (10.0)	0.143
Patient Satisfaction (Satisfied), n (%)	54 (90.0)	48 (80.0)	0.121

Overall, the findings suggest that the use of large-pore mesh in ventral hernioplasty is associated with reduced postoperative pain, shorter hospital stay, and lower rates of early postoperative complications compared with small-pore mesh. However, larger multicentre studies with extended follow-up are recommended to establish long-term efficacy and recurrence outcomes

DISCUSSION

The present study evaluated the early outcomes of large-pore versus small-pore polypropylene mesh in patients undergoing ventral mesh hernioplasty at Lady Reading Hospital, Peshawar. Our findings demonstrated that the use of large-pore mesh was associated with lower postoperative pain scores, shorter duration of hospital stay, and a reduced incidence of early postoperative complications, including seroma formation and surgical site infection. Although the recurrence rate was lower in the large-pore mesh group, the difference was not statistically significant during the three-month follow-up period.

Ventral hernia repair remains one of the most commonly performed procedures in general surgery, with mesh characteristics playing a crucial role in determining postoperative outcomes.^{7,12} Advances in biomaterial engineering have led to the development of lightweight, large-pore meshes designed to reduce foreign body reaction and improve tissue integration.^{13,14} In the present study, patients receiving large-pore mesh experienced significantly lower pain scores at both 24 and 72 hours postoperatively. This observation is consistent with previous studies that have reported improved patient comfort and reduced inflammatory responses with lightweight mesh materials.^{22,23} The larger pore size facilitates better tissue ingrowth and flexibility, thereby minimizing mesh stiffness and postoperative discomfort.¹⁶

Similarly, the incidence of seroma formation and surgical site

infection was lower among patients in the large-pore mesh group. Although these differences did not achieve statistical significance, the observed trend is clinically relevant. Several investigators have suggested that large-pore meshes permit enhanced vascularization and reduced bacterial colonization compared with small-pore meshes, potentially contributing to improved wound healing and lower complication rates.^{14,15} The shorter hospital stay observed in our study further supports the potential advantages of large-pore mesh in facilitating early postoperative recovery and reducing healthcare resource utilization.

With regard to recurrence, only a small number of patients experienced early recurrence during the follow-up period. The absence of a statistically significant difference between the two groups may be attributed to the relatively small sample size and the short duration of follow-up. Hernia recurrence is a long-term outcome that often becomes evident several years after repair; therefore, studies with prolonged surveillance are necessary to establish the comparative durability of different mesh types.⁸ This study has several limitations. It was conducted at a single tertiary care centre with a modest sample size and limited follow-up duration, which may affect the generalizability of the findings. Additionally, long-term outcomes such as chronic pain, mesh-related complications, and late recurrence could not be adequately assessed. Nevertheless, the study provides valuable local evidence supporting the use of large-pore mesh in ventral hernioplasty. Future multicentre prospective studies with larger patient populations and extended follow-up periods are recommended to validate these findings and inform evidence-based surgical practice.

CONCLUSION

The findings of this study suggest that large-pore polypropylene mesh is associated with better early postoperative outcomes compared with small-pore mesh in patients undergoing ventral mesh hernioplasty. Patients receiving large-pore mesh experienced lower postoperative pain, shorter hospital stay, and fewer early complications, including seroma formation and surgical site infection. Although the recurrence rate was lower in the large-pore mesh group, no statistically significant difference was observed during the short follow-up period. Large-pore mesh appears to be a safe and effective option for ventral hernia repair. However, further multicentre studies with larger sample sizes and longer follow-up are warranted to assess long-term outcomes and establish definitive clinical recommendations.

Ethical Approval

Ethical approval for the conduct of this study was obtained from the Ethical Review Board (ERB) of Lady Reading Hospital, Peshawar, under Reference No. 568/LRH/MTI. The study was conducted in accordance with the ethical principles and institutional requirements governing research involving human participants

Data Availability

The data analyzed in this study are available from the corresponding author upon reasonable request.

Author Contributions

Conceptualization: Ahmad Faraz, Maaz Bin Ayub

Methodology: Ahmad Faraz, Ahmed Zaman

Data Collection: Maaz Bin Ayub, Ayaz Gul

Formal Analysis: Ahmed Zaman, Ahmad Faraz

Writing – Original Draft: Ahmad Faraz, Maaz Bin Ayub

Writing – Review & Editing: Ahmed Zaman, Ayaz Gul

All authors agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Informed Consent

Informed consent was obtained from all participants before their enrollment in the study. The participants were adequately informed about the study objectives and procedures, and their privacy and confidentiality were ensured throughout the study.

Funding

No.

Conflict of Interest

No.

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Declaration of AI-Assisted Language Editing

Grammarly AI was used for language and grammar correction, while Gemini AI was used for figure generation.

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