

Research Article**Outcomes of Mesh Versus Tissue Repair in Emergency Incarcerated Hernia****Muhammad Ali Sumbal¹, Muhammad Nasir Iqbal², Muhammad Azhar Qureshi³,
Mariam⁴, Muhammad Akram Dogar⁵, Muhammad Rizwan Saleem⁶****Affiliations:**¹ Junior Clinical Fellow, Ysbyty Gwynedd, Wales.² Senior Registrar, Department of General Surgery, Doctors Hospital & Medical Center, Lahore.³ Associate Professor, Department of Surgery, Rawal Institute of Health Sciences, Islamabad.⁴ Senior Registrar, Department of General Surgery, Sir Syed Hospital (Sir Syed College of Medical Sciences), Karachi.⁵ Consultant Surgeon.⁶ Professor of Surgery, University College of Medicine and Dentistry, The University of Lahore.**Corresponding author: Muhammad Ali Sumbal****ABSTRACT**

Emergency incarcerated hernia repair presents a clinical dilemma regarding the safety of mesh use in potentially contaminated fields. This prospective cohort study compared outcomes between mesh and tissue repair in emergency incarcerated hernia cases, focusing on infection rates, recurrence, hospital stay, and postoperative morbidity. A total of 120 patients presenting with incarcerated abdominal wall hernias were included and divided into two groups: mesh repair (n = 62) and tissue repair (n = 58). Mean age was 49.6 ± 13.8 years, with 68 males and 52 females. Surgical site infection occurred in 6.5% of mesh repairs versus 15.5% of tissue repairs ($p = 0.041$). Recurrence within 12 months was significantly lower in the mesh group (3.2%) compared with tissue repair (13.8%, $p = 0.02$). Mean hospital stay was shorter in the mesh group (5.8 ± 2.1 days) than tissue repair (7.2 ± 2.5 days; $p = 0.03$). No statistically significant difference was observed in postoperative pain scores or seroma formation. These findings demonstrate that mesh repair, when performed with appropriate aseptic precautions, provides superior long-term outcomes and reduced recurrence without significantly increasing infection risk, supporting its selective use in emergency incarcerated hernia management.

Keywords: emergency hernia repair, mesh repair, tissue repair

INTRODUCTION

Emergency incarcerated hernia remains a frequent surgical challenge, often presenting with bowel obstruction or ischemia requiring urgent intervention. Historically, tissue repair was preferred due to concerns over infection risk associated with mesh implantation in potentially contaminated or strangulated hernias. However, evolving evidence suggests that contemporary mesh materials and improved perioperative management may reduce recurrence without significantly elevating postoperative infection rates, even in emergency settings. The balance between preventing recurrence and minimizing sepsis risk continues to shape surgical decision-making.¹⁻⁴

Incarcerated hernias contribute significantly to emergency surgical workload, with reported incidences of incarceration ranging between 5% and 15% of all hernia cases. Prompt repair is crucial to prevent strangulation and subsequent bowel necrosis. However, the operative environment in such cases is often less controlled, with a higher risk of contamination due to bowel compromise. This has traditionally led surgeons to favor tissue repair techniques such as Bassini, Shouldice, or McVay, despite their higher recurrence rates.⁵⁻⁷

Mesh-based repair offers the advantage of tension-free closure and reduced recurrence, yet its application in emergency settings remains controversial. Concerns over mesh infection, chronic pain, and possible reoperation have led to ongoing debate among surgeons. Recent developments in antimicrobial meshes, vacuum-assisted wound therapy, and improved perioperative antibiotics have reignited interest in mesh use for emergency incarcerated hernias.⁸⁻¹⁰

Augmented clinical studies over the past few years have begun to demonstrate that, under carefully selected conditions, mesh repair may yield superior outcomes without excessive complications. Nevertheless, data remain inconsistent, and many existing studies lack adequate sample size or standardized postoperative follow-up.

This study aimed to evaluate and compare clinical outcomes of mesh versus tissue repair in emergency incarcerated hernia cases, assessing infection rates, recurrence, hospital stay, postoperative complications, and pain profiles. The analysis emphasizes statistically validated outcomes that contribute new insights into the optimal surgical approach in this high-risk population.

METHODOLOGY

This prospective comparative study was conducted at Jinnah hospital Lahore from January to June 2024. A total of 120 consecutive patients presenting with an emergency incarcerated abdominal wall hernia were enrolled. Sample size was calculated using Epi Info software, assuming a 15% difference in infection rates between mesh and tissue repair, with 80% power and 95% confidence level, yielding a minimum required sample of 110; to account for potential dropouts, 120 patients were included.

Patients were divided into two groups based on intraoperative assessment and surgeon's discretion: Group A (mesh repair, n = 62) and Group B (tissue repair, n = 58). Inclusion criteria comprised patients aged 18–75 years, diagnosed with incarcerated inguinal, femoral, or incisional hernia requiring emergency intervention. Exclusion criteria included bowel perforation, generalized peritonitis, hemodynamic instability precluding mesh placement, pregnancy, and severe immunosuppression.

All patients underwent standardized preoperative evaluation, resuscitation, and broad-spectrum intravenous antibiotic administration. Intraoperative findings determined the feasibility of mesh placement; if viable bowel was confirmed without gross contamination, polypropylene mesh was used. Tissue repair techniques included Bassini or McVay repair according to anatomical location. Verbal and written informed consent was obtained from all participants prior to surgery.

Postoperative outcomes were monitored for 12 months, including infection, recurrence, seroma, pain (assessed using the Visual Analog Scale), and duration of hospital stay. Data were analyzed using SPSS version 25. Continuous variables were expressed as mean $\pm$ SD and compared with t-tests, while categorical data were analyzed using chi-square tests. A p-value < 0.05 was considered statistically significant.

RESULTS

Table 1. Demographic and Baseline Characteristics of Patients

Parameter	Mesh Repair (n=62)	Tissue Repair (n=58)	p-value
Mean Age (years)	49.8 ± 13.5	49.4 ± 14.1	0.86
Male/Female	35/27	33/25	0.93
BMI (kg/m ²)	26.1 ± 3.8	25.8 ± 3.5	0.69
Hernia Type (Inguinal/Incisional/Femoral)	41/15/6	38/14/6	0.98
Duration of Symptoms (hours)	12.8 ± 5.3	13.2 ± 6.1	0.74

Demographic data demonstrated no significant baseline difference between both groups, ensuring comparability.

Table 2. Postoperative Complications and Hospital Outcomes

Outcome	Mesh Repair	Tissue Repair	p-value
Surgical Site Infection (%)	4 (6.5%)	9 (15.5%)	0.041
Seroma Formation (%)	5 (8.1%)	6 (10.3%)	0.68
Recurrence (12 months) (%)	2 (3.2%)	8 (13.8%)	0.02
Hospital Stay (days)	5.8 ± 2.1	7.2 ± 2.5	0.03
Mean Pain Score (VAS)	3.5 ± 1.1	3.8 ± 1.3	0.29

Mesh repair demonstrated lower infection and recurrence rates with shorter hospitalization compared to tissue repair.

Table 3. Correlation between Operative Variables and Infection Outcomes

Variable	Infection Present (n=13)	Infection Absent (n=107)	p-value
Mesh Use (%)	4 (30.7%)	58 (54.2%)	0.041
Contamination Grade (Clean/Contaminated)	6/7	68/39	0.03
Operative Duration (min)	88.2 ± 21.4	76.9 ± 20.1	0.02

Longer operative time and contaminated fields were associated with higher infection rates irrespective of technique, though mesh presence alone did not independently increase infection risk.

DISCUSSION

The findings of this study demonstrate that mesh repair in emergency incarcerated hernia is both safe and effective when performed under controlled aseptic conditions. Infection rates were significantly lower in the mesh group than tissue repair, contradicting traditional reservations regarding mesh use in potentially contaminated scenarios. This may be attributed to modern mesh materials with improved biocompatibility and enhanced antibiotic prophylaxis strategies.¹¹⁻¹³

The recurrence rate in tissue repair remained notably high, aligning with the pathophysiological rationale that tension-based suturing predisposes to mechanical failure, particularly in edematous or friable tissues. The substantial reduction in recurrence with mesh implantation highlights the structural advantage of tension-free repair even in urgent settings.¹⁴⁻¹⁶

Hospital stay was shorter in mesh repair cases, indicating faster recovery and fewer wound-related complications. This reflects both the reduced mechanical strain at the repair site and the lower incidence of reinfection or wound dehiscence.¹⁷⁻²⁰

The comparable postoperative pain scores between the two groups suggest that mesh implantation did not add significant discomfort. This observation supports the growing consensus that chronic pain following hernia repair is multifactorial, often related more to nerve entrapment than to mesh presence itself.

Infection correlation analysis further showed that contamination grade and operative duration were stronger determinants of infection than the use of mesh. These insights suggest that infection control depends more on intraoperative management than on the material employed.

Compared to historical studies that discouraged mesh in emergency hernia repair, these results reinforce recent data advocating selective mesh use based on contamination grading and

intraoperative assessment. The statistically significant outcomes observed in this study substantiate the evolving paradigm toward mesh-based emergency hernia management.

Ultimately, these findings contribute to redefining the surgical approach for incarcerated hernias, bridging the evidence gap between elective and emergency repair strategies while underscoring the importance of intraoperative judgment and aseptic technique.

CONCLUSION

Mesh repair in emergency incarcerated hernia provides superior outcomes with lower recurrence and reduced hospital stay without a significant increase in infection risk. Proper patient selection and adherence to aseptic technique are crucial for optimal results. This study fills a crucial evidence gap supporting mesh use in emergencies and establishes a foundation for further multicenter validation.

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