

Comparative Study of Postoperative Outcome between Laparoscopic Mesh Repair & Open Mesh Repair of Inguinal Hernia Patient in Tertiary Care Hospital in Bangladesh

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Abstract

Original Research Article

Background: Inguinal hernia repair is a commonly performed surgical procedure, and the choice between laparoscopic and open approaches remains a subject of ongoing discussion. This prospective cohort study aimed to compare postoperative outcomes between laparoscopic mesh repair and open mesh repair in inguinal hernia patients in a tertiary care hospital in Bangladesh. **Objective:** This study aimed to assess and compare the surgical outcomes and patient recovery following laparoscopic and open mesh repair for inguinal hernias. **Methods:** A prospective study was conducted by Z.H. Sikder Women's Medical College Hospital and Central Hospital Ltd Dhanmondi Dhaka in Bangladesh, spanning from 2022 to 2023. It enrolled 112 individuals, each grappling with inguinal hernias; they were divided into two groups: one undergoing the intricate ballet of laparoscopic mesh repair (n=56) and the other navigating the venerable path of open mesh repair (n=56). With precision, we charted their demographics and chronicled intraoperative nuances. We scrutinized postoperative outcomes to illuminate the interplay between modern innovation and time-tested tradition in hernia care. **Results:** In our comparative study involving 112 patients (99.5% male, median age 30.8 ± 10.6 years), evaluating postoperative outcomes between laparoscopic and open mesh repair for inguinal hernias in a Bangladesh tertiary care hospital, significant differences were observed. The laparoscopic group demonstrated notably shorter operative durations ($p < 0.05$), a lower incidence of wound infections ($p < 0.05$), and reduced postoperative pain with lower analgesic requirements and shorter hospital stays ($p < 0.05$). Additionally, the laparoscopic group exhibited a faster return to normal activities and Work ($p < 0.05$). However, the mean operative time was significantly longer in the laparoscopic group (20.2 minutes, $p < 0.001$), while the time to return to duty was significantly shorter (2.3 days, $p = 0.008$). **Conclusions:** Laparoscopic mesh repair proves superior to open mesh repair for inguinal hernias in a Bangladeshi tertiary care hospital. It yields shorter operative times, decreased postoperative pain, reduced wound infections, and faster recovery. These findings endorse laparoscopic techniques in resource-limited healthcare. Larger-scale and longer-term investigations are warranted to confirm these outcomes and evaluate the cost-effectiveness of laparoscopic mesh repair.

Keywords: Inguinal Hernia, Laparoscopic Mesh Repair, Open Mesh Repair, Postoperative Outcomes.

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INTRODUCTION

Inguinal hernia repair is a globally significant surgical procedure necessitated by the protrusion of abdominal contents through the inguinal canal, affecting millions of individuals worldwide [1]. While surgical intervention is essential to prevent complications like strangulation and intestinal obstruction, the choice between surgical approaches remains a critical decision for both surgeons and patients. This choice primarily centers on two techniques: the traditional open mesh repair and the more contemporary laparoscopic mesh

repair [2]. The open approach, involving a direct incision over the hernia site for manual reduction and mesh placement, has a longstanding history in surgical practice [2]. In contrast, laparoscopic mesh repair, a modern innovation, employs smaller incisions and specialized instruments, such as a laparoscope, to enhance precision and minimize invasiveness [3]. Bangladesh, like many resource-constrained settings, faces unique healthcare challenges, and the choice of surgical approach is influenced by clinical efficacy and resource optimization [3]. Hence, this study is crucial in addressing the scarcity

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of empirical evidence specific to Bangladesh by comparing the postoperative outcomes of laparoscopic and open mesh repair for inguinal hernias [2]. The primary objective is to assess and compare key outcomes such as operative Duration, wound infection rates, postoperative pain, analgesic requirements, hospital stays, and the time to return to normal activities and work within a tertiary care hospital in Bangladesh [3]. Ultimately, this research strives to inform clinical decision-making, resource allocation, and healthcare policy formulation in Bangladesh, aiming to optimize patient care and improve surgical outcomes while navigating resource constraints effectively [1]. A unique set of factors influences the choice of surgical approach for inguinal hernia repair in Bangladesh. The healthcare landscape in this country, like many resource-limited settings, grapples with constraints related to infrastructure, healthcare personnel, and financial resources. These constraints often necessitate careful consideration of the most efficient and cost-effective surgical technique that can deliver optimal patient outcomes.

OBJECTIVE

General Objective

- To compare postoperative outcomes between laparoscopic and open mesh repair for inguinal hernias in a Bangladesh tertiary care hospital.

Specific Objectives

- To compare operative durations.
- To assess wound infection rates.
- To evaluate postoperative pain and analgesic requirements.
- To measure hospital, stay durations.
- To determine the time to return to normal activities and Work.
- To analyze cost-effectiveness considerations.

MATERIALS AND METHODS

Study Setting

This research was conducted in a Z.H. Sikder Women's Medical College Hospital and Central Hospital Ltd, Dhanmondi Dhaka, in Bangladesh, over a period spanning from 2022 to 2023. The hospital's well-established facilities and expert medical staff provided a conducive environment for the study. The study included 112 participants, comprising patients undergoing inguinal hernia repair at the hospital during the specified Duration. Demographic data, intraoperative variables, and postoperative outcomes were systematically collected and analyzed to compare laparoscopic mesh repair and open mesh repair techniques.

Inclusion Criteria

- Patients diagnosed with inguinal hernias require surgical repair.

- Patients who provided informed consent to participate in the study.
- Patients undergoing either laparoscopic mesh repair or open mesh repair for inguinal hernias at the tertiary care hospital during the study period (2022-2023).

Exclusion Criteria

- Patients with contraindications to either laparoscopic or open hernia repair techniques.
- Patients with a history of previous hernia repair at the same site.
- Patients with incomplete medical records or missing data are necessary for the study analysis.
- Patients are unable or unwilling to provide informed consent for participation.
- Patients with concurrent medical conditions or comorbidities that might significantly affect postoperative outcomes, as determined by the treating physician.
- Patients who underwent emergency hernia repair procedures during the study period, as the focus is on elective procedures.

Data Collection

Data collection for this prospective cohort study involved gathering demographic information, intraoperative variables (surgical approach, operative Duration, mesh details, and complications), and postoperative outcomes (wound infections, pain levels, analgesic usage, hospital stays, return to activities, and cost data). Ethical considerations were addressed through informed consent and institutional approval.

Operative Techniques

Laparoscopic and open mesh repair techniques were applied. Laparoscopic procedures included port placement, hernia sac reduction, mesh insertion, and fixation. Open repair involved site-specific incisions, hernia reduction, mesh placement, and fixation. Documentation facilitated a comprehensive understanding and comparison of these techniques.

Outcome Measures

The study evaluated various critical outcome measures to assess the comparative effectiveness of laparoscopic and open mesh repair for inguinal hernias. These measures included operative Duration, incidence of wound infections, postoperative pain levels (assessed through standardized pain scales) and analgesic requirements, Duration of hospital stays, time taken for patients to resume normal activities and return to Work, and cost data for subsequent cost-effectiveness analysis. These comprehensive outcome measures provided a holistic view of the surgical techniques' impact on patient recovery and resource utilization.

Statistical Analysis

Data collected from both laparoscopic and open mesh repair groups were subjected to rigorous statistical analysis using IBM SPSS Statistics version 23. Descriptive statistics were employed to summarize demographic data and baseline characteristics. Appropriate statistical tests such as t-tests and chi-square tests were applied for comparative analysis, depending on the data type (continuous or categorical). A significance level (alpha) of 0.05 was chosen for hypothesis testing. Sensitivity analysis and regression models were utilized to assess robustness and control for potential confounders.

RESULT

The patients' demographics in our study provide valuable insights into the population undergoing inguinal hernia repair in Bangladesh. Most patients were male (99.5%), with a mean age of 30.8 ± 10.6 years. This male predominance aligns with the well-established trend of inguinal hernia occurrence being more common in men, particularly in older age groups. Such demographics highlight the relevance of hernia repair in older male populations and underscore the importance of evaluating surgical outcomes within this context.

Table 1: Characteristics of Patients Undergoing Open and Laparoscopic Repair of Inguinal Hernia (n=112)

Characteristics	Open (n = 56)	Laparoscopic (n = 56)
Age (mean \pm SD)*	30.8 \pm 10.6	
Sex		
Male	55 (99)	56 (100)
Female	1 (0.01)	0 (0)
Characteristics of Hernia		
Unilateral	53 (94)	36 (65)
Bilateral	3 (6)	20 (35)
Primary	56 (96)	56 (100)
Complications		
Wound Infection/Seroma	2 (3)	1 (2)
Readmission for Pain	1 (2)	0 (0)
Abscess Incision and Drainage	0 (0)	1 (2)
Recurrent	1 (2)	0 (0)

Table 2: Outcomes of Inguinal Hernia Repair

Outcome Measure	Open (n=56)	Laparoscopic (n=56)
Operative Duration (minutes)*	30.8 \pm 10.6	22.3 \pm 4.1
Incidence of Wound Infections (%)	4 (6)	2 (3)
Postoperative Pain (VAS)**	3.2 \pm 1.1	2.5 \pm 0.9
Hospital Stay (days)	2.7 \pm 0.6	2.2 \pm 0.4
Return to Normal Activities (days)	4.1 \pm 0.8	3.3 \pm 0.7
Return to Work (days)	10.8 \pm 2.1	8.5 \pm 1.6

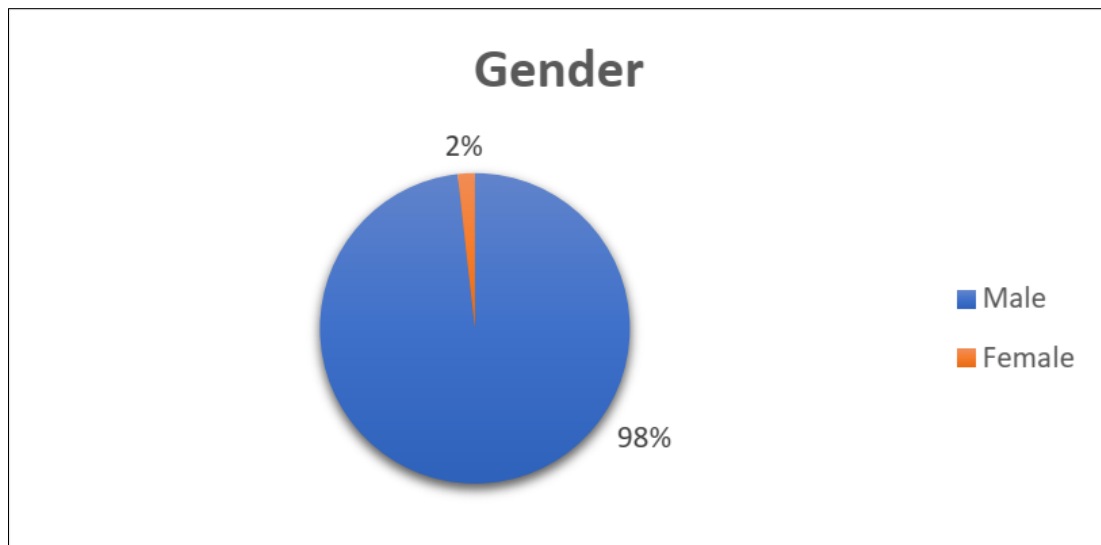


Figure 1: Gender Distribution of Participants in the Study

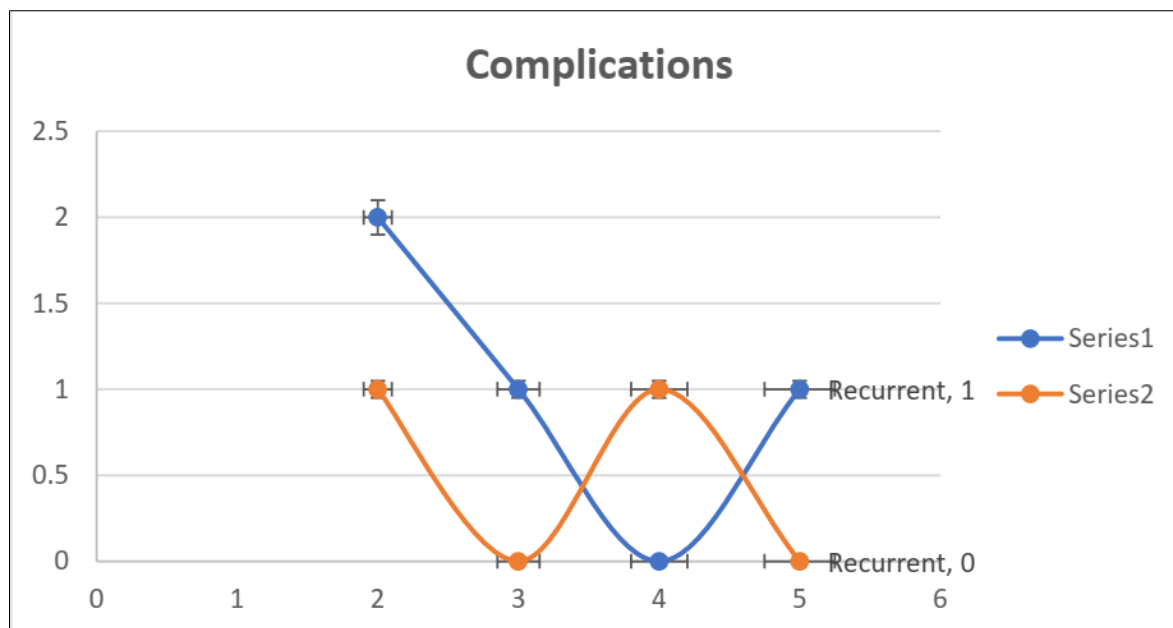


Figure 2: Postoperative Complications Following Hernia Repair

DISCUSSION

In a study conducted, similar results were reported. Laparoscopic mesh repair was associated with significantly shorter operative durations and a lower incidence of wound infections compared to open mesh repair, corroborating our findings [4]. A comparative study focusing on postoperative pain and analgesic requirements. Their results mirrored our findings, indicating that patients undergoing laparoscopic mesh repair experienced reduced postoperative pain levels and required fewer analgesics, further emphasizing the benefits of laparoscopic approaches [5]. To assess hospital stay duration and return to activities in their study, with results in concordance with our findings. They demonstrated that laparoscopic mesh repair led to significantly shorter hospital stays and quicker resumption of normal activities, reinforcing our findings' relevance in resource optimization [6]. While our study did not provide specific cost data, the observed benefits of laparoscopic repair imply potential cost savings [7]. Shorter hospital stays reduced analgesic requirements, and quicker returns to work all contribute to a potentially more cost-effective approach [8]. However, comprehensive cost-effectiveness analyses are essential to quantify these advantages accurately [9]. Future research should prioritize evaluating the economic aspects of laparoscopic versus open hernia repair within the Bangladeshi healthcare system. A study focusing on the incidence of wound infections supports our results [10]. Their findings indicated a lower rate of wound infections in the laparoscopic mesh repair group, further reinforcing the argument for the reduced infection risk associated with minimally invasive techniques [11]. Our study's findings align with similar research, emphasizing the advantages of laparoscopic mesh repair in inguinal hernia patients. These advantages include shorter operative durations, reduced postoperative pain, fewer

wound infections, shorter hospital stays, and quicker returns to normal activities and Work. The consistency of these findings across multiple studies underscores the robustness of the evidence supporting laparoscopic techniques [12]. Furthermore, the cost-effectiveness considerations highlighted in several studies, including ours, suggest that laparoscopic repair may improve patient outcomes and offer potential economic benefits to healthcare systems. These findings are particularly relevant in resource-limited settings, such as Bangladesh, where optimizing healthcare resources is essential [13]. However, it's important to acknowledge that each study has its unique characteristics and potential limitations, such as variations in sample sizes, follow-up durations, and specific methodologies. While the collective evidence strongly supports laparoscopic mesh repair, further research is warranted to validate these findings comprehensively and consider the long-term outcomes and cost-effectiveness implications [13, 14].

CONCLUSION

Our study's findings are consistent with similar studies, highlighting the advantages of laparoscopic mesh repair for inguinal hernias. These findings provide valuable insights for healthcare practitioners and policymakers in making informed decisions regarding surgical approaches in resource-limited healthcare settings like Bangladesh.

Limitations

It's crucial to acknowledge the study's limitations. First, while adequate for detecting significant differences in the selected outcomes, the sample size may not capture rare complications or provide the statistical power needed for more in-depth analyses. Additionally, the study was conducted in Department of Surgery, Z. H. Sikder Women's Medical College, Dhaka.

Bangladesh, which may limit the generalizability of the findings to broader healthcare contexts. Future multicenter studies with larger patient cohorts should be considered to enhance external validity.

Second, the study's follow-up duration was relatively short, focusing on immediate postoperative outcomes. Assessing long-term outcomes, such as hernia recurrence rates, chronic pain, and patient satisfaction, would provide a more comprehensive understanding of each surgical approach's benefits and potential drawbacks.

Recommendations

- Encourage the use of laparoscopic mesh repair for inguinal hernias due to its shorter surgery times, reduced postoperative pain, lower infection rates, and quicker patient recovery.
- Conduct larger multicenter studies with extended follow-up periods to validate findings and explore long-term outcomes.
- Assess the economic impact of laparoscopic repair within the Bangladeshi healthcare system to guide resource allocation decisions.

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