

Comparison of Herniotomy Versus Mesh Repair in Young Patients in terms of Recurrence and Post-Op Complications

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ABSTRACT

Objective: To compare the outcomes associated with herniotomy and mesh repair in young patients for treating inguinal hernia (IH).

Study Design: Prospective comparative study.

Place and duration of study: General Surgery Department of Pak-Emirates Military Hospital Rawalpindi, Pakistan, from Jul 2024 to Feb 2025.

Methodology: One hundred(n=100) patients underwent surgical treatment for IH and were segregated into two groups. Group-A had a mesh repair, and Group-B had herniotomy without mesh placement. Patients underwent surveillance after the procedure, and results were established.

Results: One hundred patients were recruited, and equally segregated into two groups. The operation time was 40.50 minutes (median) for herniotomy and 50.00 minutes (median) for mesh repair ($p<0.001$). After herniotomy, 1(2%) patient developed seroma, and after mesh repair 2(4%) patients developed seroma (p -value 0.55). Hematoma was formed in 2(4%) patients after herniotomy and in 1(2%) patient after mesh repair (p -value 0.55). One (2%) patient had wound infection after herniotomy, and 3(6%) patients had wound infection after mesh repair ($p=0.30$). Chronic groin pain (CGP) was present in 4(8%) patients after mesh repair and 2(4%) patients after herniotomy (p -value 0.40). Recurrence was observed in 2(4%) patients after herniotomy and in no patient after mesh repair ($p=0.15$).

Conclusion: In young patients, herniotomy is an acceptable alternative compared to mesh repair, with no difference in terms of recurrence and complications.

Keywords: Hernia, Herniotomy, Inguinal, Mesh.

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INTRODUCTION

Inguinal hernias (IH) are the commonest type, occurring primarily in the male population. About 75% of the abdominal wall hernias are IH, carrying a lifetime risk of 27% in men and 3% in the female population.^{1,2} Surgery is the gold standard treatment of symptomatic IH. With approximately 20 million surgeries performed worldwide, IH repair surgery is one of the most common surgical procedures globally.³

The incidence of IH, increases with age, and in the elderly population, laparoscopic or open mesh repair are standard surgical repair techniques.^{4,5} However, there are no definite international recommendations for young patients regarding whether or not to employ synthetic non-absorbable mesh during repair.⁶ Mesh is a synthetic non-

absorbable foreign body that has to stay in the patient's body for a lifetime and therefore it has its own merits and demerits. Placing mesh during hernia repair may reduce the risk of recurrence but it also may raise concerns regarding surgical site infection (SSI) and chronic groin pain (CGP).⁷ Furthermore, younger patients' distinct physiological traits – such as increased activity levels and ongoing development – call for a cautious approach regarding the use of mesh.

One longitudinal study concluded that mesh reduces recurrence of IH with no difference in safety outcomes as compared to non-mesh repair.⁸ Another meta-analysis documented no significant difference in recurrence and CGP with and without mesh in the adolescent population.⁹ A Korean study concluded that mesh repair of IH in late adolescent male patients resulted in a higher incidence of CGP.¹⁰

Existing literature contains very limited data regarding the local population of our country. Therefore, a study needs to be conducted to evaluate the outcomes associated with herniotomy and mesh

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repair in young patients with a particular focus on our local population.

METHODOLOGY

This prospective comparative study was conducted at the General Surgery Department of Pak-Emirates Military Hospital Rawalpindi, Pakistan from July 2024 to Feb 2025. The Institutional Ethical Review Board's approval (serial no: A/28/ERC/35/2024) was acquired prior to data collection.

Inclusion Criteria: Patients of either gender aged between 12-25 years, who presented to the OPD and were diagnosed with IH without any complications like incarceration, obstruction, and strangulation, were included.

Exclusion Criteria: Patients with irreducible, obstructed, or strangulated IH, those with recurrent IH, bilateral IH, or previous abdominal/groin surgery, those with chronic cough, constipation, and lower urinary tract symptoms, patients having sepsis, liver/renal disease, malignancy, congestive cardiac failure, and compromised immunity, and were those who had psychological or neurological disorders were excluded.

To calculate sample size, the WHO calculator was used, utilizing recurrence with mesh repair as 0.01%, and without mesh as 0.17%.¹¹ Based on these, the calculated sample size was 132. However, out of these, 14 patients didn't fulfill the inclusion criteria, and 18 patients were lost to follow-up, resulting in 100 patients overall (50 in each group). This information is displayed below in Figure-1.

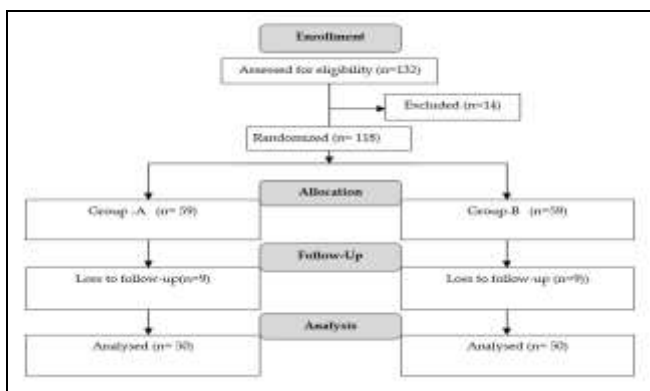


Figure-1: Patient Flow Diagram (n = 100)

Informed written consent was obtained, and non-probability consecutive sampling was used to collect data. The participants reported to the OPD with complaints of symptomatic inguinal swelling.

Diagnosis of IH was confirmed after a detailed history and clinical examination, and complications were ruled out. Pre-anesthesia assessment was obtained, and surgical repair of IH was planned under general anesthesia. The patients and their parents/guardians were informed of the research study's goal.

Age and laterality of IH were recorded. Two groups were formed using paper lottery techniques. A broad-spectrum intravenous antibiotic (co-amoxiclav) was administered to all patients at the time of anesthesia induction. All surgeries were performed under general anesthesia by a team of surgeons from the same department, following the same surgical principles and protocols. The inguinal incision was made along the skin crease line, and the wound was opened in layers. Ilioinguinal and ilio-hypogastric nerves were identified and carefully secured. In Group-A, repair was done using synthetic, non-absorbable, macro-porous, lightweight, polypropylene mesh. Mesh was fixed with polypropylene sutures in a simple interrupted fashion. In Group-B, a herniotomy was performed, and no synthetic mesh was used (Figure-1).

Operative time was recorded in all patients. No drain was placed during the surgery. After the surgery, patients were shifted to the ward. All patients were advised broad-spectrum intravenous antibiotics (co-amoxiclav) and intravenous analgesics (paracetamol). The length of stay (LOS) in the hospital was recorded, and follow-up visits were planned after 7 days and 30 days post-surgery. Thereafter, a monthly follow-up visit was planned till 06 months post-surgery. A few patients who could not reach the hospital in person were contacted via telephone and email. The outcomes were recorded in terms of the formation of seroma, hematoma, wound infection, CGP, and hernia recurrence. Hernia recurrence was diagnosed using clinical history, physical examination, and radiological workup. Centers for Disease Control (CDC) criteria was used to diagnose 30-day wound infection. Wound infection was defined as the presence of skin erythema/bruising, purulent discharge, separation of deep tissues, and isolation of bacteria. CGP was defined as pain lasting for more than 3 months after IH repair.¹²

Statistical Package for Social Sciences (SPSS) version 23 was used to evaluate results. Categorical variables (hernia side, seroma, hematoma, wound infection, CGP, recurrence) were expressed as frequencies and percentages. Chi-square test was

applied to compare categorical variables. The Shapiro-Wilk test assessed the normal distribution of data (age, operation timing). Data that was not normally distributed was analyzed using the Mann-Whitney U test. A significant p -value was defined as ≤ 0.05 .

RESULTS

One hundred ($n=100$) patients were included in the study. Comparison between age and operation time between the two groups is shown in Table-I.

Table-I: Comparison of Age and Operation Time between Study Groups ($n=100$)

Parameters	Study Groups		p -value
	Group-A ($n=50$) Median (IQR)	Group-B ($n=50$) Median (IQR)	
Age (years)	15 (2.25)	16 (2.00)	0.01
Operation timing (minutes)	50.00 (8.00)	40.50 (4.00)	< 0.001

Sixty-five (65%) patients had right sided IH and 35(35%) had left sided IH. After herniotomy, 1(2%) patient developed seroma, and after mesh repair 2(4%) patients developed seroma (p -value 0.55). Hematoma was formed in 2(4%) patients after herniotomy, and in 1(2%) patient after mesh repair ($p=0.55$). One (2%) patient had wound infection after herniotomy, and 3(6%) had wound infection after mesh repair ($p=0.30$), as shown in Table-II.

Table-II: Comparison of Hernia Side and Early Postoperative Outcomes ($n=100$)

Parameters	Group-A ($n = 50$) n (%)		Group-B ($n = 50$) n (%)	p -value
Hernia side	Right	31 (62%)	34(68%)	0.52
	Left	19 (38%)	16(32%)	
Seroma	2(4%)		1(2%)	0.55
Hematoma	1(2%)		2(4%)	0.55
Wound infection	3(6%)		1(2%)	0.30

Chronic groin pain (CGP) was present in 4(8%) patients after mesh repair, and 2(4%) after herniotomy ($p=0.40$). Hernia recurrence occurred in 2(4%) patients after herniotomy, and in no patient after mesh repair ($p=0.15$). This comparison is demonstrated in Table-III.

Table-III: Comparison of Chronic Groin Pain (CGP) and Recurrence ($n=100$)

Outcome	Group-A ($n=50$) n (%)	Group-B ($n=50$) n (%)	p -value
Chronic Groin Pain	4(8%)	2(4%)	0.40
Recurrence	0	2(4%)	0.15

DISCUSSION

Various surgical techniques are being used to repair IH. In the elderly population using non-absorbable prosthetic mesh during IH surgery is the preferred approach as it is associated with reduced

incidence of recurrence.^{13,14} However, this practice is controversial in the adolescent population who still have the potential for growth and a lifelong prosthesis inside the body may cause certain medical problems in the future, like increased risk of infection and CGP without providing any significant advantage in terms of reduced recurrence.¹⁵ This concern has prompted a shift towards investigating mesh-free alternative options in younger patients. Surgeons are becoming more and more conscious of forging a balance between recurrence prevention and reducing long-term complications, supporting a trend towards mesh-free surgery that can address the particular requirements of young patients.

In our study, young patients with IH underwent elective surgical repair with and without mesh. Most of our patients had right-sided IH. Tiwary *et al.* mentioned that right-sided IH were more common as compared to the left side, which aligns with the findings of our study.¹⁶ We found that mesh repair was associated with significantly increased operative time as compared to non-mesh repair. However, there was no significant difference among the patients in terms of hematoma/seroma formation and wound infection. Criss *et al.* conducted a similar study, and documented that operative time for mesh repair was longer as compared to herniotomy and the incidence of wound infection and post-operative complications were similar with and without mesh.¹⁷ These results correlate with the findings of our study.

We found no significant difference among the participants in terms of CGP and recurrence. Van Kerckhoven *et al.* and Taylor *et al.* stated that in the young population, herniotomy is an effective treatment option for IH repair which has an acceptable recurrence rate as compared to mesh repair, which aligns with the results of our study.^{18,19} Melkemichel *et al.* documented that CGP was a common problem faced after mesh repair and it was more prevalent in younger age groups.²⁰ Bay-Nielsen *et al.* concluded that no difference exists in CGP after IH repair with or without mesh.²¹ These findings correspond with the results of our study.

The findings of the current research, along with those of many other studies already published, support the idea that herniotomy is an effective treatment option for IH repair in young patients that is not associated with an increase in recurrent rate or CGP. Post-operative outcomes with and without mesh repair were similar. However, the operative time of

herniotomy was significantly lower as compared to mesh repair. Additionally, the routine use of mesh contributes to the overall cost of treatment, which reinforces the preference for performing herniotomy, especially in younger patients. Mesh-free herniotomy can be an effective and cost-efficient solution to address the problem, supporting the trend towards minimizing the use of foreign materials in surgical procedures. However, long-term follow-up of participants is suggested to establish the relation of the procedure with delayed complications and late recurrence.

LIMITATIONS OF STUDY

Single center study, limited follow up period and limited sample size were a few of our study's limitations. Variations in the demographic features of the participants and the surgeon's expertise could have impacted the outcomes. The correlation between BMI, gender, age, and laterality of IH with the post-surgery outcomes was not established.

CONCLUSION

Inguinal Hernia in young patients can be efficiently treated with herniotomy, without increasing the risks of recurrence and CGP. Mesh repair is associated with increased operative time without adding any benefit in terms of post-operative results.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

NH & MS: Conception, study design, drafting the manuscript, approval of the final version to be published.

MH & ABM: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

TAA & WU: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

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

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