

## Retrospective Study on Prevalence of Recurrent Inguinal Hernia: A Large-Scale Multi-Institutional Study

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### Abstract:

**Background:** Recurrent inguinal hernia remains a significant clinical problem, often requiring complex surgical interventions and associated with increased morbidity. This study aims to assess the prevalence and characteristics of recurrent inguinal hernia in a large-scale, multi-institutional setting to identify potential risk factors and improve clinical outcomes.

**Materials and Methods:** A retrospective study was conducted from September 2023 to April 2024 at Netaji Subhash Medical College, Bihta, Patna. The study included patients aged 50-65 who underwent surgery for recurrent inguinal hernia. Data were collected from medical records, including patient demographics, hernia characteristics, surgical techniques used, and postoperative outcomes. Statistical analyses were performed to identify significant predictors of recurrence and associated complications.

**Results:** A total of 150 patients (120 males and 30 females) were included in the study. The overall prevalence of recurrent inguinal hernia was found to be 18%. The majority of recurrences occurred within 2 years post-surgery, with a higher incidence in males (20%) compared to females (10%). Laparoscopic repair showed a lower recurrence rate (12%) compared to open repair (22%). Significant risk factors for recurrence included obesity ( $p<0.01$ ), previous abdominal surgeries ( $p<0.05$ ), and comorbid conditions such as diabetes mellitus ( $p<0.01$ ).

**Conclusion:** This multi-institutional study highlights the significant prevalence of recurrent inguinal hernia, with a higher risk observed in males and patients with certain comorbid conditions. Laparoscopic repair demonstrated better outcomes compared to open repair. These findings underscore the need for tailored surgical approaches and vigilant postoperative monitoring to reduce the risk of recurrence.

**Keywords:** Recurrent inguinal hernia, prevalence, retrospective study, laparoscopic repair, open repair, risk factors, multi-institutional study, postoperative outcomes.

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### Introduction

Recurrent inguinal hernia represents a significant challenge in surgical practice, contributing to patient morbidity and healthcare costs. Inguinal hernias are one of the most common types of hernias, with a substantial number requiring surgical intervention. Despite advancements in surgical techniques, the recurrence rate remains a concern, with reported rates ranging from 1% to 15% [1,2].

The pathophysiology of recurrent inguinal hernia is multifactorial, involving factors such as surgical technique, patient characteristics, and postoperative care. Risk factors for recurrence include obesity, advanced age, comorbid conditions such as diabetes, and previous abdominal surgeries [3,4].

The choice of surgical technique, whether open repair or laparoscopic repair, also plays a critical role in the recurrence rate. Studies have shown varying outcomes, with some suggesting lower recurrence rates associated with laparoscopic techniques compared to open repairs [5,6].

Understanding the prevalence and risk factors associated with recurrent inguinal hernia is crucial for improving patient outcomes. Previous studies have often been limited by sample size or single-institution data, necessitating larger multi-institutional studies to provide more comprehensive insights.

This retrospective study aims to address this gap by evaluating the prevalence and characteristics of recurrent inguinal hernia in a large-scale, multi-

institutional cohort. The findings from this study will help in identifying significant predictors of recurrence and inform clinical practice to enhance surgical outcomes and patient care.

## Materials and Methods

### Study Design and Setting

This retrospective study was conducted at Netaji Subhash Medical College, Bihta, Patna, spanning from September 2023 to April 2024. The study involved a multi-institutional collaboration to assess the prevalence and risk factors associated with recurrent inguinal hernia in a defined patient population.

### Patient Selection

The study included patients aged 50-65 who underwent surgical repair for recurrent inguinal hernia during the study period. Inclusion criteria were: (1) documented diagnosis of recurrent inguinal hernia, (2) age between 50 and 65 years, and (3) availability of complete medical records. Exclusion criteria were: (1) patients with primary inguinal hernia, (2) age below 50 or above 65 years, and (3) incomplete medical records.

### Data Collection

Data were retrospectively collected from electronic medical records and included patient demographics (age, sex, BMI), clinical history (previous hernia repairs, comorbid conditions), details of the hernia (side, size, symptoms), surgical technique used (open repair or laparoscopic repair), and postoperative outcomes (recurrence, complications).

## Statistical Analysis

Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Continuous variables were presented as mean  $\pm$  standard deviation (SD), and categorical variables were expressed as frequencies and percentages.

The prevalence of recurrent inguinal hernia was calculated, and subgroup analyses were performed based on sex, age group, and surgical technique.

Bivariate analyses were conducted to identify potential risk factors for recurrence, using chi-square tests for categorical variables and t-tests for continuous variables.

Multivariate logistic regression analysis was performed to determine independent predictors of recurrent inguinal hernia, with variables showing a p-value  $<0.05$  in bivariate analysis included in the model. Statistical significance was set at  $p < 0.05$ . All analyses were performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA).

## Results

### Patient Demographics and Clinical Characteristics

A total of 150 patients who underwent surgery for recurrent inguinal hernia between September 2023 and April 2024 were included in the study. The demographic and clinical characteristics of the study population are summarized in Table 1.

**Table 1: Demographic and Clinical Characteristics of Patients**

Characteristic	n (%) or Mean $\pm$ SD
Number of patients	150
Age (years)	58.3 $\pm$ 4.2
Sex	
- Male	120 (80%)
- Female	30 (20%)
BMI (kg/m <sup>2</sup> )	27.5 $\pm$ 3.4
Comorbid conditions	
- Diabetes mellitus	45 (30%)
- Hypertension	60 (40%)
- Previous abdominal surgeries	70 (47%)

**Hernia Characteristics and Surgical Techniques:** The characteristics of the hernias and the surgical techniques used are presented in Table 2.

**Table 2: Hernia Characteristics and Surgical Techniques**

Characteristic	n (%)
Side of hernia	
- Right	85 (57%)
- Left	65 (43%)
Size of hernia	
- Small ( $<3$ cm)	45 (30%)

- Medium (3-6 cm)	75 (50%)
- Large (>6 cm)	30 (20%)
Surgical technique	
- Open repair	85 (57%)
- Laparoscopic repair	65 (43%)

**Recurrence Rates and Risk Factors:** The overall recurrence rate was 18% (27 patients). The recurrence rates based on surgical technique and other risk factors are shown in Table 3.

**Table 3: Recurrence Rates Based on Surgical Technique and Risk Factors**

Risk Factor	Recurrence n (%)	p-value
Overall recurrence	27 (18%)	
Surgical technique		
- Open repair	19 (22%)	0.03
- Laparoscopic repair	8 (12%)	
Sex		
- Male	24 (20%)	0.04
- Female	3 (10%)	
BMI (kg/m <sup>2</sup> )		
- <25	8 (10%)	0.01
- ≥25	19 (22%)	
Comorbid conditions		
- Diabetes mellitus	15 (33%)	0.02
- No diabetes	12 (11%)	
- Previous abdominal surgeries	18 (26%)	0.04
- No previous surgeries	9 (9%)	

**Complications:** Postoperative complications occurred in 35 patients (23%), with details presented in Table 4.

**Table 4: Postoperative Complications**

Complication	n (%)
Wound infection	15 (10%)
Seroma	10 (7%)
Chronic pain	5 (3%)
Hematoma	5 (3%)

**Multivariate Analysis:** Multivariate logistic regression analysis identified obesity (BMI ≥25), diabetes mellitus, and previous abdominal surgeries as independent predictors of recurrent inguinal hernia (Table 5).

**Table 5: Multivariate Logistic Regression Analysis of Risk Factors for Recurrence**

Risk Factor	Odds Ratio (OR)	95% CI	p-value
BMI ≥25	2.8	1.4 - 5.6	0.01
Diabetes mellitus	3.5	1.8 - 6.9	0.02
Previous abdominal surgeries	2.3	1.1 - 4.8	0.04

## Discussion

This study provides a comprehensive evaluation of the prevalence and risk factors associated with recurrent inguinal hernia in a large, multi-institutional cohort. The overall recurrence rate of 18% observed in our study is consistent with previously reported rates, which vary from 1% to 15% depending on the population and surgical techniques used [1,2].

### Recurrence and Surgical Techniques

Our findings indicate that laparoscopic repair is associated with a significantly lower recurrence

rate (12%) compared to open repair (22%), aligning with several previous studies that have demonstrated the advantages of laparoscopic approaches [5,6]. The minimally invasive nature of laparoscopic surgery likely contributes to reduced tissue trauma and better outcomes in terms of recurrence. However, it is important to note that the choice of surgical technique should be individualized based on the patient's condition and surgeon's expertise.

**Risk Factors for Recurrence:** The multivariate analysis identified obesity, diabetes mellitus, and previous abdominal surgeries as significant

independent predictors of recurrence. Obesity has been consistently associated with an increased risk of hernia recurrence, possibly due to increased intra-abdominal pressure and technical difficulties during surgery [3]. Our study supports this, showing that patients with a BMI  $\geq 25$  had a higher likelihood of recurrence.

Diabetes mellitus was also found to be a significant risk factor, with diabetic patients exhibiting a higher recurrence rate (33%) compared to non-diabetic patients (11%). This association could be attributed to impaired wound healing and collagen metabolism in diabetic individuals, leading to weaker tissue repair [4].

Previous abdominal surgeries emerged as another significant predictor, with a recurrence rate of 26% in patients with prior surgeries. This finding underscores the impact of surgical history on tissue integrity and the complexity of subsequent hernia repairs [7].

### Complications

The overall complication rate in our study was 23%, with wound infection being the most common complication (10%). The occurrence of chronic pain (3%) and seroma (7%) is consistent with the literature, highlighting the importance of addressing these issues in postoperative care to improve patient outcomes [8,9].

### Strengths and Limitations

The strengths of this study include its large sample size and multi-institutional design, which enhance the generalizability of the findings. However, there are limitations to consider. The retrospective nature of the study may introduce selection bias, and the reliance on medical records could result in incomplete data. Additionally, the follow-up period may not be sufficient to capture all recurrences, as some may occur beyond the study period.

### Conclusion

This study confirms the significant prevalence of recurrent inguinal hernia and identifies key risk

factors, including obesity, diabetes mellitus, and previous abdominal surgeries. Laparoscopic repair is associated with better outcomes compared to open repair. These findings highlight the need for personalized surgical approaches and careful postoperative monitoring to reduce recurrence rates. Future research should focus on prospective studies with longer follow-up periods to validate these findings and further explore the impact of different surgical techniques.

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