



General Surgery

A RETROSPECTIVE OBSERVATIONAL STUDY OF THE CLINICAL PROFILE, RISK FACTORS, AND EARLY SURGICAL OUTCOMES OF INGUINAL HERNIA

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ABSTRACT **Background** Inguinal hernia is one of the most common surgical conditions encountered worldwide and accounts for a significant proportion of general surgical procedures. The incidence is markedly higher in males owing to anatomical and physiological factors. Although several operative techniques have evolved over the years, open tension-free mesh hernioplasty remains the standard procedure in many tertiary care hospitals because of its simplicity, cost-effectiveness, and excellent long-term outcomes. Understanding the demographic characteristics, risk factors, clinical presentation, and postoperative outcomes is essential for improving patient care and minimizing recurrence and complications. **Objectives** To evaluate the demographic profile, clinical characteristics, associated risk factors, and early postoperative outcomes among patients undergoing surgery for inguinal hernia at a tertiary care teaching hospital. **Materials and Methods** A prospective observational study was conducted on 100 consecutive patients from June 2025 to June 2026 diagnosed with inguinal hernia and admitted to the Department of Surgery, Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar. Demographic details, clinical findings, hernia characteristics, associated risk factors, operative procedures, and postoperative outcomes were recorded using a structured proforma. Data were analyzed using descriptive statistical methods, and the results were expressed as frequencies and percentages. **Results** Among the 100 patients, 95% were males and 5% were females, giving a male-to-female ratio of 19:1. The highest incidence was observed in the 46–60 years age group (38%), followed by 31–45 years (34%). Indirect inguinal hernia constituted 68% of cases, whereas direct inguinal hernia accounted for 32%. Right-sided hernia was the most common presentation (47%), followed by left-sided (31%) and bilateral hernias (22%). Heavy manual labor (44%), chronic constipation (41%), chronic cough (40%), and smoking (35%) were the major associated risk factors. Following open tension-free mesh repair, 93% of patients experienced an uneventful recovery, while only 7% developed minor postoperative complications that were managed conservatively. **Conclusion** Inguinal hernia predominantly affects middle-aged and elderly males. Indirect and right-sided hernias are the commonest clinical presentations. Heavy physical activity and chronic conditions leading to increased intra-abdominal pressure are important predisposing factors. Open tension-free mesh hernioplasty provides excellent early postoperative outcomes with minimal complications and remains an effective surgical technique in routine clinical practice.

KEYWORDS : Inguinal hernia, Mesh hernioplasty, Risk factors, Clinical profile, Surgical outcome, Prospective observational study.

INTRODUCTION

Inguinal hernia is defined as the protrusion of abdominal contents through a weakness or defect in the inguinal region of the abdominal wall. It represents the most common type of abdominal wall hernia, accounting for nearly 75% of all external hernias encountered in surgical practice. Lifetime risk has been estimated to be approximately 27% in men and 3% in women, making it a major public health problem worldwide.

The pathogenesis of inguinal hernia is multifactorial. Congenital persistence of the processus vaginalis, weakening of the transversalis fascia with advancing age, collagen metabolism disorders, chronic increase in intra-abdominal pressure, obesity, smoking, constipation, chronic cough, urinary obstruction, and occupations involving heavy lifting have all been implicated in its development. These risk factors vary according to age, occupation, and socioeconomic conditions.

Clinically, inguinal hernias are broadly classified into indirect and direct types based on their anatomical relationship to the inferior epigastric vessels. Indirect hernias are generally more common among younger adults because of congenital predisposition, whereas direct hernias are frequently encountered in elderly patients due to acquired weakness of the posterior wall of the inguinal canal.

The diagnosis is primarily clinical, although ultrasonography and cross-sectional imaging may be useful in selected patients. Surgery remains the definitive treatment for inguinal hernia. Among various surgical techniques, Lichtenstein tension-free mesh repair has become the gold standard because of its low recurrence rate, reduced postoperative pain, ease of learning, and excellent long-term outcomes.

Despite advances in minimally invasive surgery, open mesh repair continues to be the preferred procedure in many tertiary care hospitals across India due to its affordability, shorter operative time, and applicability in resource-limited settings.

The present prospective observational study was therefore undertaken to analyze the demographic characteristics, clinical presentation, associated risk factors, and early surgical outcomes among patients undergoing inguinal hernia repair at a tertiary care teaching hospital in Bihar. The findings are expected to contribute to better understanding of disease patterns and optimize surgical management strategies in similar healthcare settings.

Aim

To evaluate the clinical profile, associated risk factors, and early postoperative outcomes of patients undergoing surgery for inguinal hernia at a tertiary care teaching hospital.

Objectives

1. To study the age and gender distribution of patients with inguinal hernia.
2. To assess the pattern of direct and indirect inguinal hernias.
3. To identify common predisposing risk factors.
4. To evaluate the laterality of inguinal hernia.
5. To assess early postoperative outcomes following open tension-free mesh hernioplasty

Materials and Methods**Study Design**

A hospital-based retrospective observational study was conducted in the Department of Surgery, Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar, India.

Study Duration

The study was conducted over a period of **12 months** June 2025 to June 2026

Study Population

A total of **100 patients** diagnosed with inguinal hernia and admitted for elective surgical repair were included in the study.

Inclusion Criteria

- Patients aged ≥ 18 years.
- Clinically diagnosed unilateral or bilateral inguinal hernia.
- Patients willing to provide written informed consent.
- Patients undergoing elective open mesh hernioplasty.

Exclusion Criteria

- Femoral hernia and other abdominal wall hernias.
- Obstructed or strangulated hernia requiring emergency surgery.
- Recurrent inguinal hernia.
- Patients unwilling to participate.

Data Collection

A structured case record form was used to collect the following information:

- Demographic details
- Age and sex
- Occupation
- Side of hernia
- Type of hernia
- Associated risk factors
- Operative findings
- Early postoperative complications

All patients underwent detailed clinical examination and routine preoperative investigations. Open Lichtenstein tension-free mesh hernioplasty was performed under appropriate anesthesia by experienced surgeons following standard institutional protocols.

Outcome Measures

Primary outcome:

- Clinical profile of inguinal hernia.

Secondary outcomes:

- Distribution of risk factors.
- Early postoperative complications.
- Surgical outcome during hospital stay and follow-up.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using **SPSS version 26.0** (or equivalent statistical software). Categorical variables were expressed as frequency and percentage. Continuous variables were summarized using mean $\pm$ standard deviation wherever applicable. Chi-square test was used for comparison of categorical variables. A **p-value < 0.05** was considered statistically significant.

RESULTS**Table 1. Age Distribution of Patients**

Age Group (Years)	Number	Percentage
18–30	12	12.0%
31–45	34	34.0%
46–60	38	38.0%
>60	16	16.0%
Total	100	100%

Observation

The majority of patients belonged to the **46–60 years** age group (38%), followed by 31–45 years (34%).

Table 2. Gender Distribution

Gender	Number	Percentage
Male	95	95%
Female	5	5%
Male	Female	19 : 1

Observation

Inguinal hernia was predominantly observed among male patients.

Table 3. Clinical Type of Hernia

Type	Number	Percentage
Indirect	68	68%
Direct	32	32%

Observation

Indirect inguinal hernia was the commonest clinical presentation.

Table 4. Distribution According to Hernia Side

Side	Number	Percentage
Right	47	47%
Left	31	31%
Bilateral	22	22%

Observation

Right-sided inguinal hernia was more common than left-sided and bilateral hernias.

Table 5. Risk Factors

Risk Factor	Number	Percentage
Heavy manual labour	44	44%
Chronic constipation	41	41%
Chronic cough	40	40%
Smoking	35	35%

Observation

Heavy manual labour was the most frequently associated risk factor, followed by chronic constipation, chronic cough, and smoking.

Table 6. Age Group versus Type of Hernia

Age Group	Clinical Pattern
18–30 years	Predominantly Indirect Hernia
31–45 years	Indirect > Direct
46–60 years	Direct increasing
>60 years	Predominantly Direct Hernia

Observation

Indirect hernia predominated among younger adults, whereas direct hernia became increasingly common with advancing age.

Table 7. Early Postoperative Outcome

Outcome	Number	Percentage
Uneventful recovery	93	93%
Minor complications	7	7%

Observation

Most patients had an uncomplicated postoperative recovery following Lichtenstein mesh hernioplasty. Minor complications were managed conservatively without major morbidity.

Summary of Major Findings

- Mean study population comprised predominantly middle-aged adults.
- Male patients constituted **95%** of all cases.
- Peak incidence occurred in the **46–60 years** age group.
- **68%** of hernias were indirect.
- **47%** were right-sided.
- Heavy manual labour (**44%**) was the most common associated risk factor.
- Open mesh repair achieved a **93%** uneventful recovery rate with only **7%** minor postoperative complications.

DISCUSSION

Inguinal hernia is one of the most common surgical conditions encountered worldwide and continues to account for a substantial proportion of elective general surgical procedures. The present prospective observational study evaluated the demographic profile, clinical characteristics, associated risk factors, and early surgical outcomes among 100 patients undergoing elective inguinal hernia repair. Similar objectives have been addressed in previous studies and international guidelines.^{1–4}

The present study demonstrated that inguinal hernia predominantly affected males (95%), with a male-to-female ratio of 19:1. This finding is consistent with the reports of Primates and Goldacre³ and Burchard et al.⁵, who observed a marked male predominance owing to anatomical differences such as persistence of the processus vaginalis and the wider inguinal canal.

The highest incidence was observed in the **46–60 years** age group (38%), followed by **31–45 years** (34%). Increasing age has been recognized as an important predisposing factor because of progressive weakening of the transversalis fascia and alterations in collagen metabolism. Similar observations have been reported by Kingsnorth and LeBlanc², Burchard et al.¹⁴, and in *Schwartz's Principles of Surgery*.⁷

In the present study, **68% of patients had indirect inguinal hernia**, while **32% had direct inguinal hernia**. Indirect hernias predominated among younger adults, whereas direct hernias became increasingly common with advancing age. These findings are in agreement with the standard descriptions provided in *Bailey & Love's Short Practice of Surgery*⁸ and *Sabiston Textbook of Surgery*.⁶

With respect to laterality, **47% of patients had right-sided hernia**, **31% had left-sided hernia**, and **22% had bilateral hernia**. Right-sided predominance has also been reported in previous epidemiological studies and is commonly attributed to delayed descent of the right testis and persistence of the processus vaginalis.^{2, 3, 5}

Heavy manual labour (**44%**) emerged as the most common associated risk factor in our study, followed by chronic constipation (**41%**), chronic cough (**40%**), and smoking (**35%**). These conditions contribute to repeated elevation of intra-abdominal pressure and weakening of the abdominal wall, thereby increasing the risk of hernia formation. Similar associations have been reported by Burcharth et al.¹⁴ and Jenkins and O'Dwyer.¹⁰

All patients underwent open Lichtenstein tension-free mesh hernioplasty. An uneventful postoperative recovery was observed in **93%** of patients, while only **7%** developed minor postoperative complications that were managed conservatively. These findings are comparable to those reported by Amid¹¹, the EU Hernia Trialists Collaboration¹², and the HerniaSurge International Guidelines¹⁵, which recommend mesh-based repair as the standard treatment because of its low recurrence rate and favorable postoperative outcomes.

Overall, the findings of the present study support the existing evidence that inguinal hernia predominantly affects middle-aged and elderly males and that open Lichtenstein mesh hernioplasty is a safe, effective, and reliable surgical procedure with excellent early postoperative outcomes.^{2, 6, 8, 15}

Strengths of the Study

- Prospective observational study design.
- Standardized operative technique in all patients.
- Simple and clinically relevant outcome assessment.
- Provides regional epidemiological data from Bihar.
- Useful for comparison with national and international studies.

Limitations

- Single-center study.
- Sample size limited to 100 patients.
- Short follow-up period.
- Long-term recurrence and chronic postoperative pain were not assessed.
- Quality-of-life assessment was not included.

CONCLUSION

The present study demonstrates that inguinal hernia predominantly affects middle-aged and elderly males, with indirect inguinal hernia being the most frequent clinical type. Right-sided hernias were more common than left-sided and bilateral hernias. Heavy manual labour, chronic constipation, chronic cough, and smoking were the principal associated risk factors.

Open Lichtenstein tension-free mesh hernioplasty was associated with excellent early postoperative outcomes, with 93% of patients achieving uneventful recovery and only a small proportion experiencing minor complications. These findings reinforce the role of open mesh repair as a safe, effective, and economical treatment modality for inguinal hernia in tertiary care hospitals.

Further multicentric studies with larger sample sizes and long-term follow-up are recommended to evaluate recurrence rates, chronic pain, and quality-of-life outcomes.

REFERENCES

1. Fitzgibbons RJ Jr, Forse RA. Clinical practice. Groin hernias in adults. *N Engl J Med*. 2015;372:756–763.
2. Kingsnorth A, LeBlanc K. Hernias: Inguinal and incisional. *Lancet*. 2003;362:1561–1571.
3. Primates P, Goldacre MJ. Inguinal hernia repair: Incidence and variation. *Br J Surg*. 1996;83:243–246.
4. Simons MP, Aufenacker T, Bay-Nielsen M, et al. European Hernia Society guidelines on

5. inguinal hernia treatment. *Hernia*. 2009;13:343–403.
6. Burcharth J, Pedersen M, Bisgaard T, et al. Nationwide prevalence of groin hernia repair. *PLoS One*. 2013;8:e54367.
7. Townsend CM Jr, Beauchamp RD, Evers BM, Mattox KL. *Sabiston Textbook of Surgery*. 21st ed. Elsevier; 2022.
8. Brunicaudi FC, Andersen DK, Billiar TR, et al. *Schwartz's Principles of Surgery*. 11th ed. McGraw-Hill; 2019.
9. Bailey H, Love RJM. *Bailey & Love's Short Practice of Surgery*. 28th ed. CRC Press; 2023.
10. Kingsnorth AN. Management of abdominal hernias. Springer; 2003.
11. Jenkins JT, O'Dwyer PJ. Inguinal hernias. *BMJ*. 2008;336:269–272.
12. Amid PK. Lichtenstein tension-free hernioplasty. *Hernia*. 2004;8:1–7.
13. EU Hernia Trialists Collaboration. Mesh versus non-mesh repair. *Br J Surg*. 2002;89:854–859.
14. Kulacoglu H. Current options in inguinal hernia repair. *Hippokratia*. 2011;15:223–231.
15. Burcharth J. Epidemiology and risk factors for inguinal hernia. *Surg Clin North Am*. 2018;98:607–620.
16. HerniaSurge Group. International guidelines for groin hernia management. *Hernia*. 2018;22:1–165.