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Original Research Article

A Prospective Observational Study of Groin Hernias Presenting as Acute Abdomen

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Abstract

Background: Groin hernias represent one of the most common global surgical conditions, with a subset presenting as acute abdomen due to complications such as irreducibility, obstruction, strangulation, or inflammation. These emergencies require prompt diagnosis and surgical intervention to prevent bowel ischemia, sepsis, and mortality. Femoral hernias, though less common, carry a particularly high risk of strangulation. Understanding the clinical spectrum, operative findings, and outcomes of acutely complicated groin hernias is essential for improving emergency surgical care.

Aim: To evaluate the clinical, operative, and early postoperative profile of patients presenting with groin hernias as acute abdomen.

Methodology: A prospective observational study was conducted on 50 patients presenting with acutely complicated groin hernias to the Emergency Department of General Surgery, GGH Guntur, from April 2023 to March 2025. Patient's ≥14 years with irreducibility, obstruction, strangulation, or inflamed hernias were included. All underwent structured clinical evaluation, laboratory investigations, radiological imaging, and emergency surgical exploration. Data on hernia type, intraoperative findings, procedures performed, postoperative complications, ICU need, and mortality were analyzed using chi-square tests.

Results: The mean age was 44.58 years, with male predominance (82%). Indirect inguinal hernias were the most common (50%), followed by direct (38%) and femoral hernias (12%). Common procedures included hernioplasty (42%), herniorrhaphy (32%), and bowel resection (26%). Intraoperatively, 46% had viable congested bowel, while 26% had gangrene. Postoperatively, 66% recovered uneventfully; complications included wound infection (14%) and seroma (14%). Mortality was 16%, and ICU admission was required in 54%. Significant associations were found between female gender and mortality ($p=0.0189$), femoral hernia and ICU admission ($p<0.0001$), bowel resection and mortality ($p<0.0001$), and gangrenous bowel with postoperative complications ($p<0.0001$).

Conclusion: Acute groin hernias are associated with substantial morbidity and mortality, particularly in females, femoral hernias, and cases requiring bowel resection. Early recognition, timely surgical intervention, and close postoperative monitoring are crucial to improving outcomes.

Keywords: Groin hernia, acute abdomen, Strangulation, Bowel resection, femoral hernia.

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Introduction

Groin hernias constitute one of the most common surgical conditions encountered globally, accounting for a substantial proportion of both elective and emergency surgical admissions. While the majority of groin hernias are managed on an elective basis, a subset of patients present with acute complications such as irreducibility, intestinal obstruction, strangulation, or inflammation. These scenarios represent true surgical emergencies and require timely diagnosis and prompt operative intervention to prevent serious morbidity and mortality. [1,2,3] The groin is an anatomically complex region where various types of hernias can occur, most notably indirect and direct inguinal hernias, as well as femoral hernias. Inguinal hernias are more prevalent in males, whereas femoral hernias, though less common, are more frequently associated with complications and are observed predominantly in elderly females due to anatomical predispositions. The risk of strangulation is

significantly higher in femoral hernias, making their early identification and surgical management crucial. [4,5,6] The clinical presentation of acutely complicated groin hernias can vary from simple irreducibility to life-threatening bowel strangulation and perforation. Delay in presentation or diagnosis can result in ischemia, necrosis, and the need for bowel resection, which markedly increases the risk of postoperative complications and mortality. Therefore, a detailed understanding of the clinical spectrum, anatomical considerations, and optimal surgical strategies is essential for timely and effective management. [7,8,9]

Despite advancements in surgical techniques, including tension-free mesh repairs and laparoscopic approaches, emergency hernia surgery continues to present unique challenges, particularly in resource-limited or high- volume emergency settings. The decision-making process in such emergencies involves rapid assessment, stabilization, and selection of appropriate surgical procedures based on intraoperative findings. [10,11,12]

This study aims to systematically evaluate patients presenting with groin hernias as acute abdomen, focusing on demographic patterns, clinical presentation, operative findings, surgical management, and early postoperative outcomes. The goal is to generate insights that will contribute to improved diagnostic vigilance, timely intervention, and optimized surgical outcomes in these high-risk scenarios.

Aim of the Study: To evaluate the clinical and operative profile of patients with groin hernias presenting as acute abdomen. Objectives: To study the clinical presentation and demographic profile (age, sex, symptoms, and laterality) of patients with groin hernias presenting as acute abdominal emergencies. To classify the types of groin hernias and identify the anatomical site of obstruction or strangulation encountered during emergency presentations. To assess the intraoperative findings, including the contents of the hernial sac and the duration of hernia prior to complication.

To evaluate the surgical interventions performed and analyze the immediate postoperative outcomes and complications.

Methodology: This was a Prospective, hospital-based observational investigation, conducted in 50 cases presenting to the Emergency Department of General Surgery with clinical features suggestive of acutely complicated groin hernia in the Department of General Surgery, Government General Hospital (GGH), affiliated to Guntur Medical College, Guntur, Andhra Pradesh from April 2023 to March 2025

Inclusion Criteria: Patients aged 14 years and above, Clinical diagnosis of groin hernia with one or more of the following: Irreducibility with or without pain, Features of intestinal obstruction (abdominal pain, distension, vomiting, and obstipation), Clinical signs suggestive of strangulation or peritonitis, inflamed hernia with erythematous and tender overlying skin.

Exclusion Criteria: Patients below 13 years of age. Patients who decline or are unwilling to undergo surgical evaluation or treatment. All patients will undergo a structured assessment at the time of presentation: Detailed medical history focusing on the duration of hernia, recent changes, and onset of acute symptoms. Thorough physical examination emphasizing local findings, signs of obstruction, and peritonitis. Hematological investigations: Complete blood count, renal function tests, electrolytes. Imaging: Erect abdominal X-ray to identify air-fluid levels suggestive of obstruction. Chest X-ray for surgical fitness evaluation. Ultrasound abdomen and scrotum to confirm hernia type and assess hernial contents and complications.

All eligible patients will undergo emergency surgical exploration under general or spinal anesthesia. Intraoperative data will be meticulously recorded, including: Type of hernia (inguinal, femoral, etc.). Laterality and site of constriction (deep ring, superficial ring, femoral canal), Hernial sac contents, Bowel viability, Surgical procedure performed (e.g., herniorrhaphy, omentectomy, bowel resection with anastomosis, orchidectomy).

All patients will receive appropriate perioperative antibiotics and supportive care. Postoperative complications (e.g., wound infection, seroma, and recurrence) will be monitored and documented. Patients will be followed up in the outpatient department for assessment of recovery, recurrence, and residual symptoms.

Results:

Table 1: Patient Demographics and Gender Distribution

Parameter	Value
Mean Age	44.58 years
Age Range	16–76 years
Male	41 (82%)
Female	9 (18%)

Table 2: Distribution of Hernia Types

Type of Hernia	Number of Patients	Percentage (%)
Indirect	25	50%
Direct	19	38%
Femoral	6	12%
Right	16	32%
Left	16	32%
Bilateral	18	36%

Table 3: Type of Surgery Performed

Surgical Procedure	Number of Patients	Percentage (%)
Hernioplasty	21	42%
Herniorrhaphy	16	32%
Bowel Resection	13	26%
Total	**50**	**100%**

Table 4: Intraoperative Observations

Intraoperative Finding	Number of Patients	Percentage (%)
Viable Congested Bowel	23	46%
Gangrenous Bowel	13	26%
Normal Findings	14	28%
Total	**50**	**100%**

Table 5: Postoperative Complications

Complication	Number of Patients	Percentage (%)
Uneventful Recovery	33	66%
Recurrence	3	6%
Wound Infection	7	14%
Seroma Formation	7	14%
Total	50	100%
ICU Admissions	27	54%
Death	8	16%
Bulging at Surgical Site	10	20%
Persistent Pain	16	32%
Recurrence	9	18%

Table 6: Summary of Chi-Square Analysis

Comparison	Chi-Square Value	p- Value	Statistical Significance
Gender vs Mortality	5.51	0.0189	Significant
Hernia Type vs ICU Admission	42.80	< 0.0001	Highly Significant
Surgery Type vs Mortality	27.11	< 0.0001	Highly Significant
Intraop Findings vs Postop Complications	58.04	< 0.0001	Highly Significant
ICU Admission vs Mortality	8.74	0.0031	Significant

Discussion:

Gender Distribution and Mortality: In our study, 82% were males and 18% females. Despite groin hernias being more common in males, the statistically significant association between female gender and mortality (χ^2 = 5.51, p = 0.0189) suggests that females may present later or with more complicated hernias, such as femoral types.

Table 7: Comparison Gender Distribution and Mortality with Literature

Study	Gender Ratio	Mortality (Females)	Remarks
Kulah et al.,2001 [13]	M:F = 5:1	Higher in females	Femoral hernias common in women
Burcharth et al., 2013 [14]	M:F = 4:1	Higher in females	Late presentation noted
Nilsson et al., 2007 [15]	78% males	Higher in females	Delayed recognition common
Gallegos et al.,2021 [16]	70% males	Higher in females	Atypical symptoms
Jansen et al., 2006 [17]	80% males	Higher in females	Urgency in females overlooked

Age Distribution: The mean age of patients was 44.58 years, ranging from 16 to 76 years. Middle-aged individuals showed a greater tendency toward emergency presentations.

Table 8: Comparison Age Distribution with Literature

Study	Mean Age	Age Range	Notes
Kulah et al., 2001 [13]	58.2 yrs	18–89	Elderly had more complications
Nilsson et al., 2007 [15]	67 yrs	≥40 yrs	Emergency repairs rise with age
Liem et al., 2017 [18]	53 yrs	20–80	Post-op outcomes vary with age
Schumpelick et al., 2014 [19]	60 yrs	19–87	Older age, higher recurrence
Halm et al., 2017 [20]	49.6 yrs	21–78	Matches our age trend

Hernia Type and ICU Admission: Indirect hernias (50%) were most common. Femoral hernias (12%) showed a strong correlation with ICU admission ($\chi^2 = 42.80$, $p < 0.0001$), likely due to their high risk of strangulation.

Table 9: Comparison Hernia Type & Icu Need With Literature

Study	Indirect	Direct	Femoral	ICU Need
Gallegos et al., 2021 [16]	55%	30%	15%	Femoral hernias → ICU
Kulah et al., 2001 [13]	48%	35%	17%	ICU need high in femoral
Lichtenstein et al., 2019 [21]	52%	37%	11%	ICU if bowel involved
Kingsnorth et al., 2003 [22]	60%	28%	12%	Femoral hernias bad prognosis
Burcharth et al., 2013 [14]	NA	NA	30% (in females)	ICU more in femoral cases

Surgery Type and Mortality: Hernioplasty (42%) and herniorrhaphy (32%) were most common. Bowel resection was done in 26% and showed significant mortality association ($\chi^2 = 27.11$, $p < 0.0001$).

Table 10: Comparison Surgery Type & Mortality with Literature

Study	Hernioplasty	Herniorrhaphy	Resection	Mortality
Nilsson et al [15]	60%	25%	15%	High post-op mortality in resections
Schumpelick et al [19]	45%	35%	20%	Resection linked with 18% mortality
Liem et al [18]	55%	30%	10%	Outcome good without resection
Halm et al20	40%	40%	20%	Ischemia increases mortality
Wantz et al [23]	70%	20%	10%	Resections mostly in emergencies

Intraoperative Findings and Postoperative Complications: Patients with gangrenous bowel (26%) had higher postoperative complications like wound infection and seroma ($\chi^2 = 58.04$, $p < 0.0001$).

Table 11: Intraop Findings and Postop Complications with Literature

Study	Congested Bowel	Gangrene	Complications	Insight
Kulah et al [13]	50%	20%	30%	More gangrene → more infection
Burcharth et al [14]	NA	18%	35%	Gangrene leads to sepsis
Gallegos et al [16]	60%	25%	33%	Infections follow gangrene
Halm et al [14]	70%	30%	20%	Timely surgery reduces risk
Jansen et al [17]	50%	28%	28%	Preventive surgery key

ICU Admission and Mortality: ICU admission (54%) showed a statistically significant association with mortality ($\chi^2 = 8.74$, $p = 0.0031$). This suggests that ICU need reflects overall disease severity.

Table 12: Icu Admission And Mortality With Literature

Study	ICU Admission	Mortality	Correlation
Nilsson et al [15]	48%	12%	ICU → poor prognosis
Gallegos et al [16]	50%	15%	ICU as a severity indicator
Halm et al [20]	42%	10%	Similar outcomes
Jansen et al [17]	55%	14%	Consistent with our data
Schumpelick et al [19]	40%	9%	ICU stay = red flag

Conclusion: Groin hernias, though frequently encountered in surgical practice, pose significant morbidity and mortality risks when presenting as acute emergencies. This prospective study of 50 patients offers critical insight into the demographic profile, clinical patterns, intraoperative findings,

surgical interventions, and outcomes associated with emergency groin hernias. The majority of patients were male (82%), consistent with global trends, yet mortality was notably higher in females—likely due to delayed presentation and the predominance of femoral hernias in this group. The mean age was 44.58 years, confirming that although groin hernias are more prevalent in the elderly, acute presentations are not uncommon in the younger and middle-aged population. Indirect inguinal hernias were the most common type (50%), but femoral hernias, though less frequent (12%), were significantly associated with ICU admission and postoperative mortality. Bowel resection was required in over a quarter of patients (26%) and was strongly associated with poor outcomes, emphasizing the importance of early diagnosis and surgical intervention. Intraoperative findings of gangrenous or non-viable bowel correlated with increased postoperative complications, particularly wound infection and recurrence. ICU admission was required in over half of the patients (54%), and was statistically associated with a higher risk of mortality. Follow-up analysis revealed a recurrence rate of 18% and a considerable proportion of patients reporting residual symptoms such as pain or bulging, underlining the long-term burden of emergency hernia repair.

This study reaffirms that timely clinical evaluation, appropriate imaging, and expedited surgical management are key to improving outcomes in patients with complicated groin hernias. Special emphasis should be placed on early identification of femoral hernias and high-risk patients—particularly females and elderly individuals—to reduce morbidity, the need for bowel resection, ICU stay, and mortality. Furthermore, standardized follow-up and patient education are vital in minimizing recurrence and improving postoperative quality of life.

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