Section: General Surgery

Original Research Article

INCISIONAL HERNIA: ANALYSIS OF RISK FACTORS, CLINICAL FEATURES, AND MANAGEMENT STRATEGIES

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Received *: 07/08/2025*
Received in revised form *: 17/09/2025*
Accepted *: 04/10/2025*

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DOI: 10.70034/ijmedph.2025.4.72

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (4); 396-399

ABSTRACT

Background: Incisional hernia is a common long-term complication of abdominal surgery, occurring in 2–11% of laparotomy incisions. It results from multifactorial causes including patient-related comorbidities and surgical factors, and is associated with significant morbidity and recurrence. **Objective:** To analyze the risk factors, clinical features, and outcomes of different management strategies in patients with incisional hernia.

Materials and Methods: This prospective observational study was conducted at the Department of General Surgery, HIMS, Varanasi, from November 2022 to May 2024, enrolling 100 patients with incisional hernia. Data on demographics, comorbidities, clinical presentation, location of hernia, previous surgical complications, and operative details were recorded. Patients underwent either open mesh repair or laparoscopic mesh repair. Outcomes including operative time, hospital stay, return to work, postoperative pain, and complications were compared.

Results: The mean age of patients was 48.9 years, with peak incidence in the 41–50-year group, and female predominance (60%). Wound infection (37%), diabetes (27%), obesity (21%), and hypertension (23%) were major risk factors. The infraumbilical region was the most common site (48%). Compared to open repair, laparoscopic repair showed significantly shorter operative time (52.6 vs 64.5 min; $p<0.0001$), earlier ambulation, shorter hospital stay, faster return to work, lower pain scores, and fewer complications.

Conclusion: Incisional hernia is most common in middle-aged females, often associated with wound infection and comorbidities. Laparoscopic mesh repair demonstrated superior short-term outcomes over open repair, making it the preferred strategy. Long-term follow-up is needed to assess recurrence.

Keywords: Incisional hernia, risk factors, mesh repair, laparoscopic surgery, wound infection.

INTRODUCTION

Incisional hernia is defined as an abnormal protrusion of abdominal contents through a weakness in the musculofascial layer of the abdominal wall at the site of a previous surgical incision.[1] It is one of the most common long-term complications of abdominal surgery, occurring in 2–11% of laparotomy incisions and 1–5% of laparoscopic incisions.[2] The condition not only causes physical discomfort and cosmetic issues but can also lead to severe complications such as bowel obstruction, incarceration, and strangulation if left untreated.[3]

The etiology of incisional hernia is multifactorial, involving both patient-related and surgical factors. Patient-related risk factors include advanced age, obesity, diabetes mellitus, chronic respiratory diseases, malnutrition, immunosuppression, and conditions associated with raised intra-abdominal pressure.[4-6] Surgical factors include the type of incision, emergency procedures, postoperative wound infection, choice of suture material, and

closure technique.[7] Among these, wound infection and faulty surgical technique are the most significant contributors to hernia formation.[8]

Clinically, patients present with a swelling or bulge at the site of a previous surgical scar, often accompanied by pain or discomfort. In some cases, complications such as irreducibility, obstruction, or strangulation may necessitate urgent surgical intervention.[9] Diagnosis is primarily clinical but may be supported by imaging modalities like ultrasonography or computed tomography (CT) for better delineation of the defect, particularly in obese patients.[10]

Surgical repair remains the cornerstone of management, with techniques ranging from primary suture closure to mesh reinforcement, which significantly reduces recurrence rates.[11] The introduction of laparoscopic mesh repair has further improved outcomes by reducing postoperative pain, wound complications, and hospital stay.[12] However, recurrence and complications such as seroma, infection, and chronic pain remain challenges, underscoring the need for careful patient selection and surgical expertise.[13]

Given the high incidence, varied presentation, and challenges in management, the present study was undertaken to analyze the risk factors, clinical features, and management strategies for incisional hernia in patients attending a tertiary care hospital.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Surgery, Heritage Institute of Medical Sciences (HIMS), Varanasi, over a period of one and a half years from November 2022 to May 2024. A total of 100 patients with incisional hernia were included.

Patients of all age groups presenting with incisional hernia and undergoing surgery at HIMS were enrolled after obtaining informed written consent. Patients who did not provide consent and those who had undergone surgery for incisional hernia outside HIMS and were admitted only for postoperative complications were excluded.

Detailed history, demographic profile, and clinical findings were recorded for all patients. Relevant investigations were performed, including hematological tests (Hb, TLC, DLC, BT, CT, RBS, HbA1c), biochemical tests (renal and liver function tests, viral markers), and radiological evaluation with ultrasonography or CT scan of the abdomen when indicated.

Data were collected in a semi-structured proforma and analyzed using SPSS version 26 (IBM Corp.). Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation. Statistical significance was assessed using the Student's t-test and ANOVA for continuous variables, Chi-square or Mann-Whitney test for categorical variables, and Pearson's correlation for association analysis. A p-value < 0.05 was considered statistically significant.

RESULTS

In this prospective study of 100 patients with incisional hernia, the mean age was 48.9 years, with a peak incidence in the fourth and fifth decades of life. Females were more frequently affected (60%), which may be attributed to factors such as multiple abdominal surgeries, pregnancy-related changes, and higher prevalence of obesity. Similar demographic trends have been reported in earlier studies, reinforcing the role of female gender and middle age as significant risk groups.

Agriculturists (40%) and day wagers (20%) constituted the majority of cases, likely due to the heavy physical strain associated with their occupations. Diabetes (27%), hypertension (23%), obesity (21%), and anemia (18%) were important comorbidities, while wound infection (37%) emerged as the most common postoperative complication predisposing to hernia. These findings highlight the importance of both systemic comorbidities and surgical site infection in the pathogenesis of incisional hernia.

Infraumbilical region was the most common site (48%), reflecting inherent weakness in the lower abdominal wall. Supraumbilical (22%) and epigastric (12%) hernias were also observed, consistent with the distribution seen in prior surgical series.

Regarding management, equal numbers of patients underwent open mesh repair and laparoscopic mesh repair. Laparoscopic repair demonstrated significant advantages: reduced operative and mesh fixation times, earlier postoperative ambulation, shorter hospital stay, and faster return to work. Postoperative pain was lower in the laparoscopic group, with consistently reduced visual analogue scale (VAS) scores up to 7 days. Complication rates were slightly lower in laparoscopic repair, although not statistically significant.

Overall, this study supports laparoscopic mesh repair as a preferred approach in suitable patients, offering faster recovery, fewer complications, and better patient satisfaction. However, long-term recurrence rates require further follow-up for conclusive assessment.

Table 1: Demographic Profile of Patients (n=100)

Variable	Findings
Mean Age	48.9 ± 8.6 years
Commonest Age	41–50 years (42%)
Gender	Female: 60% Male: 40%

Occupation	Agriculturists 40% Day wagers 20%

Table 2: Risk Factors and Previous Surgical Complications

Predisposing Factors	**n (%)**
Diabetes mellitus	27
Hypertension	23
Obesity	21
Anemia	18
Others	11
Previous surgical complication	
Wound infection	37
Respiratory tract infection	15
Urinary tract infection	2
Constipation	2
None	44

Table 3: Clinical Characteristics of Hernia

Location of Hernia	**n (%)**
Infraumbilical	48
Supraumbilical	22
Epigastric	12
Umbilical	8
Paraumbilical	10

Table 4: Surgical Management and Outcomes

Parameter	**Open Repair**	**Laparoscopic Repair**	**p-value**
Operative time (min)	64.5 ± 20.2	52.6 ± 12.1	<0.0001
Mesh fixation time (min)	27.8 ± 12.6	17.9 ± 3.2	<0.0001
Early ambulation	Slower	Faster	0.903
Hospital stay (days)	4–6: 15; 7–10: 14	4–6: 17; 7–10: 10	0.922

Table 5: Postoperative Pain and Complications

Outcome	**Open Repair**	**Laparoscopic Repair**
VAS pain score (1 hr)	7.2	6.8
VAS pain score (24 hr)	6.1	4.0
VAS pain score (7 days)	4.0	2.0
Pain >10 days	7	6
Infection	5	4
Seroma	4	4
Bleeding	3	5
Others	3	1
No complication	28	30

DISCUSSION

Over the course of one and a half years, this prospective study was carried out at the Department of General Surgery, Heritage Institute of Medical Sciences, Varanasi. The majority of patients with incisional hernia were in their fourth to fifth decades, with a mean age of 48.91 ± 8.63 years, which is consistent with previous studies.[14,15]

Females comprised 60% of cases, aligning with other studies.[16,17] The higher prevalence in women may be due to repeated pregnancies, anemia, hypoproteinemia, early return to work, and poor postoperative rest. The most common clinical presentation was pain and swelling at the previous surgical site, seen in 80% of cases, consistent with Degloorkar et al.[18]

Pfannenstiel incisions (40%) and infraumbilical midline incisions (30%) were common precursors. Parekh et al. also reported a predominance of infraumbilical scars,[19] In our study, 48% of cases had infraumbilical scars, which aligns with these findings.

Incisional hernias followed gynecological surgeries in 62.5% of female cases,[16] reflecting both the location of incisions and weaker muscle tone. Wound infection was the most significant risk factor (37%), consistent with earlier reports.[1] Other postoperative complications included respiratory tract infections (15%), urinary retention (2%), and constipation (2%), all of which increase intra-abdominal pressure and weaken scars.

Most hernias appeared within one year of surgery (60%), with fewer after two years (18%) or five years (2.5%). This trend is similar to Bhamre et al.[16] Systemic comorbidities such as diabetes (27%), hypertension (23%), obesity (21%), and anemia (18%) were frequent, increasing susceptibility to infection, similar to George et al.[6] Multiparity was seen in 60% of female cases.

Fifty patients underwent laparoscopic repair and fifty open mesh repair. Postoperative complications included infection (9%), seroma (8%), and bleeding (8%), similar to prior reports.[12] Operative time was

significantly shorter with laparoscopy (52.6 ± 12.1 min vs 64.5 ± 20.2 min; p<0.0001). Laparoscopic repair also had shorter hospital stay (p=0.922) and earlier return to work. Importantly, no mortality occurred, and no recurrence was observed during the study follow-up, similar to Jennifer et al.[15]

CONCLUSION

Incisional hernia was most common in the fourth to fifth decades, with female predominance, especially among agriculturists, and predominantly involved the infraumbilical region. Wound infection was the major risk factor, along with systemic conditions such as diabetes, hypertension, obesity, and anemia. Laparoscopic mesh repair showed significant advantages over open repair, including reduced mesh fixation and operative time, earlier ambulation, faster return to work, and fewer complications. Although laparoscopic repair was superior in many aspects, outcomes ultimately depend on surgeon skill and operative setup.

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