

A STUDY ON VARIABLE FACTORS AND SURGICAL OUTCOME OF INCISIONAL HERNIA AT TERTIARY CARE CENTRE

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ABSTRACT

Background: Incisional hernia occurs in a significant proportion of patients following abdominal surgery and is influenced by multiple patient-related and surgical factors. Despite advances in technique, postoperative complications remain frequent. The aim and objective is to evaluate clinical presentation, contributing factors, and early postoperative outcomes in patients undergoing repair for incisional hernia. **Materials and Methods:** A prospective cohort study was conducted on 80 consecutively recruited patients diagnosed with incisional hernia at Government Medical College, Omandurar, from March 2024 to April 2025. Adults willing to provide informed consent were included, while patients with non-incisional hernias or connective tissue disorders were excluded. All patients underwent open repair with or without mesh based on defect characteristics. Postoperative outcomes including wound infection, seroma, and pain severity were assessed at 1 week, 1 month, and 3 months. Data were analysed using SPSS version 26.0. **Result:** Most patients were middle-aged (36.3% aged 51–60 years), and females constituted 75%. Pain (66.3%) and swelling (85%) were the predominant symptoms. Diabetes (27.5%), hypothyroidism (16.3%), and diabetes-hypertension (12.5%) were common comorbidities. Omentum was the most frequent hernia sac content (58.8%), and previous appendectomy (47.5%) was the leading operative history. Elective repairs accounted for 88.8% of cases. Postoperatively, mild to moderate pain occurred in 87.6%, while wound infection and seroma were observed in 20% and 23.8%, respectively. **Conclusion:** Timely diagnosis and comorbidity optimisation are essential to improving postoperative outcomes in incisional hernia repair. Further multicentre research with long-term follow-up is required to evaluate recurrence and refine surgical management strategies.

INTRODUCTION

Incisional hernia is a common long-term complication following abdominal surgery, occurring when the abdominal wall fails to regain sufficient strength after the primary procedure, resulting in protrusion of intra-abdominal contents through a surgical scar. Reported incidence varies, but it may affect 15-20% of patients after laparotomy depending on surgical method, wound healing quality, and follow-up duration.^[1] Multiple patient-related factors influence the development of incisional hernia. Obesity, advanced age, diabetes mellitus, smoking, and poor nutritional status have been repeatedly described as major contributors that interfere with normal collagen formation and healing. These comorbid conditions reduce tensile strength at the incision site and increase susceptibility to hernia formation.^[2]

Perioperative and surgical factors strongly impact risk. Midline laparotomy incisions, emergency operations, prolonged operative duration, postoperative wound infection, and inadequate fascial closure techniques are associated with a significantly higher incidence of incisional hernia. Technical choices including suture material and closure method also affect long-term abdominal wall stability.^[3] Incisional hernia may remain asymptomatic for years, many patients present with swelling at the incision site, discomfort, or pain aggravated by activity or straining. As the condition progresses, symptoms may worsen, and the hernia may contain omentum or bowel, predisposing patients to complications such as obstruction or strangulation.^[4] Surgical management is only final treatment for incisional hernia. Open repair is largely used, in minimally invasive are limited or when it's large. Mesh support is suggested for tension-free closure

and reduced recurrence compared with primary tissue repair.^[5] Despite improvements in surgical, postoperative problems remain common. Wound infection, seroma, hematoma, chronic pain, and early recurrence is challenges postoperative cure and long-term outcomes. Seroma and surgical site infection are frequent after open mesh repair, with wound infection rates up to 13%.^[6]

The risk of infection and reappearance is influenced by patient comorbidities, hygiene, wound contamination, and postoperative care. Diabetes, obesity, and emergency surgery increase the adverse outcomes and may complicate healing and mobilisation.^[7] Data show changes in outcome reporting methods, follow-up, and complications.^[8] This heterogeneity makes comparison between studies hard and need for prospective observational studies to understand regional patterns, surgical practices, and real-world outcomes.

Early recognition of risk factors, comorbidities, and selection of surgical methods are important to improve outcomes, reducing complications, and preventing recurrence after repair.^[9,10] Considering the problem of incisional hernia and lack of regional outcome informations, further assessment of factors, presentation characteristics, and postoperative complications is necessary to make clinical decisions and improve surgical practice.

Aims and Objectives

Aim

This study aimed to find the different presentations, predisposing factors, and postoperative outcomes of incisional hernia in patients.

Objectives

- To study the common clinical presentations and risk factors associated with incisional hernia among patients undergoing treatment.
- To evaluate the role of patient-related factors such as previous surgeries and comorbidities in the development of incisional hernia.

MATERIALS AND METHODS

This prospective observational study was conducted on 80 patients at the Government Medical College, Omandurar Government Estate, Chennai, from March 2024 to April 2025. This was designed using a consecutive sampling technique and done after getting approval from Institutional Ethics Committee. Informed consent was obtained from all before the study (ECR/1492/Inst/TN/2021). Sample size determined based on feasibility and expected case load in the study period.

Inclusion Criteria

Patients with a diagnosis of incisional hernia, irrespective stage of appearance, including emergencies and willing to give informed consent.

Exclusion Criteria

Patients with types of hernias or abdominal wall swellings without evidence of incisional hernia,

diagnosed with connective tissue illnesses like Ehlers-Danlos syndrome, Marfan syndrome, or similar syndromic conditions.

Methods

Preoperative assessment

History, including symptoms and prior abdominal surgeries, was noted. A clinical examination for swelling, reducibility, contents, and complications. Comorbidities such as diabetes mellitus, hypertension, and hypothyroidism were recorded. Ultrasound or CT was done when needed to confirm defect characteristics and contents.

Surgical approach

Patients underwent open repair, and choice of mesh placement or primary anatomical repair based on defect characteristics and surgeon preference. Elective and emergency settings were included as per need.

Postoperative monitoring and follow-up

Patients were evaluated postoperatively for pain severity, wound infection, and seroma formation. Pain severity was classified as mild (1–3), moderate (4–6), or severe (7–10). Follow-up was conducted at 1 week, 1 month, and 3 months, during early postoperative outcomes were analysed. Surgical site infection was defined by CDC criteria. Seroma was defined as clinically detectable fluid collection requiring conservative or procedural management. Recurrence was also evaluated.

Data collection and analysis

All assessments were performed by trained surgical residents using a standardized proforma. Data were documented using a structured proforma and entered into a secure database. Variables collected included demographic profile, presenting symptoms, comorbidities, previous surgical history, operative approach, and postoperative outcomes (pain, wound infection, seroma). Data were analysed descriptively and presented as frequencies and percentages.

Statistical analysis

Only descriptive statistics were used in the study. The collected data were presented as frequencies and percentages using tables for simple interpretation of demographic, clinical, surgical, and postoperative variables.

RESULTS

Most patients were middle-aged between 51 and 60 years (36.3%), and females were 75%. Pain (66.3%) and swelling (85%) were the most common presenting symptoms. Comorbidities were frequent, with diabetes (27.5%) and hypothyroidism (16.3%) being the most common [Table 1].

Most hernia sacs contained omentum (58.8%), and prior appendicectomy (47.5%) was the most common previous surgery. Elective repairs predominated (88.8%). Postoperative pain was mostly mild to moderate. Wound infection occurred in 20%, and seroma in 23.8% [Table 2].

Table 1: Demographic and clinical characteristics

Parameter	Category	Frequency (%)
Age (years)	21–30	4 (5.0%)
	31–40	21 (26.3%)
	41–50	24 (30.0%)
	51–60	29 (36.3%)
	61–70	2 (2.5%)
Gender	Female	60 (75%)
	Male	20 (25%)
Pain	No	27 (33.8%)
	Yes	53 (66.3%)
Swelling	No	12 (15.0%)
	Yes	68 (85.0%)
Comorbidity	DM	22 (27.5%)
	DM + Hypertension	10 (12.5%)
	Hypertension	11 (13.8%)
	Hypothyroidism	13 (16.3%)
	Others	12 (15.0%)
	None	12 (15.0%)

Table 2: Surgical and postoperative characteristics

Parameter	Category	Frequency (%)
Hernia sac content	Omentum	47 (58.8%)
	Small bowel	33 (41.3%)
Previous surgeries	Appendicectomy	38 (47.5%)
	Caesarean scar	22 (27.5%)
	Emergency laparotomy	11 (13.8%)
	Hysterectomy	9 (11.3%)
Surgical setting	Elective	71 (88.8%)
	Emergency	9 (11.3%)
Postoperative pain severity	Mild	35 (43.8%)
	Moderate	35 (43.8%)
	Severe	10 (12.5%)
Wound infection	No	64 (80.0%)
	Yes	16 (20.0%)
Seroma formation	No	61 (76.3%)
	Yes	19 (23.8%)

DISCUSSION

In this prospective study, most patients were middle-aged females, and pain with abdominal swelling formed the predominant presentation. Omentum was the most frequent sac content, and diabetes and hypothyroidism were the most common comorbidities. Elective repair predominated, with early postoperative complications mainly limited to wound infection and seroma. These findings align with the study aim focusing on presentations, predisposing factors, and short-term outcomes of incisional hernia repair. Our study has females predominance, contrasting with Deshmukh et al. where 82% were males and wound infection was the leading risk factor.^[11] Our findings aligned with Salve (71% female),^[12] and Bakale & Suryawanshi (67.5% female),^[13] while Akoh et al. reported moderate female predominance (56.6%).^[14]

In our study, most patients were middle aged. Bakale & Suryawanshi similarly reported a fifth-decade peak (32.5% of 40 patients), though with fewer patients above 70 years.¹³ Deshmukh et al. observed a younger mean age of 46 years,^[11] while Akoh reported a mean of 59.1 years (range 19–95).^[14] Salve documented an even lower mean age of 42.7 years.^[12] These variations likely reflect differences in index surgeries, follow-up duration, and referral pathways.

Incisional hernias often develop 10–20 years post-surgery, coinciding with age-related declines in collagen integrity and muscle mass.

Pain was expressed by 66.3% of our patients, comparable to the >60% symptomatic rate described by Deshmukh et al. and Akoh reported that about 10% of hernias were incidentally detected without pain, similar to our 33.8% asymptomatic subgroup.^[11,14] Higher elective-repair rates in symptomatic cases in our cohort parallel findings from González-Abós et al,^[16] where symptomatic hernias after major abdominal surgery were repaired more promptly. The predominance of pain in two-thirds of patients highlights its influence on the timing of surgery and preference for less painful approaches such as laparoscopic IPOM, which has been shown to reduce postoperative pain and hospital stay.^[17] However, the presence of one-third painless hernias justifies continued clinical and imaging surveillance.

In our study, the most common presenting feature was swelling, reflecting the typical manifestation of fascial dehiscence. This compares with 100% swelling reported by Salve in his study, while Akoh reported that about 10% of hernias are incidental and may not have a visible bulge.^[12,14] Similarly, González-Abós et al. documented asymptomatic or imaging-only hernias in the postoperative patient.^[16]

In the present study, 85% of patients had at least one comorbidity. These findings are similar to Salve and Bakale & Suryawanshi, who also reported high rates of metabolic and respiratory comorbidities.^[12,13] Ullah et al. demonstrated strong associations between obesity, diabetes, hypertension, and hernia development.^[18] McAuliffe et al. identified comorbidities as key predictors of hernia formation.^[15] Preoperative optimisation, glycaemic control, blood-pressure management, pulmonary rehabilitation, and nutritional support remain essential to minimise postoperative complications and recurrence.

The contents of the hernia sac included omentum in 58.8% and small bowel in 41.3%. Omental hernias carry lower risks of strangulation, supporting the high elective-surgery rate, whereas small-bowel herniation presents a higher risk of obstruction and may require urgent intervention. Chen et al. noted that laparoscopic approaches allow safer reduction of omental sacs and reduce postoperative complications.^[17] Therefore, preoperative imaging is important for determining urgency and planning mesh placement.

Elective repairs constituted 88.8% of surgeries in our study. Elective management allows optimisation of comorbidities and the option of minimally invasive approaches. Chen et al. demonstrated superior outcomes with elective laparoscopic IPOM compared with open sublay repair.^[17] Emergency laparotomies also predispose to incisional hernia development, as shown by Ullah et al., where postoperative infection and contaminated fields contributed to a high incidence of hernias.^[18] Early referral for elective surgery may therefore help reduce emergency presentations. These findings highlight the importance of early detection and elective repair to reduce complication risk. Optimising modifiable comorbidities, improving infection control practices, and selecting appropriate surgical techniques may reduce postoperative morbidity and recurrence.

In the current study, 20% of patients developed wound infection after incisional hernia repair. Bakale & Suryawanshi higher rate of 37.5%, due to a high prevalence of diabetes and obesity.^[13] Ullah et al. said 36.8% infection in hernias after laparotomy.^[18] Technique-related differences supported by Hassan et al. noted high infection in onlay repairs. Infection rates from 1.9% to 36.8%,^[19] show changes in comorbidities, technique, and emergency vs elective surgical settings.

Seroma formation was 23.8% in our study. Seromas from dead-space accumulation may delay recovery or higher the infection chances. Hassan et al. report higher seroma in onlay mesh placement, while sublay repair lowers dead space.^[19]

The main strength of this study is comprehensive assessment and surgical factors in a well-defined study. The inclusion of 80 patients gives acceptable strength and real-world applicability, with both elective and emergency cases improving external

validity. Standardised data collection and uniform perioperative protocols reduced changes. Assessment of demographics, comorbidities, hernia features, prior surgery, and early postoperative outcomes allowed multifactorial analysis, while early monitoring of pain, wound infection, and seroma gives practical clinical standards.

Limitations of the study

This study has limited generalisability and statistical power, and the absence of a control group restricts interpretation. Follow-up was narrowed to early outcomes, and incomplete documentation of surgical technique limited assessment of impact. Future studies with longer follow-up and detailed operative comparisons are needed to progress robustness and generalisability.

CONCLUSION

Female predominance, previous abdominal surgery, and a high comorbidity as key factors in incisional hernia. Pain and abdominal swelling were the main clinical presentations, and most cases were managed electively. Short-term outcomes were acceptable; however, long-term recurrence not be assessed within follow-up. Multicentre studies with extended surveillance and standardised reporting are suggested to strengthen evidence-based surgical treatment.

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