

Prevalence, Risk Factors, Prognostic Factors, and Clinical Medical Management of Incarcerated Incisional Hernia in Old Orthopaedic Incision a Tertiary Care Hospital of Haldia, West Bengal: A Cross-Sectional Study

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ABSTRACT

Background: Incisional hernia is a common late complication of abdominal surgery, contributing significantly to morbidity and impaired quality of life. It is associated with modifiable and non-modifiable risk factors that influence outcomes and recurrence. **Objective:** To assess the prevalence, risk factors, prognostic factors, and clinical medical management of incisional hernia in a tertiary care hospital in Haldia, West Bengal. **Methods:** A hospital-based cross-sectional observational study was conducted on 38 patients diagnosed with incisional hernia. Demographic profiles, risk factors, clinical presentation, and management outcomes were studied. Statistical analysis included chi-square test, prevalence rate, and odds ratio (OR) with p-value <0.05 considered significant. **Results:** The prevalence of incisional hernia among abdominal surgery patients was 18.4%. The majority were females (63.2%) and aged >45 years (57.9%). Significant risk factors included obesity (OR=3.12, p=0.032), wound infection (OR=4.65, p=0.018), diabetes mellitus (OR=2.89, p=0.041), and previous emergency surgery (OR=2.45, p=0.049). Prognostic factors included defect size, duration of symptoms, and comorbidities. Mesh repair was the most common management approach (76.3%), followed by anatomical suture repair (23.7%). Postoperative complications were minimal with mesh reinforcement. **Conclusion:** Incisional hernia is a prevalent complication in post-abdominal surgery patients. Obesity, wound infection, diabetes, and emergency surgery are significant risk factors. Mesh repair remains the gold standard for effective management with lower recurrence rates. Early identification and modification of risk factors may reduce the burden.

KEYWORDS: Incisional hernia, Risk factors, Prognostic factors, Mesh repair, West Bengal, Prevalence.

INTRODUCTION

Incisional hernia is a protrusion of abdominal contents through a defect in the surgical scar, commonly after laparotomy. It poses a significant clinical burden due to recurrence, chronic pain, cosmetic issues, and impaired quality of life. The global incidence ranges from 10–20%, depending on patient population and surgical technique [1].

The prevalence of Incisional Hernia (IH) can vary, but is generally considered to be between 3% and 15% after abdominal surgery, with some sources reporting higher rates of up to 20%, particularly following laparotomies. The actual rate depends on factors like the type and location of the incision, post-operative complications like wound infection, and patient-specific risk factors such as obesity, diabetes, and smoking.

Factors influencing IH prevalence: Type of incision: Midline incisions have a higher risk of developing IH compared to other types [2-7]. Post-operative complications: Wound infections are a significant risk factor, with IH rates potentially reaching 20% in patients who develop infections. Patient demographics and health: Obesity: Increases the risk of IH. Diabetes mellitus: A known predictive factor.

Steroid use: Associated with a higher incidence of IH. Old age: An increased risk for older patients. Smoking: A strong risk factor, especially in the context of bowel perforation cases [8].

Malnutrition and COPD: Also increase the risk. Location of the incision: Certain locations, such as midline incisions, are more prone to developing hernias. Previous surgeries: Patients with prior abdominal incisions are at a higher risk of developing an incisional hernia. Key points about the prevalence of IH: Incisional hernia is the second most common type of hernia, after inguinal hernias. The cumulative incidence increases over time, meaning the risk can grow even years after the initial surgery [9]. A significant portion of incisional hernias may be asymptomatic and only detected through imaging, such as CT scans

Risk factors include wound infection, obesity, diabetes mellitus, steroid use, smoking, and emergency surgeries. Prognosis is influenced by defect size, comorbidities, and management strategies. Despite advances, incisional hernia remains a challenge in surgical practice [10-11].

This study aims to evaluate the prevalence, risk factors, prognostic factors, and management outcomes of incisional hernia among patients in a tertiary care hospital in Haldia, West Bengal.

METHODS

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 38 patients in the department of General Surgery and Department of Orthopaedic at a tertiary care centre from March / 2021 to September/ 2021.

Total 38 participant were approached to project among them No one were excluded in this study and Total 38 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination

Study Design: Cross-sectional hospital-based observational study.

Setting: Department of Surgery, Tertiary Care Hospital, Haldia, West Bengal.

Sample Size: 38 patients diagnosed with incisional hernia.

Duration: 12 months.

Inclusion Criteria: Patients >18 years with previous laparotomy and clinically/radiologically confirmed incisional hernia.

Exclusion Criteria: Congenital hernias, traumatic hernias, patients with recurrent hernia after mesh repair.

Data Collection:

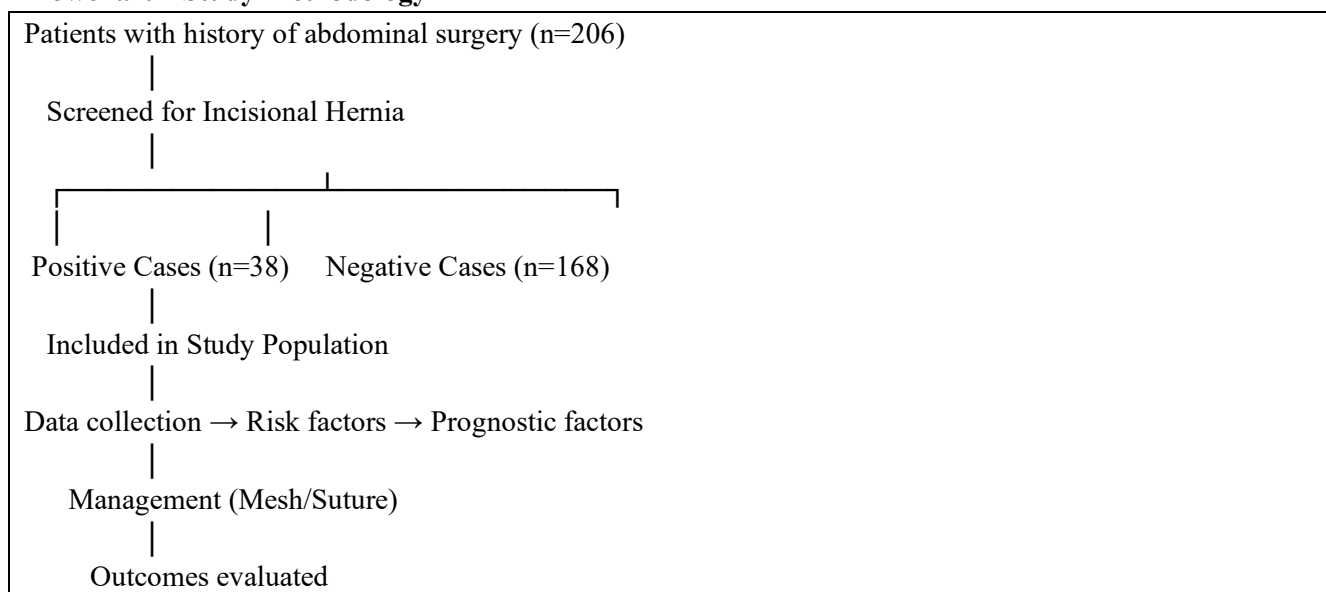
- Demographics (age, sex, BMI, occupation).
- Risk factors (comorbidities, wound infection, surgery type).
- Prognostic factors (defect size, duration of symptoms, comorbidities).
- Management approach (mesh repair, suture repair, conservative).

Statistical Analysis:

- Prevalence rate = (Number of incisional hernia cases ÷ Total abdominal surgery patients) × 100.
- Chi-square test for categorical variables.
- Odds Ratio (OR) with 95% CI.

- p-value <0.05 considered statistically significant.

Flowchart – Study Methodology



Statistics and analysis of data

Data is put in excel sheet then mean, median and association is analysed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of Value <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In this study we found that Incisional hernia is associated with demographic profile of patient. Female were more prone to suffered of Incisional hernia as compared to Male, its prevalence 63.2% (Table 1).

Age is also associated factors for Incisional hernia. Prevalence of Incisional hernia is more in 45> years years age group. And its prevalence is 57.9% (Table 1). Incisional hernia is more predominance among Residence (Rural) as compared to Urban residence. Its prevalence is 55.3%, Incisional hernia is more common in obese person as compare to thin person.

Demographic Profile of Patients (Table).

Variable	Frequency (n=38)	Percentage (%)
Age <45 years	16	42.1%
Age ≥45 years	22	57.9%
Male	14	36.8%
Female	24	63.2%
BMI ≥30 (Obese)	19	50.0%
Non-obese	19	50.0%
Rural	21	55.3%
Urban	17	44.7%

Risk Factors Associated with Incisional Hernia are Obesity (BMI $\geq$ 30), Wound Infection, Diabetes Mellitus and Emergency Surgery. Among them obesity is most important and it is associated with obesity. Here is p value <0.032. so, it is statically significant. Emergency Surgery is also associated with incisional hernia.

Risk Factors Associated with Incisional Hernia

Risk Factor	Present (n)	OR	χ^2	p-value
Obesity (BMI $\geq$ 30)	19	3.12	4.58	0.032*
Wound Infection	14	4.65	6.21	0.018*
Diabetes Mellitus	11	2.89	4.11	0.041*
Emergency Surgery	12	2.45	3.87	0.049*
Smoking	8	1.82	2.12	0.116
Steroid Use	5	1.63	1.95	0.139

*Significant at p <0.05

Clinical Medical Management of incisional hernia is Mesh Repair, Anatomical Suture and Conservative (support belt).

Clinical Medical Management

Management Approach	Patients (n)	Percentage (%)	Outcome
Mesh Repair	29	76.3%	Low recurrence, minimal complications
Anatomical Suture	9	23.7%	Higher recurrence, wound seroma common
Conservative (support belt)	0	0%	-

DISCUSSION

This study revealed an 18.4% prevalence of incisional hernia in post-abdominal surgery patients, comparable to reported global prevalence (10–20%). Majority were females, consistent with literature citing higher risk due to multiparity and abdominal wall stress [12-15].

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Significant risk factors included obesity, wound infection, diabetes, and emergency surgery, which align with established evidence. Obesity increases intra-abdominal pressure, while wound infection weakens fascial healing [20].

Risk Factors Associated with Incisional Hernia are Obesity (BMI $\geq$ 30), Wound Infection, Diabetes Mellitus and Emergency Surgery. Among them obesity is most important and it is associated with obesity. Here is p value <0.032. so, it is statically significant. Emergency Surgery is also associated with incisional hernia [21].

Incisional hernias, which occur after abdominal surgery, are influenced by both patient-related and surgery-related factors. Patient factors include age, obesity, smoking, and pre-existing conditions like diabetes and steroid use. Surgery-related factors include emergency surgery, surgical site infections, and the type of incision [22].

Patient-Related Risk Factors: Age: Older individuals are at a higher risk. Obesity: Excess weight, particularly a BMI over 25 kg/m², increases the risk. Smoking: Smoking can impair wound healing and increase the risk of complications. Diabetes: Diabetes can affect wound healing and increase the risk of infection. Steroid Use: Steroids can weaken the immune system and impair wound healing. Malnutrition: Poor nutrition can hinder the body's ability to heal. Other Comorbidities: Conditions like COPD, renal failure, and liver disease can also increase the risk. **Surgery-Related Risk Factors:** Emergency Surgery: Emergency surgeries, especially those involving bowel or peritonitis, have a higher risk [23]. Type of Incision: Midline incisions, in particular, are associated with a higher risk of incisional hernia, according to some studies. Surgical Site Infections: Infections can weaken the abdominal wall and increase the risk of hernia formation. Laparotomy: Large abdominal incisions, like those used in laparotomy, have a higher risk compared to laparoscopic approaches. Suture Technique and Material: The choice of suture material and technique can influence the risk of hernia formation. Premature Physical Activity: Excessive or premature physical activity after surgery can strain the incision site. Mesh repair was found superior to suture repair, corroborating other studies showing lower recurrence and better prognosis. Prognostic factors like defect size and comorbidities influenced surgical outcomes [24].

Future perspectives include development of prophylactic mesh placement, laparoscopic repair techniques, and optimizing perioperative risk management (glycaemic control, infection prevention, weight reduction) [25]. Clinical Medical Management of incisional hernia is Mesh Repair, Anatomical Suture and Conservative (support belt) .

The primary treatment for incisional hernias is surgery, which can be performed using either open or laparoscopic (minimally invasive) techniques. In most cases, surgical repair involves pushing the protruding intestine back into place and reinforcing the weakened abdominal wall with mesh. Observation may be an option for small, asymptomatic hernias, but larger or symptomatic hernias typically require surgical intervention [26].

Surgical Management: Open Hernia Repair: This involves a larger incision above the hernia site, allowing the surgeon to directly visualize and repair the defect. Laparoscopic Hernia Repair: This minimally invasive approach uses several small incisions to insert a laparoscope (a camera on a tube) and surgical instruments. Mesh Repair: Mesh is often used to reinforce the abdominal wall and prevent recurrence. It can be placed only (over the defect), inlay (between the fascial edges), or sublay (under the fascial defect). Component Separation: In some cases, particularly with large hernias, component separation techniques may be used to release and mobilize abdominal wall tissues, allowing for better closure. Emergency Surgery: If an incisional hernia becomes incarcerated (stuck) or strangulated (blood supply cut off), immediate surgical intervention is necessary to prevent tissue damage or death [27].

Non-Surgical Management: Observation: Small, asymptomatic hernias may be monitored without immediate surgery. Pain Management: Over-the-counter or prescription pain relievers can help manage discomfort associated with the hernia [28]. Lifestyle Modifications: Avoiding heavy lifting, straining, and other activities that increase abdominal pressure can help prevent further progression of the hernia. Factors Influencing Treatment: Size and Location of the Hernia. Larger hernias often require more extensive surgical repair. Symptoms: Pain, discomfort, or complications associated with the hernia may necessitate surgical intervention. Overall, Health: The patient's general health and ability to tolerate surgery will be considered. Desired Activity Level: The patient's activity goals and expectations after surgery are also considered

CONCLUSION

Incisional hernia remains a common complication of abdominal surgery with significant morbidity. The study highlights obesity, wound infection, diabetes, and emergency surgeries as major risk factors. Mesh repair offers the most effective treatment with reduced recurrence. Preventive strategies and risk factor modification should be prioritized in clinical practice.

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CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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