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Original research article

RISK FACTORS OF INCISIONAL HERNIA IN PATIENTS PRESENTING TO TERTIARY CARE HOSPITAL

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Abstract: *Incisional hernia is a common complication following abdominal surgeries, influenced by various demographic and clinical factors. Identifying associated risk factors can aid in preventive strategies and improve surgical outcomes.* ***Objective:*** *To assess the associated risk factors in patients presenting to tertiary care hospital.* ***Methods:*** *This study was carried out from March 2023 to March 2024, involving 150 patients aged 30 years or older, who underwent either laparotomy or laparoscopy for abdominal surgeries. Data were collected from medical records and postoperative follow-ups, focusing on demographic characteristics, comorbidities, surgical data, and the development of incisional hernia and its associated risk factors.* ***Results:*** *The incidence of incisional hernia was 12.7%, with 68.4% of affected patients being over the age of 45. Risk factors identified included obesity (57.9%) of obese patients developed incisional hernia), diabetes (52.6%), hypertension (63.2%), and laparotomy (89.5% of laparotomy patients developed hernia). Wound infections were also considerably associated with incisional hernia development (36.8%).* ***Conclusion:*** *The study identified age, obesity, diabetes, hypertension, laparotomy, and wound infections as notable risk factors for the development of incisional hernia.*

Keywords: Incisional hernia, risk factors, obesity, diabetes, hypertension, laparotomy, surgical site infections, abdominal surgery.

Introduction

An incisional hernia is formed at the location of a prior surgical incision, when the abdominal wall has been compromised during the healing process. This syndrome frequently occurs in patients post-abdominal surgery, as the surgical site may not completely restore its strength or integrity, permitting internal tissue or organs, such as segments of the intestine, to herniate through the compromised area. (1, 2) Incisional hernias may develop following any surgical intervention involving an incision in the abdominal wall. (3, 4) Notwithstanding advancements in abdominal surgeries, the incidence of incisional hernia remains between 15% to 20%. Despite continuous research on optimal closure techniques to prevent incisional hernias and the release of updated guidelines, incisional hernias remain a common challenge for surgeons. Factors leading to suboptimal closure include patient-related factors, disease-related conditions, and technical issues. (5-7)

These hernias are distinctive since they are the sole abdominal wall hernias ascribed to iatrogenic causes. Incisional hernias arise when the abdominal wall fails to properly seal after a surgical intervention. Factors associated with the patient that hinder adequate wound healing and compromise the tensile strength of the newly formed tissue supporting the abdominal wall elevate the risk of incisional hernia. (8, 9)

Systemic chronic illnesses such as diabetes mellitus, renal failure, obesity, smoking, as well as malnutrition, as well as prolonged use of systemic drugs elevate the risk of incisional hernia formation. Factors associated to disease, such as incision location, timing and urgency of the treatment, complications, including the underlying condition, significantly influence the incidence of incisional hernia. Emergency procedures, midline incisions, infections. (10)

Investigating the risk factors for incisional hernias is crucial for comprehending the fundamental mechanisms that lead to the onset of this ailment, which can profoundly affect patient health and quality of life. This study investigates risk factors to offer insights into primary and secondary prevention measures, facilitating the creation of customised therapies that decrease the occurrence of incisional hernias, improve patient outcomes, and increase surgical recovery.

Methodology

This observational study was carried at a Hayatabad Medical Complex, Peshawar from March 2023 to March 2024, focusing on patients who underwent abdominal surgeries. One hundred fifty patients who were aged 30 years or older and presented for either laparotomy or laparoscopy were selected. Surgeries were performed by experienced surgeons having more than 5 years of experience. Inclusion criteria consisted of patients scheduled for these types of abdominal surgeries, while exclusion criteria included patients with a previous incisional hernia repair, those with uncontrolled systemic diseases such as chronic renal failure or severe diabetes, and those undergoing emergency surgeries or unable to be followed up postoperatively.

Data collection was performed through patient medical records, preoperative assessments, and postoperative

follow-ups. Clinical data such as comorbidities, including diabetes and hypertension, were also recorded. Additionally, information on the type of surgery and wound infection were noted. For postoperative assessment, the development of incisional hernia was tracked. Incisional hernia was identified by clinical signs such as a palpable bulge at the incision site, with further confirmation provided through imaging if required. We assessed the risk factors of incisional hernia in this study.

Data was analyzed by SPSS 24. The relationship between categorical variables and the development of incisional hernia was assessed using the chi-square test. A p-value of less than 0.05 was considered statistically significant.

Results

The study included 150 patients, with an average age of 47.03 ± 12.469 years. Regarding gender distribution, 56.7% were male and 43.3% were female. Age groups, education status, employment status and socioeconomic status of the patients are presented in table 1. Comorbidities were common among the patients. Diabetes was present in 28.0% of the patients. Hypertension was found in 34.0% of patients, while 62.7% were not obese (Table 2). Wound infections were observed in 17.3% of the patients (Table 3). Figure 1 shows the type of surgery performed. As for the incidence of incisional hernia, 12.7% of the patients developed this complication. Among the patients with incisional hernia, 68.4% were over the age of 45 (P = 0.02) (Table 4). About 52.6% of patients with diabetes had hernia (P = 0.01). Hypertension also appeared to be a notable factor, with 63.2% of hypertensive patients developing incisional hernia (P = 0.0004). Regarding the type of surgery, laparotomy was associated with a higher incidence of incisional hernia, as 89.5% of those who underwent this procedure developed a hernia (P = 0.0001). About 57.9% of obese patients developed an incisional hernia (P = 0.04). Lastly 36.8% of wound infected patients experienced incisional hernia (P = 0.01) (Table 5).

Table 1 Demographics

Demographics		N	%
Age groups (Years)	30 to 45	83	55.3%
	> 45	67	44.7%
Gender	Male	85	56.7%
	Female	65	43.3%
Education status	Educated	69	46.0%
	Uneducated	81	54.0%
Employment status	Employed	78	52.0%
	Unemployed	72	48.0%
Socioeconomic status	Low	42	28.0%
	Middle	83	55.3%
	High	25	16.7%

Table 2 Comorbidities

Comorbidities		N	%
Diabetes	Yes	42	28.0%
	No	108	72.0%
Hypertension	Yes	51	34.0%
	No	99	66.0%
Obesity	Yes	56	37.3%
	No	94	62.7%

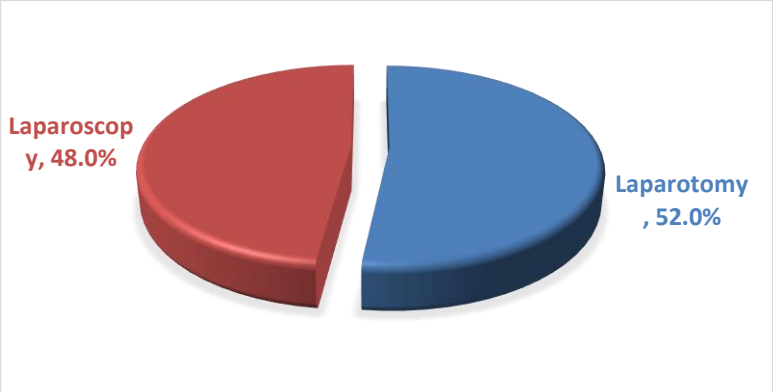

Figure 1 Type of surgery

Table 3 Wound infection

Wound infection	N	%
Yes	26	17.3
No	124	82.7
Total	150	100.0

Table 4 Frequency of incisional hernia

Incisional hernia	N	%
Yes	19	12.7
No	131	87.3
Total	150	100.0

Table 5 Risk factors of incisional hernia

Risk factors of incisional hernia		Incisional Hernia				P value
		Yes		No		
		N	%	N	%	
Age groups (Years)	30 to 45	6	31.6%	77	58.8%	0.02
	> 45	13	68.4%	54	41.2%	
Diabetes	Yes	10	52.6%	32	24.4%	0.01
	No	9	47.4%	99	75.6%	
Hypertension	Yes	12	63.2%	39	29.8%	0.004
	No	7	36.8%	92	70.2%	
Surgery type	Laparotomy	17	89.5%	61	46.6%	0.0001
	Laparoscopy	2	10.5%	70	53.4%	
Obesity	Yes	11	57.9%	45	34.4%	0.04
	No	8	42.1%	86	65.6%	
Wound infection	Yes	7	36.8%	19	14.5%	0.01
	No	12	63.2%	112	85.5%	

Discussion

In our study, it was found that 12.7% of the patients developed incisional hernia, and the majority of these (68.4%) were over the age of 45 years. Khor SN et al., found similar trends, where majority of older patients (above 60 years) had developed incisional hernia in their study. The association between age and incisional hernia is well-documented in the literature, with older individuals at greater risk due to factors such as decreased collagen production, impaired wound healing, and reduced tissue elasticity. (11) Therefore, the results from our study corroborate the existing evidence on the link between age and incisional hernia.

The mean BMI in our study was 29.24 ± 2.547 kg/m², and it was observed that 57.9% of obese patients developed incisional hernia. This aligns with findings from Ortega-Deballon P et al., which also noted a higher frequency of incisional hernia in patients with high BMI. Obesity is a well-established risk factor, with excess body weight contributing to increased intra-abdominal pressure, which in turn stresses the abdominal wall and increases the likelihood of hernia formation. (12)

Another significant finding in our study was the association between comorbid conditions, particularly diabetes and hypertension with incisional hernia. Specifically, 52.6% patients with diabetes developed incisional hernia, and 63.2% of hypertensive patients experienced the same complication. Le Huu R et al., found that diabetes and hypertension were significant contributors to the development of incisional hernia. Diabetes impairs wound healing through its effects on collagen metabolism, while hypertension can lead to impaired microcirculation. (13) Our findings of a strong association between diabetes, hypertension, and incisional hernia further confirm these relationships, emphasizing the importance of managing these comorbidities in surgical patients.

Regarding surgical factors, our study found that laparotomy was linked with a higher frequency of incisional hernia, with 89.5% of those who underwent laparotomy developing the complication. Le Huu R et al., also found that patients undergoing open surgeries, particularly laparotomy, had a higher risk of incisional hernia compared to those who underwent minimally invasive procedures. The larger incisions and higher levels of tension on the abdominal wall in laparotomy are thought to increase the likelihood of hernia formation. (13) Our results, showing a notable association between laparotomy and incisional hernia, mirror these findings, reinforcing the idea that open surgery presents a higher risk for this complication.

Additionally, wound infection were observed in 17.3% of our patients, and 36.8% of those with wound infections developed incisional hernia. This finding aligns with Khor SN et al and Le Huu R et al., both of which found that wound infections notably linked with incisional hernia. (11-13) Infections can lead to delayed wound healing, increase inflammation, and disrupt normal tissue regeneration, all of which contribute to the formation of hernias. Our study's observation that wound infections significantly raised the risk of incisional hernia underscores the importance of effective infection control strategies during and after surgery.

Conclusion

In conclusion, the incidence of incisional hernia in our study was found to be 12.7%, with a higher frequency observed in patients over the age of 45 years, those with obesity, diabetes, hypertension, wound infections and those who underwent laparotomy. These findings highlight the importance of managing modifiable risk factors such as obesity, diabetes, and hypertension, as well as considering surgical techniques that minimize the risk of hernia formation, to improve patient outcomes in abdominal surgeries.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department Concerned. (IRBEC-TCHK-0244/23)
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Conflict of interest

The authors declared an absence of conflict of interest.

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Concept & Design of Study

References

1. Sanders DL, Pawlak MM, Simons MP, Aufenacker T, Balla A, Berger C, et al. Midline incisional hernia guidelines: the European Hernia Society. British Journal of Surgery. 2023;110(12):1732-68.
2. Köckerling F. Recurrent incisional hernia repair—an overview. Frontiers in Surgery. 2019;6:26.
3. van Veenendaal N, Poelman M, van den Heuvel B, Dwars B, Schreurs WH, Stoot J, et al. Patient-reported outcomes after incisional hernia repair. Hernia. 2021;25:1677-84.
4. Schattenkerk LDE, Musters GD, Le Coultre S, de Jonge WJ, van Heurn LE, Derikx JP. Incisional hernia after abdominal surgery in infants: a retrospective analysis of incidence and risk factors. Journal of pediatric surgery. 2021;56(11):2107-12.
5. Kaneko T, Funahashi K, Ushigome M, Kagami S, Goto M, Koda T, et al. Incidence of and risk factors for incisional hernia after closure of temporary ileostomy for colorectal malignancy. Hernia. 2019;23:743-8.
6. Doussot A, Abo-Alhassan F, Derbal S, Fournel I, Kasereka-Kisenge F, Codjia T, et al. Indications and outcomes of a cross-linked porcine dermal collagen mesh (permacol) for complex abdominal wall reconstruction: a multicenter audit. World journal of surgery. 2019;43:791-7.
7. Blatnik JA, Brunt LM. Controversies and techniques in the repair of abdominal wall hernias. Journal of Gastrointestinal Surgery. 2019;23(4):837-45.
8. Berrevoet F. Prevention of incisional hernias after open abdomen treatment. Frontiers in surgery. 2018;5:11.
9. Henriksen NA, Deerenberg EB, Venclauskas L, Fortelny RH, Miserez M, Muysoms FE. Meta-analysis on materials and techniques for laparotomy closure: the MATCH review. World journal of surgery. 2018;42:1666-78.
10. Krivan MS, Giorga A, Barreca M, Jain VK, Al-Taan OS. Concomitant ventral hernia repair and bariatric surgery: a retrospective analysis from a UK-based bariatric center. Surgical Endoscopy. 2019;33:705-10.
11. Khor SN, Cheok S, Sultana R, Tan EKW. Incidence of incisional hernia after major colorectal cancer surgery & analysis of associated risk factors in Asian population: Is laparoscopy any better? Asian Journal of Surgery. 2023;46(1):99-104.
12. Ortega-Deballon P, Renard Y, De Launay J, Lafon T, Roset Q, Passot G. Incidence, risk factors, and burden of incisional hernia repair after abdominal surgery in France: a nationwide study. Hernia. 2023;27(4):861-71.
13. Nho RLH, Mege D, Ouaïssi M, Sielezneff I, Sastre B. Incidence and prevention of ventral incisional hernia. Journal of visceral surgery. 2012;149(5):e3-e14.