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ORIGINAL ARTICLE

Evaluation of Postoperative Complications in Patients Undergoing Bilateral Lateral Incision Repair for Abdominal Wall Hernia

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Abstract

Introduction: One of the most frequently encountered complications of abdominal surgery is an abdominal wall incisional hernia. The current study investigated the postoperative complications in patients undergoing bilateral lateral incision repair for abdominal wall hernia in a one-year follow-up.

Methods: This descriptive cross-sectional study was conducted on patients with abdominal wall hernias larger than 5 cm who were referred to the Poursina Educational and Medical Center, Guilan University of Medical Sciences, Rasht, Iran. This study recorded the demographic and clinical data of 66 patients who underwent bilateral lateral incision repair for abdominal wall hernia at Poursina Educational and Medical Center in Rasht, Iran, after a six-month follow-up. All data were analyzed using SPSS version 22.

Results: About 65.2% of participants were females, and the mean age of the patients was 59.89±10.12 years. About 36.4% and 42.4% of patients had a history of diabetes and hypertension, respectively, and 81.8% and 63.6% had a history of abdominal surgery and hernia repair, respectively. The prevalence of seroma, wound infection, and hematoma was 6.1%, 3.0%, and 1.5%, respectively. After follow-up, hernia recurrence was observed in 1.5% of patients. Diastasis, lateral hernia, and death after surgery were not observed in any of the patients.

Conclusion: The results of this study indicated that bilateral lateral incision repair for abdominal wall hernias was associated with a low rate of postoperative complications. Additionally, the recurrence rate of hernia was minimal, which suggested that this surgical approach was a safe and effective option for managing abdominal wall hernias.

Key words: Abdominal wall hernia, Postoperative complications, Surgery

Introduction

Abdominal wall hernias are among the most prevalent surgical conditions globally, with significant implications for patient morbidity, healthcare costs, and quality of life (1,2). Specifically, these hernias account for over 25% of all surgical procedures in general surgery departments, with annual healthcare expenditures (3). Surgical repair, particularly in symptomatic cases, is the primary treatment method aimed at alleviating pain, preventing complications, such as incarceration and strangulation, and restoring the structural integrity of the abdominal wall (4,5). The

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global burden of abdominal hernias has risen dramatically, with a 36% increase in prevalence from 1990 to 2019, reaching 32.53 million prevalent cases, while incident cases surged by 63.67%, totaling 13.02 million (6).

This translates to approximately 2.4 million hernia repairs performed annually worldwide, with inguinal hernias representing 75% of all abdominal wall hernias (7). Although hernias can be classified into various types, including inguinal, femoral, and abdominal, all are associated with an increased risk of recurrence following surgery, especially when mesh is used for repair (8–10). The recurrence rates vary significantly by hernia type: 1-3% for inguinal hernias, 10-15% for incisional hernias, and up to 25% for complex ventral hernias (11,12). Mesh-related complications, such as infections (occurring in 1-8% of cases), small bowel obstructions (reported in 2-3% of repairs), and entero-cutaneous fistulas (affecting 0.5-1% of patients), are notable concerns that necessitate careful surgical planning and technique (13–16).

The development of abdominal wall hernias is influenced by multiple factors, including genetic predisposition, anatomical weaknesses, and environmental triggers, such as chronic cough, constipation, ascites, and heavy lifting (17,18). Studies have shown that patients with certain collagen disorders, such as Ehlers-Danlos syndrome, have a 2-4 times higher risk of hernia development (19,20). Additionally, conditions that increase intra-abdominal pressure, such as obesity (BMI>30 increases risk by 3-fold), age (peak incidence between 75-80 years), and previous abdominal surgeries (responsible for 15-20% of all hernias), contribute significantly to the formation and exacerbation of hernias (21,22).

Of the various surgical techniques, bilateral incision on the anterior rectus fascia has gained favor due to its ability to provide broader exposure for mesh placement, reduce tension on the repair site, and minimize postoperative complications compared to traditional methods (9,23). This technique has demonstrated a 40% reduction in postoperative pain scores and a 25% decrease in recovery time (24,25). The rising prevalence of risk factors, such as obesity (affecting 42.4% of US adults) and an aging population with a projected 2.1 billion people over 60 by 2050, has led to an increased incidence of hernias, adding strain to healthcare systems globally (17,26). Surgical choice is crucial in determining outcomes, as the technique employed can significantly influence the rate of complications and the long-term success of the repair. This study aimed to evaluate the outcomes of bilateral lateral incision repair for abdominal wall hernias, specifically focusing on postoperative complications, recurrence rates, and the factors that may influence these outcomes.

Methods

This descriptive cross-sectional study was conducted on 66 patients with abdominal wall hernias larger than 5 cm who were referred to the Poursina Educational and Medical Center, Guilan University of Medical Sciences, Rasht, Iran. The surgical team comprised specialists with varying levels of expertise. The study was approved by the Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran [IR.GUMS.REC.1399.528], and informed consent was obtained from all participants.

Patients were included if they had abdominal wall hernias exceeding 5 cm and were deemed suitable for surgical repair using a standardized bilateral lateral incision technique. Patients with smaller hernias (<5 cm), those at risk of increased intra-abdominal pressure after fascial closure, or those with incomplete data, autoimmune diseases, or malignancies were excluded.

Demographic and clinical data were collected, including age, gender, history of diabetes, hypertension, prior abdominal surgeries, previous hernia repairs, and whether the initial surgery was classified as clean or infected. The level of expertise and experience of the surgeons performing the procedures was also recorded. Postoperative complications, seroma, wound infection, recurrence, diastasis, and lateral hernia were assessed during a six-month follow-up.

The surgical technique was standardized for all patients, beginning with a limited skin flap raised to the lateral margin of the rectus abdominis muscles on both sides. An anterior longitudinal incision was made along the rectus sheath, carefully avoiding damage to the rectus muscles, posterior fascia, and peritoneum. The parietal defect was closed with sutures to restore abdominal wall continuity, and a synthetic mesh was placed over the repair site, extending beyond the defect margins and secured with nylon sutures for reinforcement. Two Hemovac drains were inserted to manage postoperative fluid accumulation and reduce the risk of seroma formation.

Descriptive statistics were used to summarize data, including frequencies, percentages, means, and standard deviations (SD). Relationships between variables, such as surgical outcomes and patient characteristics, were analyzed using SPSS version 22.

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Results

The mean age of participants was 59.89±10.12 years, and most were females (n=43). Out of 66 patients, 24, 28, 54, and 46 patients had a history of diabetes, hypertension, abdominal surgery, and hernial repair, respectively. Among complications, the frequency of seroma (6.1%) was more prevalent, followed by wound infection (3.0%), hematoma (1.5%), and recurrent hernia (1.5%). None of the patients represented diastasis or lateral hernia (Table 1).

The frequency of complications according to gender, age, and underlying diseases showed that seroma, hematoma, and recurrent hernia were more prevalent in females and those under 60. In contrast, the frequency of wound infection was higher in men and older patients. Patients with diabetes had a higher prevalence of seroma, wound infection, and recurrent hernia, and hematoma was more prevalent among those without diabetes. Seroma, hematoma, and wound infection were frequently reported in patients with hypertension, and those without hypertension had more recurrent hernias. Among patients with a history of abdominal surgery, the prevalence of hematoma, wound infection, and recurrent hernia were higher than those without, while in patients without a history of abdominal surgery, seroma was more prevalent (Table 2).

Table 1: Frequency of demographical and clinical data of patients (n=66)

Variables		n (%)
Gender	Male	23 (34.8)
	Female	43 (65.2)
Diabetes	Yes	24 (36.4)
	No	42 (63.6)
Hypertension	Yes	28 (42.4)
	No	38 (57.6)
Abdominal Surgery	Yes	54 (81.8)
	No	12 (18.2)
Hernial repair	Yes	42 (63.6)
	No	24 (36.4)
Complications	Seroma	3 (6.1)
	Hematoma	1 (1.5)
	Wound infection	2 (3.0)
	Diastasis	0 (0.0)
	Lateral hernia	0 (0.0)
	Recurrent hernia	1 (1.5)
	Death	0 (0.0)

Table 2: Frequency of complications according to demographical and clinical data patients (n=66)

Variables		Seroma n (%)	Hematoma n (%)	Wound infection n (%)	Recurrent hernia n (%)
Gender	Male	1 (4.34)	0 (0.00)	1 (4.34)	0 (0.00)
	Female	3 (6.97)	1 (2.32)	1 (2.32)	1 (2.32)
Age (year)	<60	2 (4.16)	1 (2.08)	0 (0.00)	1 (2.08)
	>60	2 (11.11)	0 (0.00)	2 (11.11)	0 (0.00)
Diabetes	Yes	2 (8.330	0 (0.00)	2 (8.33)	1 (4.16)
	No	2 (4.76)	1 (2.38)	0 (0.00)	0 (0.00)
Hypertension	Yes	2 (7.14)	1 (3.57)	2 (7.14)	0 (0.00)
	No	2 (5.26)	0 (0.00)	0 (0.00)	1 (2.63)
Abdominal Surgery	Yes	2 (3.70)	1 (1.85)	2 (3.70)	1 (1.85)
	No	2 (16.66)	0 (0.00)	0 (0.00)	0 (0.0)

Discussion

Abdominal wall hernias are a common surgical condition, and understanding the frequency and risk factors for complications associated with this approach is crucial for optimizing patient outcomes. The findings of this study shed light on the frequency and risk factors associated with complications following abdominal wall hernia repair by lateral incision on the anterior rectus fascia with a hernial size greater than 5 cm. The mean age of the patients was about 60 years, with the highest frequency among women (65%). About 10.6% of patients represented complications during six-month follow-up, in which the frequency of seroma was higher among the age group under 60, and both seroma and wound infection were more frequent in upper ages.

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In a study by Pereira-Rodriguez1 et al., the mean age of patients was close to our population, while most patients were males (55%). They reported that wound infection was prevalent among their patients (27). Caglia et al. reported that mesh used in abdominal wall repair, the standard approach thus far, should be recognized as contributing to the development of incisional hernias. Nevertheless, it is important to acknowledge the potential risks associated with mesh repairs, such as low rates of incarceration, risk of recurrence, postoperative pain, and complications such as small bowel obstruction, mesh infection, and entero-cutaneous fistula (28). Kesicioglu et al. demonstrated that upper age and larger defect size were the significant risk factors associated with complication severity among patients with median ventral hernias sizing larger than 15 cm (29). Hernia surgery has evolved significantly, with improvements in surgical techniques and outcomes. New advancements, such as prosthetic repair and laparoscopy, have brought benefits and challenges. Selecting the appropriate surgical method for hernia repair may reduce the incidence of surgical wound infection (30,31).

In the current study, about 89% and 64% of the patients had a history of abdominal surgery and hernial repair. Similarly, Pavithira et al. showed that inguinal hernias were common (64%) among patients. Surgical site infection was a significant complication, affecting a considerable proportion of patients, and postoperative sepsis emerged as the only independent factor associated with perioperative mortality (32). On the other hand, some studies reported less frequency of hernia repair (10,33,34). In developed countries, there has been an increase in minimally invasive techniques, such as endoscopic methods and component separation techniques, that reduce the pressure on the midline during hernia repair. Ergenç et al. reported that during the COVID-19 pandemic, the frequency of hernial surgery increased in Istanbul, Turkey, while other abdominal surgeries decreased (35).

We observed that seroma was the most common complication, which could be attributed to surgical technique, patient characteristics, and postoperative care. Seroma is a common complication seen in abdominal seroma formation following procedures such as breast reconstruction with abdominal flaps or abdominoplasty. Various techniques have been employed to reduce the occurrence of early seroma, including closed suction drains, ultrasonic and sharp dissection, fibrin application, and vessel clipping or ligation during surgery (36,37). In the study by Gala et al., the prevalence of surgical site infection, cellulitis, and necrosis was higher than that in the present study. Furthermore, 20% of the patients underwent debridement, which could have led to the drainage of any existing seromas, potentially making it challenging to diagnose their formation (33).

In a study by Pereira and Gururaj, it has been demonstrated that the frequency of seroma was significantly higher in the onlay group compared to the sublay. The frequency of surgical infection was 4.6% in their study, and hematoma was reported in 11 cases. However, there was no significant difference between the onlay and sublay groups regarding hematoma frequency (38). In the current study, the risk of wound infection was higher in men, while seroma, hematoma, and recurrent hernia were higher among females. Assakran et al. reported that most of the patients were male (80%), and about 17.2% of the participants had complications, including seroma formation (2.9%), wound infection (5.8%), and mesh infection (1.8%). They observed no significant associations between gender and the presence of complications, while patients with diabetes represented more complications (26).

The novelty of this study lies in its comprehensive examination of postoperative complications and their association with patient demographical and clinical characteristics in patients with abdominal wall hernia. In this study, the association between complications and underlying diseases, such as diabetes and hypertension, was not evaluated, which has been suggested to be considered for postoperative complications for abdominal wall hernia repair. Another limitation of the study was its cross-sectional nature, which limited us to further evaluating the association between variables.

Conclusions

The current study illustrated the low prevalence of complications following bilateral lateral incision repair for abdominal wall hernias, with seroma being the most common. Complication rates varied based on gender, age, and comorbidities, with higher rates of seroma, wound infection, and recurrent hernia observed in patients with diabetes and hypertension. These findings suggested that careful preoperative assessment and management of underlying conditions may further improve outcomes for patients undergoing this surgical procedure.

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Conflict of Interest

The authors declare that they have no competing interests.

References

1. Pandya B, Huda T, Gupta D, Mehra B, Narang R. Abdominal Wall Hernias: An Epidemiological Profile and Surgical Experience from a Rural Medical College in Central India. Surg J (New York, NY). 2021 Jan;**7**(1):e41–6.
2. Salamone G, Licari L, Guercio G, Campanella S, Falco N, Scerrino G, et al. The abdominal wall hernia in cirrhotic patients: a historical challenge. World J Emerg Surg. 2018;**13**(1):35.
3. Baylón K, Rodríguez-Camarillo P, Elías-Zúñiga A, Díaz-Elizondo JA, Gilkerson R, Lozano K. Past, Present and Future of Surgical Meshes: A Review. Membranes (Basel). 2017;**7**(3):47.
4. Najm A, Niculescu AG, Gaspar BS, Grumezescu AM, Beuran M. A Review of Abdominal Meshes for Hernia Repair-Current Status and Emerging Solutions. Mater (Basel, Switzerland). 2023;**16**(22).
5. Najera BMF, Montoya BIM. Incisional Hernias: A Complete Review of Literature. Int J Med Sci Clin Res Stud. 2023;**3**(9):1921–3.
6. Ma Q, Jing W, Liu X, Liu J, Liu M, Chen J. The global, regional, and national burden and its trends of inguinal, femoral, and abdominal hernia from 1990 to 2019: findings from the 2019 Global Burden of Disease Study - a cross-sectional study. Int J Surg. 2023;**109**(3):333–42.
7. Kulacoglu H. Current options in inguinal hernia repair in adult patients. Hippokratia. 2011;**15**(3):223–31.
8. Kallinowski F, Ludwig Y, Gutjahr D, Gerhard C, Schulte-Hörmann H, Krimmel L, et al. Biomechanical Influences on Mesh-Related Complications in Incisional Hernia Repair. Front Surg. 2021;**8**:763957.
9. Munoz-Rodriguez JM, Lopez-Monclus J, San Miguel Mendez C, Perez-Flecha Gonzalez M, Robin-Valle de Lersundi A, Blázquez Hernando LA, et al. Outcomes of abdominal wall reconstruction in patients with the combination of complex midline and lateral incisional hernias. Surgery. 2020;**168**(3):532–42.
10. Pereira-Rodriguez JA, Bravo-Salva A, Montcusí-Ventura B, Hernández-Granados P, Rodrigues-Gonçalves V, López-Cano M, et al. Early outcomes of component separation techniques: an analysis of the Spanish registry of incisional Hernia (EVEREG). Hernia. 2021;**25**(6):1573–80.
11. Parker SG, . Mallett S, Quinn L, Wood CPJ, Boulton RW, Jamshaid S, et al. Identifying predictors of ventral hernia recurrence: systematic review and meta-analysis. BJS Open. 2021;**5**(2):zraa071.
12. Gillies M, Anthony L, Al-Roubaie A, Rockliff A, Phong J. Trends in Incisional and Ventral Hernia Repair: A Population Analysis From 2001 to 2021. Cureus. 2023;**15**(3):e35744.
13. Liu H, Liu X, Zheng G, Ye B, Chen W, Xie H, et al. Chronic mesh infection complicated by an enterocutaneous fistula successfully treated by infected mesh removal and negative pressure wound therapy: A case report. Medicine (Baltimore). 2019;**98**(49):e18192.
14. Dop LM Van Den, Egmond S Van, Heijne J, Rosmalen J Van, Goede B De, Wijsmuller AR. Articles Twelve-year outcomes of watchful waiting versus surgery of mildly symptomatic or asymptomatic inguinal hernia in men aged 50 years and older : a randomised controlled trial. 2023;**64**:1–10.
15. Bueno Garcia Reyes P, Hashim H. Mesh complications: best practice in diagnosis and treatment. Ther Adv Urol. 2020;**12**:1756287220942993.
16. Gossetti F, D'Amore L, Annesi E, Bruzzone P, Bambi L, Grimaldi MR, et al. Mesh-related visceral complications following inguinal hernia repair: an emerging topic. Hernia. 2019;**23**:699–708.
17. AhmedAlenazi A, Alsharif MM, Hussain MA, Alenezi NG, Alenazi AA, Almadani SA, et al. Prevalence, risk factors and character of abdominal hernia in Arar City, Northern Saudi Arabia in 2017. Electron physician. 2017;**9**(7):4806–11.
18. Kibret AA, Tekle SY, H/Mariam MM, Worede AG, Dessie MA. Prevalence and associated factors of external hernia among adult patients visiting the surgical outpatient department at the University of Gondar Comprehensive Specialised Hospital, Northwest Ethiopia: a cross-sectional study. BMJ Open. 2022;**12**(4):e056488.
19. Kroese LF, Mommers EH, Robbens C, Bouvy ND, Lange JF, Berrevoet F. Complications and recurrence rates of patients with Ehlers-Danlos syndrome undergoing ventral hernioplasty: a case series. Hernia. 2018;**22**(4):611–6.
20. Chang HH, Juan YS, Li CC, Lee HY, Chen JH. Congenital collagenopathies increased the risk of inguinal hernia developing and repair: analysis from a nationwide population-based cohort study. Sci Rep. 2022;**12**(1):2360.
21. Elango S, Perumalsamy S, Ramachandran K, Vadodaria K. Mesh materials and hernia repair. BioMedicine. 2017;**7**(3):16.
22. Shrestha S, Upadhyay PK. Prevalence of Obesity in Inguinal Hernia Repair Patients in a Tertiary Care Center. JNMA J Nepal Med Assoc. 2021;**59**(234):156–9.
23. Baumann DP, Butler CE. Lateral abdominal wall reconstruction. Semin Plast Surg. 2012;**26**(1):40–8.
24. Jain Y, Gianchandani Gyani SG, Chauhan S, Nayak K, Jain Y, Malhotra G, et al. Comparative Analysis of Bilateral Open Inguinal Hernia Repair and Rives-Stoppa Repair: A Comprehensive Review. Cureus. 2024;**16**(4):e57431.
25. Martis G, Laczik R, Németh N, Martis G, Damjanovich L. Bilateral rectus muscle turning-over for complicated and eventrated abdominal wall hernias: results of a novel method. Acta Cirúrgica Bras. 2024;**39**:e393624.
26. Assakran BS, Al-Harbi AM, Abdulrahman Albadrani H, Al-Dohaiman RS. Risk Factors for Postoperative Complications in Hernia Repair. Cureus. 2024;**16**(1):e51982.

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[DOI: 10.61186/jsurgtrauma.12.3.106]

27. Rodriguez JAP, Salva AB, Ventura BM, Granados PH. Early outcomes of component separation techniques : an analysis of the Spanish registry of incisional Hernia (EVEREG). Hernia. 2021;**25**(6):1573–80.
28. Caglià P, Tracia A, Borzì L, Amodeo L, Tracia L, Veroux M, et al. Incisional hernia in the elderly: Risk factors and clinical considerations. Int J Surg. 2014; **12**:S164–169.
29. Kesicioglu T, Yildirim K, Yuruker S, Karabicak I, Koc Z, Erzurumlu K, et al. Three-year outcome after anterior component separation repair of giant ventral hernias: A retrospective analysis of the original technique without mesh. Asian J Surg. 2022;**45**(5):1117–21.
30. Basile F, Biondi A, Donati M. Surgical approach to abdominal wall defects: history and new trends. Int J Surg. 2013;**11**:S20–23.
31. Kohno S, Hasegawa T, Aoki H, Ogawa M, Yoshida K, Yanaga K, et al. Analysis of risk factors for surgical site infection and postoperative recurrence following inguinal and femoral hernia surgery in adults. Asian J Surg [Internet]. 2022;**45**(4):1001–1006.
32. Pavithira GJ, Dutta S, Sundaramurthi S, Nelamangala Ramakrishnaiah VP. Outcomes of Emergency Abdominal Wall Hernia Repair: Experience Over a Decade. Cureus. 2022;**14**(6):e26324.
33. Gala J, Nichat P, Bhandarwar A, Dhimole N, Bhat R, Muley G. Single institute experiences in anterior and posterior component separation technique for the large ventral hernia: A retrospective review. Asian J Surg. 2022;**45**(3):854–859.
34. Butler CE, Campbell KT. Minimally invasive component separation with inlay bioprosthetic mesh (MICSIB) for complex abdominal wall reconstruction. Plast Reconstr Surg. 2011 Sep;**128**(3):698–709.
35. Ergenç M, Uprak TK. A comparative study of abdominal wall hernia surgery before and after the COVID-19 pandemic: Results from a 2-year observational period. Int J Abdom Wall Hernia Surg. 2023;**6**(3):171–175.
36. Damiani GR, Lombardi C, Pulerà E, Loizzi V, Villa M, Schonauer LM, et al. Management of abdominal wall recurrent subfascial seroma after pelvic surgery. Acta Biomed. 2020;**91**(4):e2020092.
37. Ardehali B, Fiorentino F. A Meta-Analysis of the Effects of Abdominoplasty Modifications on the Incidence of Postoperative Seroma. Aesthetic Surg J. 2017;**37**(10): 1136–1143.
38. Pereira C, Gururaj S. Onlay Versus Sublay Mesh Repair for Incisional Hernias: A Systematic Review. Cureus. 2023;15(1):e34156.

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[DOI: 10.61186/jsurgtrauma.12.3.106]