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Original Research Article

FREQUENCY OF RECURRENCE OF PARAUMBILICAL HERNIA AFTER MESH REPAIR

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Abstract: *Para-umbilical hernia is a common abdominal wall defect, and mesh repair is widely used to reduce recurrence rates. However, recurrence remains challenging in clinical practice, especially after elective mesh repair procedures like the Onlay technique.* ***Objective:*** *To determine the frequency of recurrence of para-umbilical hernia following mesh repair using the Onlay technique.* ***Methods:*** *This cross-sectional study was conducted in the Department of Surgery, SMBBMC, Lyari, Karachi, from March 1, 2024, to August 30, 2024, following ethical approval from the institutional review board. A total of 125 patients, aged 18-65 years, were diagnosed with para-umbilical hernia via clinical examination and abdominal ultrasound and undergoing elective mesh repair (Onlay technique) were included through non-probability consecutive sampling. After informed consent was obtained, data on age, BMI, smoking status, diabetes (fasting blood sugar >126 mg/dl or use of antidiabetic drugs), and hernia size (assessed by a consultant radiologist via ultrasound) were documented. Statistical analysis evaluated the recurrence rate and its association with clinical variables.* ***Results:*** *The average age of the participants was 48.68 ± 14.4 years, with a male predominance (55%). The overall recurrence rate following mesh repair was 52%. Stratification of recurrence based on age, gender, BMI, smoking status, and diabetes history revealed no statistically significant associations with the recurrence rate.* ***Conclusion:*** *The recurrence rate of para-umbilical hernia following mesh repair with the Onlay technique was high, at 52%, notably higher than that reported in the existing literature. Further research is needed to identify potential factors contributing to this elevated recurrence rate.*

Keywords: Mesh Repair, hernia, onlay, recurrence

Introduction

The contribution of paraumbilical hernia to the global burden of abdominal wall hernias is around 5-14% of all hernia repairs. Therefore, choosing the appropriate repair method is very important to ensure long-term success and minimize the risk of recurrence. (1)A few decades ago, hernia surgery underwent a revolution with mesh repair techniques that have improved outcomes compared to traditional suture repair. (2). Mesh repair, especially the onlay technique, involves laying a prosthetic mesh over the abdominal defect, providing extra support, and lowering the recurrence rate to about 1-4% in most studies (3). Several factors have been identified that increase the risk of recurrence of hernia following mesh repair: obesity, smoking, diabetes, and excessive physical strain. Probably the most significant contributing factor is obesity; various studies have shown that patients with a BMI greater than 30 have a higher chance of recurrence (4). This has been confirmed by the meta-analysis of hernia repairs, demonstrating obese patients have as high as 14% recurrence compared to 2-4% in non-obese patients. This risk is further increased by smoking and uncontrolled diabetes because of their negative impact on wound healing and tissue integrity. This will be a concern even when surgical techniques are advanced (5). In a study, Kaufmann et al. (2018) reported that nearly 5-10% of patients had a recurrence rate within two years after mesh repair. Besides, large size hernia, improper surgical technique, and post-operative complications like infection are some of the causes for recurrence (6). Therefore, this study is undertaken to assess recurrence rates in the local scenario to add to the existing knowledge on paraumbilical hernia management. This study will make a significant contribution to evaluating the effectiveness of mesh repair within a particular clinical setting by examining recurrence in this population and providing recommendations to improve patient outcomes. The study's objective is to determine the frequency of recurrence of para-umbilical hernia after mesh repair.

Methodology

After the ethical approval from the institutional review board, this cross-sectional study was conducted at the Department of Surgery, SMBBMC, Lyari, Karachi, from 01/march/24 to 30/august/24. Through non-probability consecutive sampling, 125 patients aged 8-65 years, either male or female, who were diagnosed through clinical examination and an abdominal ultrasound to have a para-umbilical hernia and undergo elective mesh repair of hernia (Onlay technique) were included in the study. Patients who required emergency surgery due to strangulation and were not fit for the surgery were excluded from the study. After obtaining the informed consent, the recruited patient's age, BMI, smoking status, diabetes (fasting blood sugar > i26mgldl or using antidiabetic drugs), and size of hernia (by consultant radiologist using abdominal ultrasound of hernia sac) were documented. All these patients then underwent

mesh repair of hernia (onlay technique), which a surgeon with a minimum of two years of experience performed. All the patients were followed up for 12 months at 1,3, 6,9, and 12 months to assess for hernia recurrence through clinical examination and abdominal ultrasound. SPSS version 26 was utilized for the data analysis. Mean ± S.D was used for the continuous variables, while for the categorical variables, frequency and percentage were used. Age, BMI, smoking status, and diabetes stratified data. Post-stratification chi-square was used as a test of significance. A p-value of < 0.05 will be considered as statistically significant.

Results

Table 1 shows the demographic and clinical parameters of the 125 recruited patients who fulfilled the inclusion criteria. The average age of the study participants was 48.68±14.4 years, and most were male (55%). The average weight of the study participants was 75.97±14.6 Kg. %). The average height of the study participants was 1.69±0.11 meters. The average BMI of the study participants was 26.85±6.5 kg/m^2. The average size of the hernia was 3.6±1.29cm. Among the recruited participants, 46% had a history of smoking, while 56% had a diabetes history. Figure 1 shows that a recurrence rate of 52% was observed in the present study. Table 3 shows the stratification of recurrence rate with age, gender, BMI, smoking, and diabetes history. None of the variables was significantly associated with the recurrence rate.

Table 1: Demographic and clinical parameters of the study participants

Parameters	Mean and Frequency
Age (years)	48.68±14.4
Gender	
Male	69 (55%)
Female	56 (45%)
Weight (kg)	75.97±14.6
Height (m)	1.69±0.11
BMI (kg/m^2)	26.85±6.5
Size of Hernia(cm)	3.6±1.29
Smoking History	57 (46%)
Diabetes History	70 (56%)

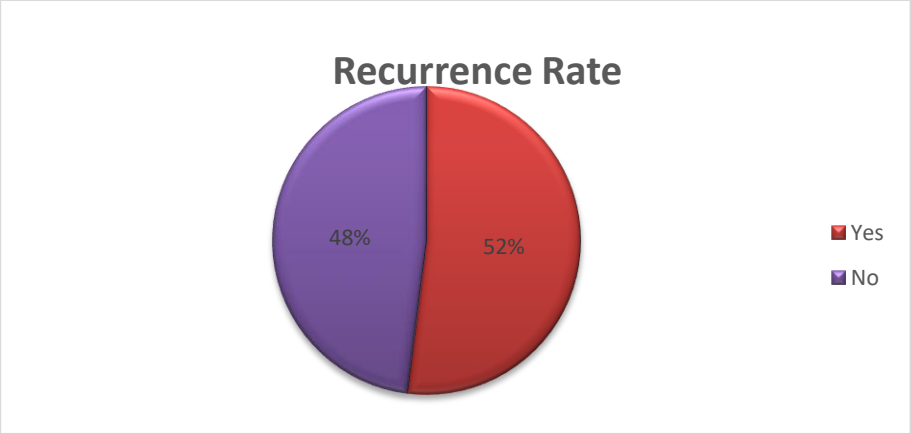

Figure 1: Recurrence rate after the mesh repair of paraumbilical hernia repair

Table 2: Stratification of recurrence based on age, gender, BMI, smoking and diabetes history

Stratification	Recurrence		P value
Age	Yes	No	
<50 years (n=68)	31 (46%)	37 (54%)	0.117
> 50 Years (n=57)	34 (60%)	23 (40%)	
Gender	Yes	No	0.499
Male	34 (49%)	35 (51%)	
Female	31 (55%)	25 (45%)	
Smoking History	Yes	No	0.897
Yes	30 (53%)	27 (47%)	
No	35 (51%)	33 (49%)	
Diabetes History	Yes	No	0.194
Yes	40 (57%)	30 (43%)	

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No	25 (45%)	30 (55%)	
BMI	Yes	No	0.625
<20 (n=23)	14 (61%)	9 (39%)	
21-25 (n=25)	12 (48%)	13 (52%)	
<25 (n=67)	39 (58%)	28 (42%)	

Discussion

The current study reports a recurrence rate for mesh repair of 52%, which is much higher compared to recurrence rates offered by previous literature. Most articles on paraumbilical hernia repair have advocated a 1-10% recurrence rate based on surgical techniques, patient demographics, and other risk factors. Hence, the high recurrence rate in this study points toward the need for further exploration of possible contributing factors in the local setting of the Department of Surgery, SMBBMC, Lyari, Karachi.

The mean age of the patients was 48.68 years, with a slight male predominance of 55%. As seen in our research, many previous studies have shown that age is not an independent risk factor for hernia recurrence. Although the present study found no significant association between age and recurrence, older patients could have weak abdominal muscles and co-morbidities. Halleran et al. (2020) have reported that age alone did not significantly influence recurrence when other factors were controlled for it (7).

It is already known that obesity is among the risk factors for recurrence because of increased intra-abdominal pressure and problems associated with surgical wound healing. The average BMI in this study was 26.85 kg/m², and no statistically significant association was found between BMI and hernia recurrence. However, the literature reports otherwise. According to Burcharth et al., in 2015, patients with a BMI of more than 30 are at a considerably higher risk of recurrence, with rates as high as 14% (8). This could be attributed to this study having a larger population or differences in the follow-up of patients and surgical techniques used in this study.

This cohort had 46% with a history of smoking and 56% with diabetes, which are causes for poor wound healing. These results were effectively explained by the study of Muysoms et al. (2016), which underlined that smoking increases postoperative complications, mainly infection and recurrence, via its adverse action on tissue integrity (9). This study, however, did not find any significant relationship between smoking history and recurrence, probably due to the small sample size or short follow-up period. In the same vein, the influence of diabetes—characterized by impaired collagen synthesis and wound healing—on recurrence was not statistically significant in this study. At the same time, other literature identifies the relationship between poorly controlled diabetes and higher rates of recurrence. The mean size of the hernia in this study was 3.6 cm, and more significant hernia defects are associated with higher recurrence rates. Although this study did not show any significant relationship with regards to hernia size and recurrence, past literature, including the studies by Jairam et al. in 2020, demonstrated that larger sizes of hernias, especially those greater than 4 cm, are associated with a higher recurrence rate since it will be more challenging to close the defect completely (10).

Conclusion

Recurrence following paraumbilical hernia repair with mesh in our study was 52%, much higher than in the existing literature. Though the effect of some factors, like age, sex, BMI, smoking, and diabetes, upon recurrence was tested, none of them showed a trend for significance concerning recurrence. Further research on a larger sample with an extended follow-up is needed to understand the underlying reasons for this outcome.

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-
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Coordinate collaborative efforts, study design, and review of literature.
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Conception of Study, Development of Research Methodology Design, manuscript review, and final approval of manuscript.
AMBER ALI (Postgraduate surgical Resident)
Manuscript revisions, critical input, Coordination of collaborative efforts.
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Data acquisition, analysis, and Manuscript drafting.
SYEDA MAHJABEEN FATIMA (Postgraduate Surgical Resident)
Data entry and data analysis, as well as drafting the article.
TAYRAM BINT-E-KHALID (Postgraduate Surgical Resident)
Data acquisition and analysis. Coordination of collaborative efforts.

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