The Rate of Hernia Recurrence in Surgical Patients with Mesh Repair and Non-Mesh Repair

Hamidreza Movahedi*, Lena Nazemi, Farzad Dehghani, Saina Ghadyani

Department of General Surgery, Ayatollah Taleghani Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Received: 2024-08-15; Received in revised form: 2024-10-21; Accepted: 2024-11-08

Abstract

Background: Hernia repair is one of the most common procedures in general surgery, which is performed by various methods. One of the consequences of hernia repair is the recurrence of hernia in the short or long term. In this study, the rate of hernia recurrence in surgical patients with mesh and non-mesh repair methods was investigated.

Methods: This prospective cohort study was conducted on 138 patients who underwent repair surgery with mesh (28 individuals) and without mesh (110 individuals) due to hernia in Hamadan Ba'ath Hospital in 2019 and 2014. The authors investigated and compared in terms of frequency of recurrence and complications. Part of the required data was obtained from the patient's medical records and part was obtained through telephone calls. Data analysis was done with SPSS software version 26.

Results: The average age of the patients was 41.2±26.25 years, 88.4% were male and 11.6% were female. The frequency of hernia recurrence was 3.6% in total, all of which were in the non-mesh repair group. No significant difference was observed between hernia repair with and without mesh in terms of frequency of recurrence (P=0.583) and complications (P=0.964). Also, no significant relationship was observed between hernia recurrence with gender, age, smoking, employment status, and body mass index (P>0.05).

Conclusions: Hernia repair with both methods with and without meshing have a relatively favorable short-term outcome. Although meshing reduces hernia recurrence; However, there was no significant difference between the two methods of hernia repair with and without meshing in terms of recurrence and complications.

Keywords: Hernia; Recurrence; Mesh

Citation: Movahedi H, Nazemi L, Dehghani F, Ghadyani S. **The Rate of Hernia Recurrence in Surgical Patients with Mesh Repair and Non-Mesh Repair.** *Acad J Surg*, 2024; 7(4): 95-100.

Introduction

Hernias are protrusions of organs or part of organs through the cavity that covers them [1]. They are generally classified by anatomic location, with inguinal and femoral hernias (collectively known as inguinal hernias) being the most common types of hernias. Inguinal hernias are often encountered with or without symptoms in clinical practice, with an estimated lifetime risk of 27% in men and 3% in women, and can be symptomatic or asymptomatic [1]. Surgical repair is indicated for symptomatic hernias, with inguinal hernia repair being one of the most common procedures worldwide [2]. Repair can be achieved by suturing the defect closed, or by implanting surgical mesh to reinforce weak or damaged tissue [1].

Due to the frequency of occurrence and recurrence of hernia all over the world, hernia has become one of the important socio-economic problems [3, 4]. Almost all researchers believe that inguinal hernia is a surgical candidate due to possible complications. In adults, an inguinal hernia can be indirect, so that the hernia sac, which is an extension of the peritoneum, comes out from the side of the cord and inside the inner ring, and when the patient pushes, it causes the viscera to be pushed inside if the viscera is inside the sac in the inguinal region. If they get stuck, there is a risk of suffocation, and there are subsequent complications [5].

Femoral hernia surgery is one of the most common general surgery procedures performed on

*** Corresponding author**: Hamidreza Movahedi
MD, Department of General Surgery, Ayatollah Taleghani Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Tel.: +98 912 0497757 Email: movahedi9898@gmail.com

children and adults [4, 6]. Various methods have been introduced for this purpose, and the goal is to improve treatment results in terms of reducing complications and recurrence, increasing patient satisfaction, and returning to work faster, which greatly reduces treatment costs. During the last two decades, the non-stretching repairs using Prolene meshes have been welcomed due to good results and low recurrence, but still, the method of choice for repairing inguinal hernias is one of the topics discussed in surgery [7].

Despite the improvement of treatment methods and technical aspects, one of the biggest challenges regarding inguinal hernia surgery, which still remains a clinical problem, is its recurrence after surgery. It has been observed that after surgery, about 13% of patients frequently relapse and undergo surgery again [8]. Among the non-modifiable causes of hernia recurrence are factors and risk factors related to the patient, such as the gender of the patient [8], the anatomy of the hernia [9], the type of hernia [9], the method of accepting the patient [10], the composition of the connective tissue [11], the destruction of the connective tissue [12], smoking and recovery after surgery [13]. Recurrent hernia surgery has a higher risk of complications compared to primary hernia. The Lichtenstein method is a relatively simpler method among the many methods of hernia repair using mesh, which is usually preferred to other methods and is referred to as a gold standard method [14] in which the mesh is placed on the floor of the inguinal canal [15]. Placing the mesh in the periperitoneal space completely covers the weakened fascia and the defect and reduces the possibility of the peritoneum coming out of this area due to intra-abdominal pressure, but on the contrary, this pressure causes the mesh to stick more to the surrounding tissue and to the sutures. Less preservative is also needed [16]. The average recurrence in the Lichtenstein method is reported to be 4.3% [17]. According to the different results of the studies conducted in the field of the effect of using and not using mesh in hernia repair, the present study was conducted with the aim of comparing the rate of hernia recurrence in patients who underwent surgery with the method of repair with mesh and repair without mesh.

Materials and methods

Type of study

This study was conducted as a cohort on patients who underwent hernia surgery with and without the use of mesh at the educational-therapeutic center of Hamedan University of Medical Sciences in 1400. The study samples were selected by a simple random method among the patients who underwent hernia surgery in Hamedan Besat Hospital in 2018.

Data collection tool and validity and reliability of the tool

In this study, a checklist designed by the researchers was used, which included demographic variables such as age, gender, body mass index, smoking, and recurrence and complications of surgery.

Inclusion criteria

· All patients underwent elective hernia surgery
· The presence of medical and treatment information in the patient file
· The existence of information about the recurrence of the disease
· Age 18 to 65 years

Exclusion criteria

· Morbid obesity
· Incarcerated inguinal hernia
· Previous history of hernia surgery
· Bilateral hernia surgery
· Absence of relapse records in the patient's medical record or not responding to phone calls

Data collection method

This study was conducted in the Ba'ath Hospital of Hamedan using the cohort method. After approving the proposal and obtaining the code of ethics by census method, all the patients who underwent hernia surgery in Ba'ath Hamadan Medical Education Center between 2019 and 2018 were included in the study. The basic information of the patients, including age, gender, history of diabetes, smoking, history of surgery and location of hernia, as well as the use or non-use of mesh fixation and complications after surgery (infection, cirrhosis, etc.) were extracted from the patients' medical records. Information related to hernia recurrence (according to the presence of the contact number of the patients) they were contacted and asked about the actual recurrence of hernia in the previous surgical site or other late complications. It should be noted that the minimum time interval elapsed from the surgery took one year.

Data analysis method

After collecting the data related to the study, they were entered into SPSS software version 26 and analyzed. Descriptive information related to qualitative variables was shown in the form of tables and graphs, and descriptive information of quantitative variables was shown in the form of central and dispersion

indices. In order to compare the frequency of hernia recurrence in two groups, Fisher's exact test and the frequency of other complications were used, Chi-square test and Fisher's exact test. The significance level in this study was 0.05.

Results

138 patients who met the inclusion criteria were examined. In terms of gender, 122 individuals (84%) were men and 213 individuals (11.6%) were women. The mean and standard deviation of the age of the patients was 41.2±26.25 years, most of them were in the age group of 60 to 69 years. In total, 14.5% (20 individuals) were smokers, 42% (80 individuals) were unemployed, 47.2% (65 individuals) were overweight and obese.

The mean and standard deviation of the age of individuals with and without hernia recurrence repaired without meshing method were 36.4 ± 25.32 and 41.38 ± 26.36 years, respectively. According to the result of Student's t test, no significant relationship was observed between the age of the subjects under the study of hernia recurrence.

Out of the total number of surgeries performed, 73 cases were urgent and 65 cases were elective, for which 28 cases were performed with mesh and 110 cases without mesh. No recurrence of hernia was observed in any of the cases of surgery with mesh placement, according to the analysis, the results showed that there was no statistically significant difference between the patients undergoing hernia repair surgery with and without mesh placement in terms of hernia recurrence (p=0.583).

In the comparison between the two groups, no significant difference was observed in the incidence of pain, infection, and inflammation complications.

According to the findings of Table 1, no significant difference was observed between hernia repair with and without meshing in terms of operative urgency, unilateral or bilateral hernia, gender, smoking, and employment.

According to the findings in Table 2, no significant difference was observed between hernia repair with and without meshing in terms of postoperative complications.

According to Fig. 1, the mean and standard deviation of body mass index of individuals with and without hernia recurrence repaired without meshing method were 25.7±6.36 and 24.22±3.16 kg/m^2,

Table 1: The frequency of hernia recurrence in the patients under study according to the urgency of the operation, involved side, gender, occupation and smoking.

Variable		Recurrence of hernia			P. value
		Yes N (%)	No N (%)	Total N (%)	
Urgency	Selective	70 (95.9)	3 (4.1)	73 (100)	0.746
	Elective	63(96.9)	2 (3.1)	65 (100)	
Side	One-way	111 (97.4)	3 (2.6)	114 (100)	0.208
	Two-way	22 (91.7)	2 (8.3)	24 (100)	
Gender	Male	118 (96.7)	4 (3.3)	122 (100)	0.465
	Female	15 (93.8)	1 (6.2)	16 (100)	
Smoking	No	114 (96.6)	4 (3.4)	118 (100)	0.549
	Yes	19 (95.0)	1 (5.0)	20 (100)	
Employment status	Unemployed	78 (97.5)	2 (2.5)	80 (100)	0.650
	Employed	55 (94.8)	3 (5.2)	58 (100)	

Table 2: Frequency of complications after hernia repair with and without meshing

Variable		Hernia repair method		p. value
		Without mesh N (%)	With mesh N (%)	
Side effect	Pain	6 (5.4)	2 (7.4)	0.728
	Infection	1 (0.9)	1 (3.7)	
	Swelling	1 (0.9)	0 (0)	
	Itching	3 (2.7)	0 (0)	
	Numbing	1 (0.9)	0 (0)	
	Without side effect	111 (91.0)	24 (88.9)	
Total Side effect	No	6 (5.4)	6 (5.4)	0.964
	Yes	6 (5.4)	6 (5.4)	
	Total	6 (5.4)	6 (5.4)	

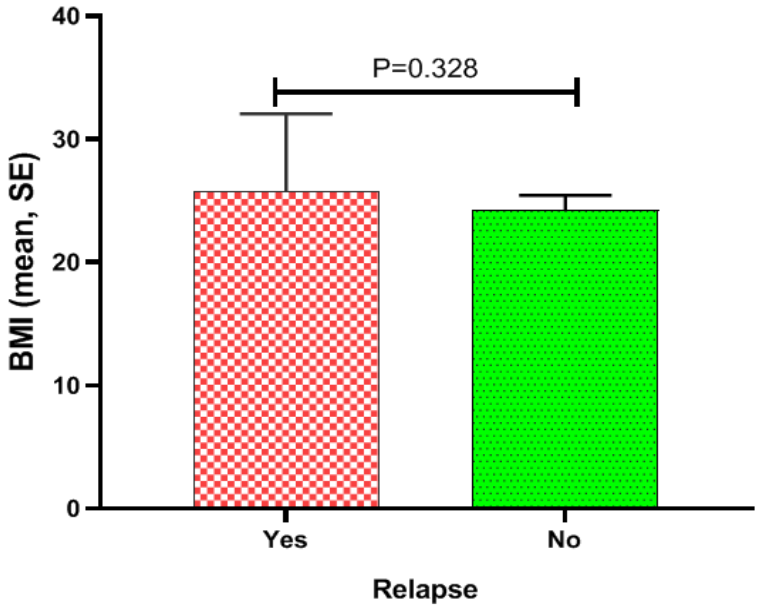

Fig. 1: Mean and standard error of body mass index of people with and without hernia recurrence

respectively. According to the statistical test, it can be shown that there was no significant relationship between the body mass index of the subjects under study and the recurrence of hernia after surgery (p=0.328).

Discussion

In this study, hernia recurrence was 4.5% in patients repaired without mesh. However, in the group repaired with mesh within one year, no case of hernia recurrence was observed. This study was conducted with the aim of comparing the rate of hernia recurrence in patients who underwent surgery with the method of repair with mesh and repair without mesh.

According to the obtained results, the frequency of short-term recurrence of hernia in the studies carried out, in hernia repair with mesh was between 0.4 and 10.1% and in the group without mesh between 0 and 15.5%. The frequency of long-term recurrence in hernia repair with mesh was between 0.99 to 30.7% and zero to 31.3% in the group without meshing. The results of the authors' findings are almost consistent with the results of the mentioned studies in the field of repaired hernia recurrence with and without meshing.

In the present study, no significant difference was observed between the frequency of hernia repair with and without meshing. In line with the results of the authors' study, the meta-analysis of Petric et al. compares the frequency of long-term and short-term recurrence of hiatus hernia repair with sutures and reinforced mesh and without mesh [18]. The study of Koetje et al. in the Netherlands compared the frequency of radiological and symptomatic recurrence of laparoscopic hiatal hernia repair with and without mesh [19] and the clinical trial of Taylor et al. in Australia [20] between hernia repair with and without mesh placement in terms of short-term and long-term recurrence. No significant difference was observed. On the other hand, in the meta-analysis of Bisgaard et al., comparing the frequency of recurrence after umbilical hernia repair with and without mesh, the results showed that the risk of recurrence in mesh repair compared to repair without mesh was 0.28 with a 95% confidence interval between 0.13 and 0.58. percentage decreases [21]. The difference in the results may be due to the difference in the sample size (138 people vs. 656 people), the study method (cohort study vs. clinical trial), or the type of hernia (hernia in different parts of the body vs. umbilical hernia).

In the present study, there was no significant relationship between hernia recurrence and body mass index, age, employment status, and smoking. In the study of Eruglo et al. in Turkey regarding factors affecting hiatal hernia recurrence after repair, having a poor metabolic profile was an independent risk factor for recurrence after 12 months in the group undergoing repair with non-tension mesh [22]. In a review study conducted by Subramanya-Siddaiah et al. in Australia, regarding the causes of recurrence in laparoscopic inguinal hernia repair, modifiable risk factors for recurrence were higher BMI, smoking, diabetes, and surgical site infections, which increased the risk. Recurrence, larger mesh with better tissue overlap, and precise surgical techniques to reduce the incidence of seroma or hematoma were associated

with reduced recurrence [23]. The reason for the discrepancy between the findings of the authors' study and the results of the mentioned studies in the field of factors affecting relapse is probably due to the small sample size in the group of relapsers.

In this study, no significant difference was observed between hernia repair with and without mesh in terms of complications (pain, infection, and inflammation). Based on the results of a review and meta-analysis conducted by Petric et al., comparing hiatus hernia repair with sutures vs. Reinforced mesh, the results showed that the use of mesh in hernia repair did not have a significant advantage over sutures. Both methods had good clinical results, and the use of sutures in hernia repair is still a suitable approach [18]. In a review study Bisgaard et al. compared the results of clinical trials conducted for the repair of umbilical hernia with mesh and without mesh, no significant difference was found between the two methods in terms of the incidence of infection and seroma formation [21]. Also, in the study conducted by Koetje et al. In the Netherlands, in terms of patient satisfaction, quality of life, and objective recurrence rate after laparoscopic hiatal hernia repair with and without mesh, the rate of complications was the same, and no significant difference was observed between the two groups in terms of satisfaction [19], which is consistent with the results of the authors' study.

Conclusion

Hernia repair with both methods, with and without meshing, has a relatively favorable short-term outcome. Although meshing reduces hernia recurrence, no significant difference was observed between these two methods of hernia repair with and without meshing in terms of short-term recurrence.

Factors other than mesh that are associated with an increased incidence of relapse may be related to increased BMI and smoking history. There is a need to establish a specific hernia registry to provide long-term postoperative surveillance data and facilitate effective adverse event reporting for all hernia operations. Surgeons can be confident that the use of mesh can be a safe and effective choice when counseling patients about inguinal hernia repair techniques.

Conflict of interest

None declared.

References

1. Lockhart K, Dunn D, Teo S, Ng JY, Dhillon M, Teo E, al. Mesh versus non-mesh for inguinal and femoral hernia repair. Cochrane Database Syst Rev. 2018;9(9):CD011517.. https://doi.org/10.1002/14651858.CD011517.pub2
2. HerniaSurge G. International guidelines for groin hernia management. Hernia. 2018;22(1):1-165. https://doi.org/10.1007/s10029-017-1668-x
3. Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. Lancet. 2003;362(9395):1561-71. https://doi.org/10.1016/S0140-6736(03)14746-0
4. Rutkow IM. Demographic and socioeconomic aspects of hernia repair in the United States in 2003. Surg Clin North Am. 2003;83(5):1045-51, v-vi. https://doi.org/10.1016/S0039-6109(03)00132-4
5. Durukan U, Agcaoglu O, Ozoran E, Karahan SN, Ozata I, Duzkoylu Y, et al. The role of tissue inhibitor of metalloproteinases in the aetiology of inguinal and incisional hernias. Int Wound J. 2022;19(6):1502-8. https://doi.org/10.1111/iwj.13746
6. Ein SH, Njere I, Ein A. Six thousand three hundred sixty-one pediatric inguinal hernias: a 35-year review. J Pediatr Surg. 2006;41(5):980-6. https://doi.org/10.1016/j.jpedsurg.2006.01.020
7. Charara RH, Ibrahim R, Zaarour R, Houmani A, Haidar Ahmad H. Laparoscopic Repair of Acute Traumatic Diaphragmatic Hernia: A Case Report. Cureus. 2023;15(6):e40959. https://doi.org/10.7759/cureus.40959
8. Kehlet H, Bay-Nielsen M, Danish Hernia Database C. Nationwide quality improvement of groin hernia repair from the Danish Hernia Database of 87,840 patients from 1998 to 2005. Hernia. 2008;12(1):1-7. https://doi.org/10.1007/s10029-007-0285-5
9. Kocijan R, Sandberg S, Chan YW, Hollinsky C. Anatomical changes after inguinal hernia treatment: a reason for chronic pain and recurrent hernia? Surg Endosc. 2010;24(2):395-9. https://doi.org/10.1007/s00464-009-0595-z
10. Peltrini R, Carannante F, Giovine G, Petitti T, V LAV, Caricato M, et al. Long-term patient-reported outcomes after anti-reflux surgery for gastroesophageal reflux disease and hiatal hernia repair: a single-center experience. Minerva Surg. 2023. https://doi.org/10.23736/S2724-5691.23.09930-6
11. Ben-Yaacov A, Laks S, Zoabi G, Kirshenboim Z, Goldenshlger A, Hazzan D, et al. Increased risk for incisional hernia following cytoreductive surgery with hyperthermic intraperitoneal chemotherapy. ANZ J Surg. 2023. https://doi.org/10.1111/ans.18594
12. Hakeem A, Saqib SU, Zafar H. Return to Work in Patients With Unilateral Inguinal Hernia Surgery: A Comparative Study Between Laparoscopic Transabdominal Preperitoneal Approach and Lichtenstein Tension-Free Mesh Repair. Cureus. 2023;15(5):e39202. https://doi.org/10.7759/cureus.39202
13. Yoo JG, Ki EY, Kim SM, Chung YH, Kang HJ, Jung G, et al. Visceral obesity as a risk factor of incisional hernia after single-port laparoscopic gynecologic surgery. Asian J Surg. 2023;46(2):829-33. https://doi.org/10.1016/j.asjsur.2022.08.085
14. Bringman S, Holmberg H, Osterberg J. Location of recurrent groin hernias at TEP after Lichtenstein repair:

a study based on the Swedish Hernia Register. Hernia. 2016;20(3):387-91. https://doi.org/10.1007/s10029-016-1490-x
15. Estridge P, Sanders DL, Kingsnorth AN. Worldwide hernia repair: variations in the treatment of primary unilateral inguinal hernias in adults in the United Kingdom and in low- and middle-income countries. Hernia. 2019;23(3):503-7. https://doi.org/10.1007/s10029-019-01960-6
16. Demetriou G, Ahmad MS, Robinson SJ. Laparoscopic mesh placement during inguinal hernia repair: a meta-analysis of two methods of repair. ANZ J Surg. 2022. https://doi.org/10.1111/ans.18124
17. Tao Z, Ordonez J, Huerta S. Hernia Size and Mesh Placement in Primary Umbilical Hernia Repair. Am Surg. 2021;87(6):1005-13. https://doi.org/10.1177/0003134820971624
18. Petric J, Bright T, Liu DS, Wee Yun M, Watson DI. Sutured Versus Mesh-augmented Hiatus Hernia Repair: A Systematic Review and Meta-analysis of Randomized Controlled Trials. Ann Surg. 2022;275(1):e45-e51. https://doi.org/10.1097/SLA.0000000000004902
19. Koetje JH, Oor JE, Roks DJ, Van Westreenen HL, Hazebroek EJ, Nieuwenhuijs VB. Equal patient satisfaction, quality of life and objective recurrence rate after laparoscopic hiatal hernia repair with and without mesh. Surg Endosc. 2017;31(9):3673-80. https://doi.org/10.1007/s00464-016-5405-9
20. Taylor C LL, Liew V, Ghusn M, Crampton N, White S. Laparoscopic inguinal hernia repair without mesh fixation, early results of a large randomised clinical trial. Surg Endosc. 2008;22(3):757-62. https://doi.org/10.1007/s00464-007-9510-7
21. Bisgaard T, Kaufmann R, Christoffersen MW, Strandfelt P, Gluud LL. Lower Risk of Recurrence After Mesh Repair Versus Non-Mesh Sutured Repair in Open Umbilical Hernia Repair: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Scand J Surg. 2019;108(3):187-93. https://doi.org/10.1177/1457496918812208
22. Eroglu E, Altinli E. Poor Metabolic Profile Is an Independent Risk Factor for Recurrence After Hiatal Hernia Repair When Using Tension-Free Mesh. J Laparoendosc Adv Surg Tech A. 2023;33(1):32-7. https://doi.org/10.1089/lap.2022.0154
23. Siddaiah-Subramanya M, Ashrafi D, Memon B, Memon MA. Causes of recurrence in laparoscopic inguinal hernia repair. Hernia. 2018;22(6):975-86. https://doi.org/10.1007/s10029-018-1817-x