Al-Azhar International Medical Journal

Volume 5 | Issue 2 Article 11

2024
Section: General Surgery

Comparative Study Between Fibrin Glue and Intra Corporeal Mesh Fixation in Trans Abdominal Preperitoneal Laparoscopic Inguinal Hernial Repair

Mahmoud Tarek Mohammed Ahmed Moamn
Resident at General surgery department, Faculty of Medicine, Al-Azhar University, Cairo, Egypt, mahmoud.tarek672@gmail.com

Ashraf Abdel-Hammid Abdel-monem
General surgery department , Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Abdel-Hafez Abdel- Aziz Selim
General surgery department , Faculty of Medicine, Al-Azhar University, Cairo, Egypt

How to Cite This Article

Moamn, Mahmoud Tarek Mohammed Ahmed; Abdel-monem, Ashraf Abdel-Hammid; and Selim, Abdel-Hafez Abdel- Aziz (2024) "Comparative Study Between Fibrin Glue and Intra Corporeal Mesh Fixation in Trans Abdominal Preperitoneal Laparoscopic Inguinal Hernial Repair," *Al-Azhar International Medical Journal*: Vol. 5: Iss. 2, Article 11.
DOI: https://doi.org/10.58675/2682-339X.2279

ORIGINAL ARTICLE

Comparative Study Between Fibrin Glue and Intracorporeal Mesh Fixation in Transabdominal Preperitoneal Laparoscopic Inguinal Hernial Repair

Mahmoud Tarek Mohamed Ahmed Moamn*, Ashraf Abdel-Hammid Abdel-Monem, Abdel-Hafez Abdel-Aziz Selim

Department of General Surgery, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Abstract

Introduction: **Inguinal hernia, which often necessitates surgery, has a prevalence of 15–45% around the world, depending on age. The most common surgical treatment for inguinal hernia is mesh implantation. Current surgical options for mesh fixation involve, but are not limited to, sutures, tacks or staples, self-fixing meshes, fibrin, and other glues.**

Aim: **To evaluate the performance of fibrin glues and sutures for fixing mesh during laparoscopic inguinal hernia repair.**

Patients and methods: **Forty adult male patients with inguinal hernias were randomly assigned to have either laparoscopic transabdominal preperitoneal repair or open repair at Al-Azhar University facilities. Individuals were separated into group A, which utilized fibrin glue, and group B, which utilized sutures, based on the mesh fixation technique they received.**

Results: **There was no significant distinction in age among the groups. There was a significant variation in operative time among the groups, but no intraoperative problems occurred in any of the study populations. There are statistically substantial variations among the groups at every time point in terms of the severity of the pain scores reported after surgery. There are statistically significant disparities in length of hospital stay. There is a significant distinction in economic costs among the groups. There were no significant variations in the occurrence of early postoperative complications among the two groups. All groups showed no evidence of recurrence during the follow-up period.**

Conclusion: **Based on the results of our research, utilizing fibrin glue to secure mesh is an equally efficient and cost-effective alternative. Our research shows that fibrin glue has many benefits, involving a short recovery time, shorter hospital stay, lower overall cost, fewer problems, and a low recurrence rate.**

Keywords: Fibrin glue, Inguinal hernia, Preperitoneal, Suture, Transabdominal

1. Introduction

In accordance with Mizrahi *et al*. (2012), an inguinal hernia is a protrusion of the peritoneal sac that occurs through a weak point in the groin region. Inguinal hernias frequently contain abdominal contents and are usually treated through surgical procedures. An inguinal hernia is the kind of abdominal wall hernia that occurs the most frequently. Despite the fact that inguinal hernia repair is one of the most frequently done surgical operations globally, approximately half of persons who have the condition are unaware that it can be repaired.[1] Due to the fact that hernia affects from one to five percent of the population, inguinal hernia repair is the most prevalent operation in general surgery.[2] In men, the rate of inguinal hernia varies from around 110/100,000 among the ages from 16 to 24 to over 2000/100,000 for those 75 and above.[3] Worldwide, the incidence of inguinal hernia is about

Accepted 10 September 2023.
Available online 6 May 2024

* Corresponding author at: General Surgery Department, Faculty of Medicine, Al-Azhar University, Cairo, 11884, Egypt.
E-mail address: mahmoud.tarek672@gmail.com (M.T.M.A. Moamn).

https://doi.org/10.58675/2682-339X.2279

1700/100,000 people of all ages in addition to 4000/100,000 people aged 45 and older.[4] Inguinal hernia is more prevalent among Caucasians than African-Americans.[5]

The incidence of inguinal hernia is higher in men than in women. The number of males to females is around nine to one.[6] Inguinal hernia can be triggered by a variety of reasons, involving pregnancy, a family history of the condition, being overweight, being male, or being older in age.[7] People with enormous bulges through a tiny hole, painful hernias, and a high risk for complications involving strangulation and incarceration are the typical candidates for surgical repair of an inguinal hernia.[8]

Laparoscopic inguinal hernia repair has been around for over twenty years now. As a treatment option, it is gaining popularity for inguinal hernias.[9] Different techniques, such as the laparoscopic transabdominal preperitoneal (TAPP) approach, the laparoscopic totally extraperitoneal (TEP) method, and the intraperitoneal onlay mesh approach, can be used to treat an inguinal hernia by laparoscopic surgery.[10]

In addition, as indicated by Aiolfi *et al.*[11] in comparison to the Lichtenstein tension-free repair method, the laparoscopic transabdominal preperitoneal repair and the completely extraperitoneal repair techniques both had a lower incidence of early postoperative discomfort, return to work or activities, hematoma, chronic pain, and wound infection.[12] Inguinal hernias can be repaired surgically employing a mesh, and surgical risk factors involve the type of mesh utilized and its fixation technique.[12]

The existing mesh is composed of a wide variety of materials, and the surgical options for fixing the mesh include, but are not limited to, sutures, tacks or staples, self-fixing meshes and fibrin, as well as various types of glues.[12]

Our research aims to evaluate the outcomes of laparoscopic inguinal hernia repair with fibrin glue versus sutures for fixing the mesh.

2. Patients and methods

From October 2022 to October 2023, we performed a prospective observational research on 40 adult male participants with inguinal hernia. The hospitals of Al-Azhar University received these individuals through the university's outpatient surgery clinics. Inguinal hernia individuals, inguinal swelling individuals, and inguinal hernia individuals following laparoscopic treatment were also involved. Participants who had a history of hernia recurrence, an inguinoscrotal hernia, an obstructed or strangulated hernia, a hernia of a different location, and extensive chest involvement, who were not candidates for general anesthesia, or were taking anticoagulants, were not involved in this research. Participants that had been deemed were split into two categories: mesh was fixed in two groups, A with fibrin glue and B with sutures. Name, age, employment, current residence, and any behaviors that could be clinically significant were all recorded.

History of recent illness, including complaint analysis, onset, course, aggravating and mitigating factors, and an assessment of other body systems, especially chest disease, bowel problems such as constipation, and urination problems. Family history: presence of inguinal hernia and other family diseases. Local examination of the groin and scrotum area to confirm the diagnosis of inguinal hernia and its type and the presence of complications. Laboratory tests: complete blood count, coagulation profile, liver and kidney function tests, and fasting blood glucose. Radiological tests: Pelvic–abdominal ultrasound. Specific studies: An electrocardiogram has been requested in patients over 40 years old.

Utilizing laparoscopic transabdominal preperitoneal repair, forty individuals underwent inguinal hernioplasty. After positioning the individual supine on the operating table, the urologist will insert a urinary catheter. A full abdominal, groin, penis, and scrotum rubdown is performed while the patient is fully draped. Two 5 mm ports are introduced at the same level as the navel on either side of the rectus sheath, and a camera port is inserted below the navel using an open approach. When 14 mmHg of CO_2 pressure is applied to the stomach, it causes expansion. In order to determine the source of the pain and locate critical anatomical structures such as the epigastric arteries and umbilical cord, an exploratory laparoscopy is done. Following separation of the peritoneum from the fascia transversalis, the peritoneal flap is dissected from the area around the ASIS medially to the midline, where the gap is then produced. Rolling a piece of polypropylene mesh measuring 11 × 6 cm to form a tube, it is then inserted through the 10- mm openings for the umbilical cord. Fibrin glue and sutures are used to insert the mesh in two distinct patient populations, correspondingly.

To secure the mesh, 2 ml of fibrin glue is used in the fibrin glue group, whereas 2/0 polyproline sutures are utilized in the suture group. The femoral ring regions, together with the direct and indirect spaces, are all enclosed by the mesh. Sutures of size 2/0 Vicryl are employed for closing the peritoneal flap. Close the skin backup and take out the ports.

At the time of discharge, a nonsteroidal anti-inflammatory medicine that was taken orally was

employed to keep antibiotics and analgesia working. In order to conduct a postoperative pain assessment, the participants were given a Visual Analog Scale (VAS) and asked to score their level of discomfort at various time intervals. Early postoperative problems involve urine retention, scrotal edema, hematoma, infection at the incision site, and seroma. After surgery, you will need to remain in the hospital for some time. Utilizing a standardized telephone script, all patients were followed as outpatients 1 week, then 1, 4, and 6 months later.

IBM SPSS Version 24.0 (Armonk, NY: IBM Corp) was employed for all the computations and evaluation of data. Quantitative and percentage descriptions of qualitative data were provided. The minimum and maximum values, as well as the mean and standard deviation, were provided to describe the quantitative data. The acquired findings were analyzed for significance at the 5% level. χ^2 test is used to contrast two groups based on categorical data. Analysis of variance (ANOVA): used to compare quantitative characteristics among two groups. Compare two groups for unusual quantitative variables utilizing the Kruskal–Wallis H-Test.

3. Results

Forty males with inguinal hernias were randomized to TAPP repair in a prospective trial (Table 1).

This table shows the description of socioeconomic data in all examined individuals. Regarding age, the mean age in all examined cases was 40.1 ± 10.2 years with minimum age of 22 years and maximum age of 65 years. Concerning occupation, there were 24 (60%) manual workers, 2 (5%) teachers, 8 (20%) office clerks, and 6 (15%) retired in the examined subjects. As regards smoking, there were 16 (40%) nonsmoker, 6 (15%)ex-smokers, and 18 (45%) smokers in the studied patients (Table 2).

Table 1. Description of socioeconomic data in all examined cases.

	Studied patients ($N = 40$) [n (%)]
Age (y)	
Mean ± SD	40.1 ± 10.2
Minimum–maximum	22–65
Occupation	
Manual worker	24 (60)
Teacher	2 (5)
Office clerk	8 (20)
Retired	6 (15)
Smoking	
Nonsmoker	16 (40)
Ex-smoker	6 (15)
Smoker	18 (45)

Table 2. Comparison among investigated groups in terms of operative time.

	Group A ($N = 20$)	Group B ($N = 20$)	Stat. test	*P* value
Operative time (min) Mean ± SD	56.8 ± 4.5	75.2 ± 5.2	**T= −11.9**	**<0.001 HS**

HS, *P* value less than 0.001 is considered highly significant; T, independent sample T-test.

This table indicates highly significant increased operative time in group B (75.3 ± 5.4 min) when contrasted with group A (56.8 ± 4.5 min).

There were statistically significant variations in postoperative pain scores (VAS scores) among groups, with the highest scores found in group III and the lowest scores found in group I at all follow-up times, except after 6 months (Table 3).

This table shows.

(1) Statistically significant reduced early postoperative VAS in group A (3.05 ± 0.88) when compared with group B (4.2 ± 1.8).
(2) Highly statistically significant declined 1-week postoperative VAS in group A (1.55 ± 0.68) when compared with group B (2.6 ± 0.81).
(3) Highly statistically significant reduced 1-month postoperative VAS in group A (0.8 ± 0.5) when compared with group B (1.7 ± 0.47).
(4) Highly statistically significant declined 4-month postoperative VAS in group A (0.0 ± 0.0) when compared with group B (0.95 ± 0.6).

No statistical significance after 6 months postoperative VAS in group A (0.0 ± 0.0) when compared with group B (0.4 ± 0.5) (Table 4).

This table shows.

(1) Highly significant variation among the studied groups (group A and group B) concerning early postoperative pain score severity. In group A, there were 4 (20%) cases with mild pain and 16 (80%) patients with no pain, while in group B, there were 4 (20%) cases with mild pain, 12 (60%) patients with moderate pain, and 4 (20%) patients with severe pain.
(2) Statistically significant distinction among the studied groups (group A and group B) as regards 1-week postoperative pain score severity. In group A, there were 16 (80%) individuals with mild pain and 4 (20%) individuals with no pain, while in group B, there were 16 (80%) individuals with mild pain and 4 (20%) individuals with moderate pain.
(3) Highly significant distinction among the examined groups (group A and group B) as regards 1-

Table 3. Comparison among examined groups concerning participant's postoperative pain score (visual analog scale score).

Postoperative VAS	Group A ($N = 20$)	Group B ($N = 20$)	Stat. test	*P* value
VAS (early post-op) Mean ± SD	3.05 ± 0.88	4.2 ± 1.08	**T= −3.5**	**0.001 S**
VAS (1 week post-op) Mean ± SD	1.55 ± 0.68	2.6 ± 0. 81	**T= −4.6**	**<0.001 HS**
VAS (1 month post-op) Mean ± SD	0.8 ± 0.5	1.7 ± 0.47	**T= −5.7**	**<0.001 HS**
VAS (4 months post-op) Mean ± SD	0.0 ± 0.0	0.95 ± 0.6	**T= −7.02**	**<0.001 HS**
VAS (6 months post-op) Mean ± SD	0.0 ± 0.0	0.4 ± 0.5	**T= −3.5**	**0.001 S**

S: *P* value less than 0.05 is considered significant.

Table 4. Comparison among the studied groups in terms of postoperative pain score severity.

Pain score severity	Group A ($N = 20$) [*n* (%)]	Group B ($N = 20$) [*n* (%)]	X^2	*P* value
Early postoperative				
No pain	0	0	**15.2**	**0.0005 HS**
Mild	16 (80)	4 (20)		
Moderate	4 (20)	12 (60)		
Severe	0	4 (20)		
1 week postoperative				
No pain	4 (20)	0	**8**	**0.018 S**
Mild	16 (80)	16 (80)		
Moderate	0	4 (20)		
Severe	0	0		
1 month postoperative				
No pain	12 (60)	0	**17.1**	**<0.001 HS**
Mild	8 (40)	20 (100)		
Moderate	0	0		
Severe	0	0		
6 months postoperative				
No pain	20 (100)	16 (80)	**4.44**	**0.035 S**
	0	4 (20)		
Moderate	0	0		
Severe	0	0		

month postoperative pain score severity. In group A, there were eight (40%) patients with mild pain and 12 (60%) cases with no pain, while in group B, all patients (100%) had mild pain.

(4) Statistically significant disparity among the examined groups (group A and group B) as regards 6-month postoperative pain score severity. In group A, all patients (100%) had no pain, while in group B, there were four (20%) patients with mild pain and 16 (80%) patients with no pain.

Table 5.
This table shows.

(1) Statistically significant (*P* value = 0.001) increased percentage of hematoma in group B (8 patients, 40%) when compared with group A (0 patients, 0%).

Table 5. Comparison among the examined groups concerning early postoperative complications.

Early post-op complications	Group A ($N = 20$) [*n* (%)]	Group B ($N = 20$) [*n* (%)]	X^2	*P* value
Scrotal edema	4 (20)	4 (20)	0.0	1.0 NS
Wound infection	4 (20)	4 (20)	0.0	1.0 NS
Hematoma	0	8 (40)	**10**	**0.001 S**
Seroma	4 (20)	4 (20)	0.0	1.0 NS
Urine retention	0	0	–	–

(2) No significant variation (*P* value greater than 0.05) among the examined groups (group A and group B) as regards other investigated early postoperative complications (wound infection, scrotal edema, seroma, and urine retention).

Hospital stays (hours) in group I varied between 4 and 7 h with mean ± S.D 5.60 ± 1.075 h. Hospital stays (hours) in group II varied among 4 and 7.5 h with mean ± S.D 5.90 ± 1.350 h. Hospital stays (hours) in group III varied between 4 and 10 h with a mean ± SD of 6.60 ± 2.271 h. There were no substantial variations seen among the groups (Table 6).

This table indicates significant (*P* value = 0.028) reduced hospital stay in group A (5.3 ± 0.9 days) when contrasted with group B (6.25 ± 1.6 days) (Tables 7 and 8).

This table indicates statistically significant (*P* value = 0.012) reduced hospital stay in group A (4.4 ± 0.9 days) when in contrast to group B (5.3 ± 1.26 days).

Table 6. Comparison among the examined groups as regards hospital stay.

	Group A ($N = 20$)	Group B ($N = 20$)	Stat. test	*P*-value
Hospital stay (hours) Mean ± SD	5.3 ± 0.9	6.25 ± 1.6	**T= −2.28**	**0.028 S**

Table 7. Comparison among groups regarding patient's economic cost.

	Group A ($n = 20$)	Group B ($n = 20$)
Economic cost	High	Low

Table 8. Comparison among examined groups as regards return to normal activity.

	Group A ($N = 20$)	Group B ($N = 20$)	Stat. test	*P*-value
Return to normal activity (days) Mean ± SD	4.4 ± 0.9	5.3 ± 1.26	**T= −2.63**	**0.012 S**

4. Discussion

The demographics of the research's subject: As regarding demographic data of the studied group of patients, age in group A, the mean age in group A was 42.4 ± 12.1 years and in group B it was 37.7 ± 7.5 years. No substantial variations were found among the groups. Additionally, every individual in each group was male. Concerning operative time, we found in our research that operative time in group A ranged 56.8 min with mean ± S.D. 4.5 min and in group B ranged 75.2 min with mean ± S.D. 5.2 min. A statistically significant distinction existed among groups. Group B (suture group) had a longer operation duration, while reduced time was noted in group A (fibrin glue group). This indicates that the technique of fibrin glue is more technically feasible.

Morales-Conde's[13] research evaluated various forms of mesh fixation for laparoscopic repair. They revealed that fibrin fixation required the minimum operative time, whereas Ferrarese *et al.*[14] revealed that adhesive mixture fixation was related to a shorter operative time than suture.

Statistically, group B had a lower VAS score for post-op pain than group A, although the gap was still substantial.

Our results were consistent with Wei *et al.*[15] They indicated that the fibrin sealing group's mean hospitalization and pain scores at all follow-ups were lower than staplers. Furthermore, Ladwa *et al.*[16] found that the suturing procedure caused significantly greater postoperative pain than the fibrin glue method.

Nizam *et al.*[17] also discussed this. Adhesive fibrin mesh fixation, on the other hand, is related to less postoperative groin pain than tacks or sutures, corresponding to a meta-analysis. However, our research discovered no significant variations among the two groups when it came to chronic pain.

The most common consequence of laparoscopic repair of ventral hernia is seroma, and its prevalence varies widely from 0.5 to 78%. Neither group noticed a higher rate of postoperative complications such as urine retention, serum conversion, hospitalization, or hematoma conversion than the other. There was no significant distinction in serum conversion among the two groups. Eleven studies found no hematomas in fibrin in viscous groups; however, eight hematomas were found in contrast to the prior study.[18]

In our research of economic cost, group A had the higher costs of all groups, and group B had the lower costs of the groups.

Return to normal activity in group A ranged 4.4 days with mean ± S.D. 0.9 days and in group B was varied among 5.3 days with mean ± S.D. 1.26 days. The variations among the groups were statistically significant. In contrast to the other research, this one found statistically significant variances among groups.[7]

4.1. Conclusion

Our research demonstrated that the fibrin glue approach is an equally effective and inexpensive option for fixing mesh. Early return to normal life, a shorter hospital stay, a lower cost, fewer complications, and a lower recurrence rate.

Conflicts of interest

There are no conflicts of interest.

References

1. Buyukasik K, Ari A, Akce B, Tatar C, Segmen O, Bektas H. Comparison of mesh fixation and non-fixation in laparoscopic totally extraperitoneal inguinal hernia repair. *Hernia*. 2017;21:543–548.
2. Habeeb TA, Mokhtar MM, Sieda B, et al. Changing the innate consensus about mesh fixation in trans-abdominal preperitoneal laparoscopic inguinal hernioplasty in adults: short- and long-term outcome. Randomized controlled clinical trial. *Int J Surg*. 2020;83:117–124.
3. Mathonnet M, Mehinto D. '[Indications for inguinal hernia repair]'. *J Chir (Paris)(in French)*. 2007;144 (Spec No 4):5S11–4.
4. Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. *Lancet*. 2003;362:1561–1571.
5. Mohammad H, Fiad A, Nour H, Hamed A. Short term outcome of laparoscopic trans-abdominal preperitoneal (TAPP) inguinal hernia repair without mesh fixation, a comparative study. *0Egypt J Hosp Med*. 2020;81:1644–1647.
6. Simons MP, Aufenacker T, Bay-Nielsen M, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia*. 2009;13:343–403.
7. Kaul A, Hutfless S, Le H, et al. Staple versus fibrin glue fixation in laparoscopic total extraperitoneal repair of inguinal hernia: a systematic review and meta-analysis. *Surg Endosc*. 2012;26:1269–1278.
8. Lukong C. Surgical techniques of laparoscopic inguinal hernia repair in childhood: a critical appraisal. *J Surg Tech Case Rep*. 2012;4:1–5.
9. Ruhl CE, Everhart JE. 'Risk factors for inguinal hernia among adults in the US population'. *Am J Epidemiol*. 2007;165:1154–1161.

10. Aiolfi A, Cavalli M, Del Ferraro S, et al. Treatment of inguinal hernia: systematic review and updated network meta-analysis of randomized controlled trials. *Ann Surg*. 2021 Dec 1;274(6): 954–961.
11. Sanders DL, Waydia S. A systematic review of randomised control trials assessing mesh fixation in open inguinal hernia repair. *Hernia*. 2014;18:165–176.
12. Choi BJ, Jeong WJ, Lee SC. Fibrin glue versus staple mesh fixation in single-port laparoscopic totally extraperitoneal inguinal hernia repair: apropensity score-matched analysis. *Int J Surg*. 2018;53:32–37.
13. Morales-Conde S. A new classification for seroma after laparoscopic ventral hernia repair. *Hernia*. 2012;16:261–267.
14. Ferrarese A, Marola S, Surace A, et al. Fibrin glue versus stapler fixation in laparoscopic transabdominal inguinal hernia repair: a single center 5-year experience and analysis of the results in the elderly. *Int J Surg*. 2014;12:S94–S98.
15. Wei K, Lu C, Ge L, et al. Different types of mesh fixation for laparoscopic repair of inguinal hernia: a protocol for systematic review and network meta-analysis with randomized controlled trials. *Medicine (Baltimore)*. 2018;97:e0423.
16. Ladwa N, Sajid MS, Sains P, Baig MK. Suture mesh fixation versus glue mesh fixation in open inguinal hernia repair: a systematic review and meta-analysis. *Int J Surg*. 2013;11:128–135.
17. Nizam S, Saxena N, Yelamanchi R, Sana S, Kardam D. Mesh fixation with fibrin glue versus tacker in laparoscopic totally extraperitoneal inguinal hernia repair. *ANZ J Surg*. 2021;91: 2086–2090.
18. Jensen KK, Henriksen NA, Jorgensen LN. Inguinal hernia epidemiology. *Textbook of Hernia*. 2017:23–27.