Original Article

OPEN ACCESS

Randomised Prospective Study to Compare Outcomes of Para Umbilical Hernia On-Lay Open Mesh Repair, with and without Drain

Summera Ambreen[1], Ayesha Javed[2], Riaz Hussain Siddqui[3]

[1]Resident General Surgery, [2]Consultant Surgeon & Principal Medical Officer, [3]HOD & Consultant Surgeon
Islamabad Medical Complex, NESCOM Hospital, Islamabad

Author`s Contribution

[1]Substantial contributions to the conception or design of the work; or the acquisition, analysis, [2,3]Proof reading, critical revision of the manuscript for important intellectual content

Funding Source: None
Conflict of Interest: None

Received: Oct 10, 2023
Accepted: Dec 29, 2023

Address of Correspondent
Dr. Summera Ambreen
Resident General Surgery
Islamabad Medical Complex,
NESCOM Hospital, Islamabad
gul_surgeon@yahoo.com

ABSTRACT

Objective: To compare the outcomes of open on-lay mesh hernia repair with and without the use of a drain in PUH cases, with the goal of determining the most favorable post-operative outcome.

Methodology: A prospective clinical study was conducted at the Department of General Surgery, Islamabad Medical Complex, NESCOM, a tertiary care hospital in Islamabad, Pakistan from January 2022 to December 2022. Fifty patients were enrolled and divided equally into two treatment groups (Groups A and B), with and without drain placement, respectively. The occurrence of complications such as seroma, hematoma formation, wound dehiscence, mesh infection, and length of hospital stay were compared between the two groups.

Results: Postoperative complications were more prevalent in Group A (with drain placement) compared to Group B. Seroma formation was more common in Group A (40% on the 5th day and 16% on the 14th day post-repair) compared to Group B (16% on the 5th day and 4% on the 14th day). Hematoma formation was also higher in Group A (12% on the 5th day) compared to Group B (8% on the 5th day); however, both groups showed a 4% incidence on the 14th day. Infected mesh was more frequent in Group A (8%) compared to Group B (4%), resulting in increased morbidity.

Conclusions: In small-sized para-umbilical hernia cases undergoing open on-lay mesh repair, the presence of a drain did not significantly affect the rate of postoperative complications. Seroma formation and infection incidence did not vary significantly between groups. However, patients with drain placement experienced a significantly longer hospital stay post-surgery.

Keywords: Para-umbilical hernia, drain, seroma, hematoma, mesh repair.

Cite this article as: Ambreen S, Javed A, Siddqui RH. Randomised Prospective Study to Compare Outcomes of Para Umbilical Hernia On-Lay Open Mesh Repair, with and without Drain. Ann Pak Inst Med Sci. 2023; 19(4):436-440. doi. 10.48036/apims.v19i4.878.

Introduction

The protrusion of contents of the abdominal cavity is referred to as hernia which occurs due to weakness in the abdominal wall.[1] Approximately 20 million hernia cases are repaired every year around the world.[2] Ventral hernias comprise of hypogastric, epigastric, para umbilical, and umbilical hernias; and are also known as abdominal hernias. [1] A defect in linea alba either inferior or superior to the umbilicus leads to a Para-umbilical hernia (PUH). This is a common surgical problem that is about 10% of all cases of primary hernia.[3] The sac of a hernia generally consists of fat tissues of the omentum, and small intestine from the peritonealcavity. [4] There is a considerable rate of rising hernia repair cases every year.[5,6] PUH normallyoccurs in middle to old age, obese, and multiparous women.[7] Other common causes leading to the formation of hernias are organomegaly, intra-peritoneal masses, ventriculoperitoneal shunts, peritoneal dialysis, ascites, constipation, and chronic cough.[8] Para-umbilical hernia is more frequently reported in females in comparison to males.[7,8]

Ventral hernias are repaired through different surgical methods like open and laparoscopic techniques. Laparoscopic Intra-peritoneal On-lay Mesh (IPOM),

open mesh repair (in-lay, sub- lay, and on-lay), and open anatomical repair.

As per the classification of the European Hernia Society, hernia is of 3 types; small, medium, and large. A defect size of less than 2cm is a small hernia; whereas, a defect size of 2-4 cm is medium and more than 4 cm is a large hernia.[1]

Mostly, the post-operative complications after open mesh abdominal hernia repairs are collections and surgical site infections.[9,10] To prevent such complications drains are placed after surgery; nevertheless, it is not clear from the literature that the drains are beneficial in reducing these complications or they might increase infection chances and other problems.[1,9] The most common use of drains is in decreasing the incidence of fluid collections after surgical repair; however, the real cause of seroma formation is still contentious.[10] Klink et al. reported in their research that the consequent development of a seroma is predicted by the nature of fluid collection. [11]

The researchers have not reached a consensus regarding the matter that whether drains areinfluential in forming fluid collections or not, and it is still an ongoing debate. Some studies suggested that the occurrence of postoperative complications is not associated with the use of drains and wound infections are more common when drains are used.[11, 12]; however, other studies argued that drains could be beneficial in preventing collections at repair sites, even if they don't prevent infections.[13] Only a few research studies have compared the results of post- operative complications with or without drains in hernia repair cases.[14] Similar to this study, aprospective study was conducted in Brazil which compared quilting sutures and drains inincisional hernia repair and found similar rates of seroma formation and surgical wound infections.[15, 16]

There is scarce evidence regarding the fact that either wound with drains produces better or worse outcomes than wounds without drains, after hernia repair.[17] Additionally, in Pakistanthe current study is the first of its kind as no previous research work has been done in this realm of para-umbilical hernia repair and the complications associated with or without applying suctiondrains. Thereby, this study aims to compare the outcomes of drain and without drain open on-lay mesh hernia repair in para-umbilical hernia (PUH) cases. The purpose of this study is to achievethe most accepted post-operative results and to help in decreasing the morbidity of complications.

Methodology

This was a prospective clinical study conducted in the Department of General Surgery Islamabad Medical Complex, NESCOM; a tertiary care hospital in Islamabad, Pakistan. It was conducted from January 2022 to December 2022. The sample size was calculated by using the WHO sample size calculator taking the level of significance as 5%. The power of the test for thisstudy is 90%, the anticipated population proportion P1 is equal to 94%, and the anticipated population proportion P2 is 68%. Demographic data (age, gender and residency), body mass index (BMI) were recorded. All patients were operated under general anesthesia, in supine position, with a transverse skin incision over the bulge near the umbilicus. With blunt and sharp dissection, the rectus sheath was cleared of fatty tissues and the defect containing thehernia contents was identified. The defect was opened along with sac. The sacs were separated and contents were reduced into the abdominal cavity. The hernia sacs were excised and the peritoneum was left un-sutured. A non-absorbable suture (0 or 1 Nylon or Proline) was used to close the defect in the linea alba and a proline mesh of adequate size was applied on the fascia and fixed with few non-absorbable stitches (2/0 proline). Haemostasis was secured and wound was closed over a redivac drain placed in the subcutaneous place. The sample size was equal to 50 patients and the participants were divided into two treatment groups, with groups A and B each having 25 members respectively. In group A, the drain was placed in subcutaneous tissue, while in group B patients repair was done withouta drain. The hospital ethical committee approved the study protocol. Consecutive sampling was done. All adult patients, of both genders, who were diagnosed with a para-umbilical hernia and had no previous surgeries were included in the study. Only the patients with the size of defect lessthan 4cm (<4cm) were included and were repaired with a proline mesh of size 6 x 11 cm. Most ofthe patients were discharged on the first postoperative day. A hospital stay more than the second postoperative day was considered a prolonged hospital stay.

On the other hand, patients with large size of defects, requiring large mesh sizes 15 x 15 and 30 x 30, having a history of previous surgeries, and recurrent para-umbilical hernias were excluded from this study. Demographic details like age and gender were recorded. Patients were followed on the 5th postoperative and 14th post-operative days for complications like seroma and hematoma formation, wound infection, length of hospital

stay, wound dehiscence, and infected mesh. Data was analyzed by SPSS version 21. Mean and standard deviation were calculated for quantitative variables like age and gender. Qualitative variables like seroma/hematoma, infected mesh, wound dehiscence, and prolonged hospital stay were expressed as percentages.

Results

A total of 50 patients both males and females with para-umbilical hernia were included in this study who underwent open mesh repair. These 50 patients were divided into group A, in which the suction drain was placed in subcutaneous tissue, and group B in which the suction drain was not used rather tight pressure dressing, and an abdominal belt was used soon after the surgery. The demographic data of the participants is shown in Table I.

Table I: Demographic Profile of Participants.

Variable	Frequency	Percentage	P-value
GENDER			
Male	9	15.5%	<0.001
Female	49	84.5%	
AGE			
18 - 44	30	51.7%	0.2
45-60	20	34.5%	
>60 years	8	13.8%	
PARITY			
Multipara	43	87.8%	<0.001
Non-Multipara	6	12.2%	
BMI			
Normal	4	6.9%	<0.001
Overweight	26	44.8%	
Obese	28	48.3%	

Table II and Table III depict that Seroma formation was more prevalent among participantsof Group A (with the presence of suction drain) than Group B i.e. 40% and 16% respectively on the 5th day of repair and 16% and 4% respectively on the 14th post-operative day. Similarly, the hematoma was also more common in Group A (12%) than in Group B (8%) on the 5th day; however, 4% of participants of both groups had hematoma formation on the 14th day after surgerydiagnosed through ultrasound of abdominal wall. Similar to this, infected mesh was more commonin Group A (8%) than in Group B (4%) which led to increased morbidity.

Wound dehiscence was less common in both groups with and without drain. Lastly, it wasevident that prolonged stay in the hospital was more prevalent in Group A having suction drains (96%) on the 5th postoperative day as shown in Figure 1, while it was reduced to 2% on the 14th day after para umbilical hernia repair. However, only 12% of Group B participants without suctiondrain had prolonged hospital stays; far less than Group A as shown in figure 2.

Table II: Group A- Participants repair with drain. (n=25)

Complications	5th postoperative day	14th postoperative day
Seroma Formation	10 (40%)	4 (16%)
Hematoma formation	3 (12%)	1 (4%)
Infected mesh	2 (8%)	1 (4%)
Wound dehiscence	1 (4%)	1 (4%)
Prolong hospital stay	24 (96%)	2 (8%)

Table III: Group B- Participants repair without drain. (n=25)

Complications	5th post-operative day	14th post-operative day
Seroma Formation	4 (16%)	1 (4%)
Hematoma formation	2 (8%)	1 (4%)
Infected mesh	1 (4%)	0
Wound dehiscence	1 (4%)	0
Prolong hospital stay	3 (12%)	0

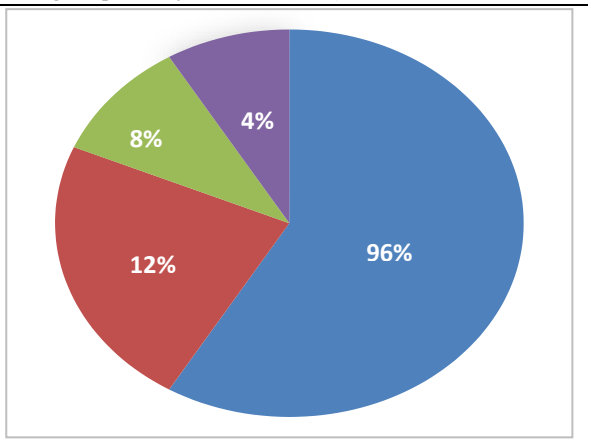

Figure 1. Prolonged hospital stay on the 5th and 14th postoperative days after para-umbilical hernia repair in Group A with suction drains.

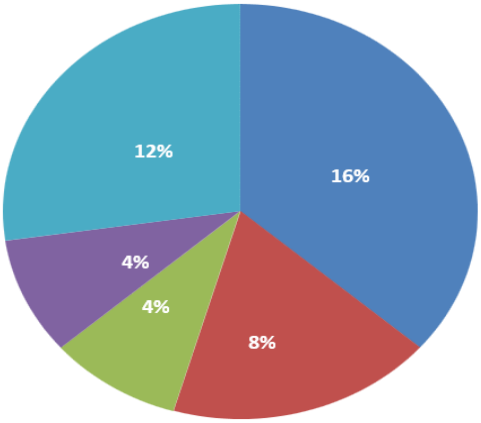

Figure 2. Prolonged hospital stay on the 5th and 14th postoperative days after para-umbilical hernia repair in Group B without suction drains.

Discussion

Para umbilical hernias occur through linea alba in the area of the umbilicus and they are generally associated with diastasis of recti.[8] These are large defects in the abdominal region and are usually more common in females than males.[4] This comparative prospective study includeda total of 50 patients with uncomplicated para-umbilical hernia; 25 patients with suction drain placement and 25 patients with no suction drain placement.

A study by Burcharth J was conducted to find the factors associatedwith para-umbilical hernia mesh repair with and without drain. Participants with ages ranging from18 to 60 years with both genders were included in this study. The results of the study revealed that PUH was more prevalent in females than males in all age groups.[4] Similar to this, the current study also found that female participants had more PUH cases than males i.e. 88% and 12% respectively.

Hussain described in his study that the outcome of PUH repair is challenging for surgeons because of increased incidences of complications after repair like recurrence, wound infection, seroma, and hematoma formation. This study investigated that fewer post-operative complications will occur if the drain is kept inside for a longer period. Further, the results of this study revealed that early removal of the drain led to 40% of cases of Seroma development among participants.[18] Another study also stated that the occurrence of Seroma is much more commonin patients where suction drains have not been kept after surgery.[19] Contrary to the findings ofthese studies, our study found that 40% of patients had developed seroma on the 5th day after repaireven after the drain was applied. Similarly, another study by Westphalen and colleagues supports the fact that drains fall short of preventing seroma formation and also lead to increased wound infections. This review study did not find any evidence regarding the advantages of using drains for decreasing seroma formation. [15]

There is still an ongoing debate among researchers on whether drains are helpful for fluid collection or not. Some of the researchers believe that the use of drains is not associated with the occurrence of complications after hernia repair.[11,12] However, the use of drains increases thechances of infection. [15-17] The Current study also found the same results as Group B withoutdrain, showed less hematoma formation and infected mesh and subsequently decreased morbidityand a short stay in hospital.

The Current study also found that prolonged hospital stay was recorded when drains were placed in patients of Group A (24%) compared to Group B (3%) where drains were not placed. Similar to this, a study by Sadiq et al also confirmed that when the drains are placed among patients, the length of hospital stay is increased.[19] In addition to this, a study by Gurusamy and Samraj reviewed the available literature about drainage in hernias and foundthat undesirable results are sometimes obtained by using drains such as increased pain, risk of infection, and increased length of hospital stay after hernia repair. Nevertheless, this study concluded that further trials are required to find drain uses after hernia repair.[18]

Conclusion

Not much research work is done related to the better or worse outcomes of drains after para-umbilical hernia repairs. This prospective study compared the outcomes of drained and drain-less open on-lay mesh hernia repair in para-umbilical hernia (PUH) cases. The current results revealed that postoperative complications were more common in patients of Group A where the drain was placed as compared to Group B, where the drain was not placed.

The obtained results of this study thus concluded that when the defect size is small, the rate of complications like seroma, hematoma formation, wound dehiscence, and mesh infection isnot affected by drain placement but the length of hospital stay after surgery is significantly more in patients who had repair with drain placement.

Nevertheless, further investigations are required in this regard to prove that drains should be placed or not after para-umbilical hernia repair, in order to improve the post-operative outcome and to decrease the morbidity. The development of seromas was not influenced by whether or not a drain was present, and infection rates were similar regardless of drain usage. It is possible to reduce postoperative pain, psychological stress, and promote postoperative recovery without the use of drains by employing techniques such as quilting sutures and abdominal binder belts

References

1. Faridoon S, Shah M, Iftikhar M, Ahmad S, Aslam R, Hadi A, Alam M. Comparison of the Outcome of Drain Vs Pressure Dressing in Ventral Hernia Repair. JGMDS.2021;8(3):3-8. https://doi.org/10.37762/jgmds.8-3.187

2. Majeed LQ, Surriah MH, Bakkour AM, Saaid AM. The use of prosthetic mesh in adult inguinal hernia Repair. Int. Surg. J. 2019;6(5):1745-9. https://doi.org/10.18203/2349-2902.isj20191513
3. Ismaeil DA. Mesh repair of paraumblical hernia, outcome of 58 cases. Ann. med. surg.2018;30:28-31. https://doi.org/10.1016/j.amsu.2018.04.028
4. Purushotham G, Revanth K, Aishwarya M. Surgical management of umbilical and paraumbilical hernias. International Surgery Journal. 2021;4(8):2507-11.
5. Burcharth J. The epidemiology and risk factors for recurrence after inguinal hernia surgery. Danish Med J. 2014; 61(5):B4846
6. Khalaf AZ. Pattern of inguinal hernia in Al-Basra teaching hospital: a prospective clinical study. Alexandria Med J.2021;57(1):70-4. https://doi.org/10.1080/20905068.2021.1880042
7. Hajibandeh S, Hajibandeh S, Sreh A, Khan A, Subar D, Jones L. Laparoscopic versus open umbilical or paraumbilical hernia repair: a systematic review and meta-analysis. Hernia. 2021;21:905-16. https://doi.org/10.1007/s10029-017-1683-y
8. Sallam RM, El-sayed AM, Abdou AM. Comparative study between drained and drainless sub- rectal mesh hernioplasty in paraumbilical hernia. The Egypt. J. Hosp. 2022;73(4):6417-22. https://doi.org/10.21608/ejhm.2018.15103
9. Westphalen AP, Araújo AC, Zacharias P, Rodrigues ES, Fracaro GB, Lopes Filho GD. Repair of large incisional hernias. To drain or not to drain. Randomized clinical trial. Acta cirurgica brasileira. 2019;30:844-51. https://doi.org/10.1590/S0102-865020150120000009
10. Willemin M, Schaffer C, Kefleyesus A, Dayer A, Demartines N, Schäfer M, Allemann P. 2023
11. Klink CD, Binnebösel M, Lucas AH, Schachtrupp A, Klinge U, Schumpelick V, Junge K. Do drainage liquid characteristics serve as predictors for seroma formation after incisional hernia repair? Hernia. 2020;14:175-9. https://doi.org/10.1007/s10029-009-0603-1
12. White TJ, Santos MC, Thompson JS. Factors affecting wound complications in repair of ventral hernias. The American Surgeon. 1998;64(3):276.
13. Coletta D, Del Basso C, Giuliani G, Guerra F. Subcutaneous suction drains do not prevent surgical site infections in clean-contaminated abdominal surgery-results of a systematic review and meta-analysis. Langenbeck's Arch. Surg.2019;404:663-8. https://doi.org/10.1007/s00423-019-01813-x
14. Massey LH, Pathak S, Bhargava A, Smart NJ, Daniels IR. The use of adjuncts to reduce seroma in open incisional hernia repair: a systematic review. Hernia. 2020;22:273-83. https://doi.org/10.1007/s10029-017-1690-z
15. Westphalen AP, Araújo AC, Zacharias P, Rodrigues ES, Fracaro GB, Lopes Filho GD. Repair of large incisional hernias. To drain or not to drain. Randomized clinical trial. Acta cirurgica brasileira. 2015;30:844-51. https://doi.org/10.1590/S0102-865020150120000009
16. Willemin M, Schaffer C, Kefleyesus A, Dayer A, Demartines N, Schäfer M, Allemann P. Drain versus no drain in open mesh repair for incisional hernia, results of a prospective randomized controlled trial. World J. Surg. 2023;47(2):461-8. https://doi.org/10.1007/s00268-022-06725-4
17. Gurusamy KS, Samraj K. Wound drains after incisional hernia repair. Cochrane Database of Systematic Reviews. 2019(1).
18. Hussain SM. Long Period Vs Short Period in Situ Drain in Paraumbilical Hernia Repair. DJM. 2021;1(1):17-20
19. Arroyo A, Garcia P, Perez F, Andreu J, Candela F, Calpena R. Randomized clinical trial comparing suture and mesh repair of umbilical hernia in adults. Br J Surg, 2001;88(10):1321-3.