COMPARSION OF INGUINAL HERNIA IN ANTERIOR VERSUS POSTERIOR OPEN MESH REPAIR IN TERM OF EARLY RECURRENCE

Muhammad Uzair[1], Uzair Ahmad[2], Yousaf Jan[2], Muhammad Fawad[2], Rashid Aslam[2]

ABSTRACT

Introduction: Inguinal hernia is a common surgical problem and still remains a significant clinical problem that a surgeon has to manage despite of improved and advance surgical techniques. Recurrence after repair is one of the fundamental and challenging complications with the incidence between 2% to 15% depending upon surgical technique.

Objective: The aim of this study is to compare anterior versus posterior mesh repair of inguinal hernia in terms of recurrence.

Materials and Methods: This study was conducted in the Department of surgery, Hayatabad Medical Complex Peshawar from January 2012 to January 2015. Through a randomized controlled trial Study Design, a total of 232 patients with inguinal hernia were randomly allocated in two groups, patients in group A were subjected to anterior mesh repair and in group B to posterior mesh repair. All patients were followed up till 6 months after surgery and examined for recurrence.

Results: The mean age of the patients in group A was 44.6 $\pm$ 10.5 years while in group B it was 44.1 $\pm$ 10.0 years (p value 0.695). In group A, we had 13.8% patients presented with recurrence of hernia while in group B 5.2% patients presented with recurrence. **Conclusion:** Posterior mesh repair is effective than anterior mesh repair for inguinal hernia surgery in terms of recurrence. We recommend more research comparing these two methods with other methods and also finding the complication rates between two procedures before recommending posterior approach as a routine for inguinal hernia repair.

Key Words: Inguinal Hernia, Mesh Repair, Recurrence.

INTRODUCTION

Hernia by definition is protrusion of viscus or a part of viscus in the wall of its containing cavity. Inguinal hernia is a common surgical problem; comprising 75% of all forms of hernia. Male to female ratio is 20:1[1]. Approximately 15% of all men develop inguinal hernia in their life time and about 77000 inguinal herrniorraphies are performed in US every year[2].

Inguinal hernia still remains a significant clinical problem that a surgeon has to manage despite of improved and advance surgical techniques[3]. Recurrence after repair is one of the fundamental and challenging complications with the incidence between 2% to 15% depending upon surgical technique[4]. Common etiological factors for recurrence are obesity, advance age, type of anesthesia, methods of repair, suture material and post-operative complication. However with the advent of tension free mesh repair, recurrence drops as low as 1-4%[5].

[1] Medical Officer at RMI surgical ward Peshawar Pakistan

[2] Department of Surgery MTI HMC Peshawar Pakistan

Address for correspondence:
Muhammad Uzair
Medical Officer at RMI surgical ward Peshawar.
Conatact: 03338686459
Email: Dr.uzairkmc@yahoo.com

In the recent years prosthetic materials for groin hernia have been found to be superior to conventional tension producing technique[6]. Increasing use of prosthetic mesh has improved the recurrence rate[7]. Mesh can be placed anteriorly or behind the fascia transversalis in the preperitoneal space[8].

Lichtenstein is the current most widely used technique and is considered the gold standard of hernia repair. Recurrence after mesh repair is dealt by preperitoneal approach, that can be performed open or laprosopically. Laparoscopic repair is documented with less hospital stay, less post-operative pain and reduce recurrence rate[6].

A study shows 10%[9] recurrence in anterior mesh repair while another study shows recurrence of 2.2%[6] in preperitoneal (posterior) approach.

The objective of my study is to compare inguinal hernia recurrence in anterior versus Posterior mesh repair. Limited studies are available in our setup regarding open posterior Mesh Repair in terms of recurrence and previous studies shows conflicting data. There is thus a need to carry out further trials comparing the two techniques which would help us to select the best approach between the two techniques thereby decreasing the morbidity of the patient and complications.

Anterior mesh repair: Placing and fixing (with Prolene 2/0) 6 x 11 cm Prolene mesh anterior to fascia transver-

salis in repair of inguinal hernia.

Posterior mesh repair: Placing and fixing (with Prolene 2/0) 6 x 11 cm Prolene mesh posterior to fascia transversalis in preperitoneal space

Recurrence

Reappearance of the lump or bulge on operative site post operatively appreciated on clinical examination (positive cough impulse) on 3rd month and 6th month which is confirmed by ultrasound (hernia defect).

MATERIALS AND METHODS

This randomized controlled study was conducted in the Department of surgery, Hayatabad Medical Complex Peshawar from January 2012 to January 2015 after taking permission from local research and ethical committee. A total of 232 patients with inguinal hernia were randomly allocated in two groups, patients in group A were subjected to anterior mesh repair and in group B to posterior mesh repair.

Inclusion criteria were patients of both gender,18–60 years of age and patients with unilateral primary inguinal hernia. Obesity (BMI greater than 35), recurrent, obstructed or strangulated inguinal hernia was **excluded**. They will act as confounders and if included in the study sample, will introduce bias in the study results.

DATA COLLECTION PROCEDURE

After approval from the Medical Ethics Committee all the patients with unilateral primary inguinal hernia fulfilling the inclusion criteria were admitted in surgical "B" ward through OPD. To diagnose inguinal hernia, detailed history (swelling/dragging sensation in inguinal region) was taken with special attention to predisposing cause. General physical examination and local examination was done in all patients; digital rectal examination was done in all patients above the age of 50 years to exclude BPH. Investigations like U/S abdomen to exclude abdominal mass was performed. Investigations for fitness of anesthesia like FBC, RFT's, Electrolytes, Hepatitis B and C screening Chest X-ray and ECG were done.

A written informed consent was taken from the patients fulfilling the selection criteria and their profiles entered in the proforma. The patients were equally divided into group "A" and group "B" randomly using the lottery method. Group A patients was subjected to anterior mesh repair while group B patients will undergo posterior mesh repair on elective list. A prophylactic dose of 3rd generation cephalosporin was given to all the patients at the time of induction and 2 doses were repeated postoperatively. All the operative details including operating time were recorded. Skin incision was closed with prolene 2/0 subcuticular stitches in both procedures. The patients were operated by consultant surgeons sufficiently capable of performing both kinds of procedures. Exclusion criteria were strictly followed to control confounders and bias in the study. Patients were discharged once they are able to take orally and can be mobilized.

The patient was examined on 1st postoperative day and skin stitches was removed on 1st follow up visit i.e. on 10th postoperative day. Follow up of the patients was scheduled on 3rd month and 6th month postoperatively. Patients were educated to report any day if they develop features of recurrence. Patient who misses follow up was telephoned and asked about features suggestive of recurrence.

The demographic and clinical data of all the patients such as name, age, gender, clinical findings, investigations, diagnosis, procedure, and fallow up status regarding recurrence was recorded in a Proforma developed after consultation with a statistician.

DATA ANALYSIS

The study was entered and analyzed by SPSS version 10. Frequency and percentages was computed for categorical data like gender and hernia recurrence. Mean and standard deviation was calculated for numerical variables like age. Chi square test was used to compare both group A and B keeping P value ≤ 0.05 was considered as significant. Recurrence was stratified among age and gender to see affect modifier. All the data was presented in the form of tables and charts/graphs.

RESULTS

The study comprised a total of 232 patients between 18 to 60 years of age. Patients were randomly allocated in two groups by lottery method. Patients in group A were subjected to anterior mesh repair while those in group B were subjected to posterior mesh repair. The mean age of the sample in group A was 44.6 ± 10.5 years while in group B it was 44.1 ± 10.0 years. The difference was statistically not significant while applying Student T test with a p value of 0.695 (Table 1).

We also distributed the age with regards to different age categories i.e. up to 40.00 years, 40.01 to 50.00 years and 50.01 to 60.00 years for both treatment groups (Table 2).

While distributing the sample with regards to gender, in group A; there were 63.8% male and 38.2% female patients while in group B there were 69% male and 31 female patients. The difference was statistically insignificant with a p value of 0.404 after applying chi square test (Table 3).

All the patients were subjected to the surgical procedure according to their treatment groups. All the patients were followed over next 6 months to determine

Table 1: Comparison of Mean age of both Groups (n = 116 each)

Group Statistics

	Group of Patient	N	Mean	Std. Deviation	Std. Error Mean
Age of Patient	Anterior Mesh Repair	116	44.6267	10.51721	.97650
	Posterior Mesh Repair	116	44.0974	10.02985	.93125

P value: 0.695

Table 2: Comparison of age in Categories Between Both Groups (n=116 each)

Age Groups * Group of Patient Crosstabulation

			Group of Patient		Total
			Anterior Mesh Repair	Posterior Mesh Repair	
Up to 40.00 years		Count	47	45	92
		% within Group of Patient	40.5%	38.8%	39.7%
Age Groups	40.01 to 50.00 years	Count	24	42	66
		% within Group of Patient	20.7%	36.2%	28.4%
50.01 to 60.00 years		Count	45	29	74
		% within Group of Patient	38.8%	25.0%	31.9%
Total		Count	116	116	232
		% within Group of Patient	100.0%	100.0%	100.0%

Table 3: Comparison of Gender Between Both Groups (n = 116 each)

Gender of Patient * Group of Patient Cross tabulation

			Group of Patient		Total
			Anterior Mesh Repair	Posterior Mesh Repair	
Gender of Patient	Male	Count	74	80	154
		% within Group of Patient	63.8%	69.0%	66.4%
	Female	Count	42	36	78
		% within Group of Patient	36.2%	31.0%	33.6%
Total		Count	116	116	232
		% within Group of Patient	100.0%	100.0%	100.0%

P Value: 0.404

Table 4: Comparison of Recurrence of Hernia Between Both Groups (n = 116 each)

Recurrence within 6 Months * Group of Patient Cross tabulation

			Group of Patient		Total
			Anterior Mesh Repair	Posterior Mesh Repair	
	Yes	Count	16	6	22
Recurrence within 6 Months		% within Group of Patient	13.8%	5.2%	9.5%
	No	Count	100	110	210
			86.2%	94.8%	90.5%
		Count	116	116	232
Total		% within Group of Patient	100.0%	100.0%	100.0%

Table 5: Comparison of Efficacy Between Both Groups (n = 116 each)

Efficacy of Treatment Groups * Group of Patient Crosstabulation

			Group of Patient		Total
			Anterior Mesh Repair	Posterior Mesh Repair	
	Yes	Count	100	110	210
Efficacy of Treatment Groups		% within Group of Patient	86.2%	94.8%	90.5%
	No	Count	16	6	22
			13.8%	5.2%	9.5%
		Count	116	116	232
Total		% within Group of Patient	100.0%	100.0%	100.0%

P Value: 0.025

Table 6: Both Gender Stratification of Efficacy Between Both Treatment Groups

Group of Patient * Efficacy of Treatment Groups Crosstabulationa

		Efficacy of Treatment Groups		Total	P value
		Yes	No		
Group of Patient (Male)					
	Anterior Mesh Repair	68	6	74	0.888
	Posterior Mesh Repair	74	6	80	
Total		142	12	154	
Group of patient (Female)					
	Anterior mesh repair	32	10	42	0.002
	Posterior mesh repair	36	0	36	
Total		68	10	78	

Table 7: Age Groups Stratification of Efficacy Between Both Treatment Groups

Group of Patient * Efficacy of Treatment Groups Crosstabulationa

		Efficacy of Treatment Groups		Total	P value
		Yes	No		
Group of Patient (up to 40 yrs)	Anterior Mesh Repair	45	2	47	0.610
	Posterior Mesh Repair	42	3	45	
Total		87	5	92	
Group of patients (40.01 to 50 yrs)	Anterior Mesh repair	19	5	24	0.012
	Posterior Mesh repair	41	1	42	
Total		60	6	66	
Group of patients (50.01 to 60 yrs)	Anterior Mesh repair	36	9	45	0.122
	Posterior Mesh repair	27	2	27	
Total		63	11	74	

the frequency of recurrence of inguinal hernia. In group A we had 13.8% patients presented with recurrence of hernia while in group B 5.2% patients presented with recurrence (Table 4.) In this regards, the efficacy of anterior hernia repair was 86.2% while that of posterior hernia repair was 94.8%. The difference was statistically significant after applying chi square test with a p value of 0.025 (Table 5).

We stratified the efficacy of the procedure with regards to gender. We observed that the difference regarding male gender was statistically insignificant after applying chi square test with a p value of 0.888 (Table 6), while for female gender it was statistically significant after applying chi square test with a p value of 0.002 (Table 6).

We also stratified the efficacy of both procedures with regards to different age groups. The difference in efficacy was statistically insignificant for both treatment groups with regards to age group up to 40.00 years with a p value of 0.610 (Table 7), it was statistically significant for the age group between 40.01 to 50.00 years with a p value of 0.012 (Table 7) and insignificant for the age group from 50.01 to 60.00 years with a p value of 0.122 (Table 7).

DISCUSSION

Despite significant advances in hernia repair techniques and technologies, recurrence rates following standard ventral herniorrhaphy remain unacceptably high. Evidence from the randomized, prospective, controlled trial conducted by Luijendijk et al[10] suggests that nearly one quarter of ventral hernias repaired with synthetic mesh recur within 3 years; the rate approaches 50% for primary repair alone. In addition, the risk of hernia recurrence increases with each additional operation. This relationship was illustrated in a retrospective cohort study of a population-based hospital discharge database[11]. The investigators reported that 12% of patients undergoing incisional hernia repair required at least 1 subsequent reoperation within 5 years; the length of time between reoperations was progressively shorter after each additional hernia repair. The 5-year rate of reoperation was 24% after the first reoperation, 35% after the second, and 39% after the third; the 7-year rate after 3 reoperations approached 50%. These data underscore the importance of minimizing the risk for subsequent reoperations by employing the best evidence-based approach to the first hernia repair.

In 1990, Ramirez et al published their work on local tissue transfer for the repair of ventral hernias[12]. This demonstration ushered in a new era in hernia repair, where incisions to release fascia allowed for a tension-free closure of the midline. In an effort to improve recurrence rates, synthetic mesh was employed to reinforce hernia repairs[13]. However, there were significant complications associated with use of synthetic mesh, including infection of the prosthesis and the formation of enterocutaneous fistulae[14,15].

In a study by Sadiq I et al, no recurrence (0%) seen after 2 years on follow-up[16]. In a study by Zhou X, the rate of recurrence differed significantly between the two groups with eleven in the Posterior group (0.87 %) and one in the Anterior repair group (0.09 %) ($P < 0.05$)[17].

There is little available evidence on the optimal management of recurrent inguinal hernia, particularly if

the original procedure involved the use of mesh[18]. The choice of an optimal strategy and surgical technique is probably more important in the treatment of recurrent hernias than in other areas of hernia surgery[19]. The repair of the resulting recurrent hernia is a difficult task because of already weakened tissues and obscured and distorted anatomy. The failure rate of these repairs using an open anterior approach may reach as high as 36%[20]. The evolution of the posterior preperitoneal approach for recurrent inguinal hernia repair made it the procedure of choice for the management of all recurrent groin hernias[21].

In the present study, we employed 116 patients in each group subjected to Anterior mesh repair in group A and posterior mesh repair in group B. In group A we had 13.8% patients presented with recurrence of hernia while in group B 5.2% patients presented with recurrence. Although not done in this study, but the anatomo-clinical classification of recurrences can help the surgeon in individuating the choice of operation[19]. Other studies of the same interest, majority of recurrences were medial or suprapubic[22] and medial, lateral or combined[23].

The most effective method to repair an inguinal hernia in any given patient is not clearly defined. The repair of recurrent inguinal hernia after mesh repair is usually a difficult operation due to the disadvantage of reoperating through dense fibrotic scar tissue around the mesh with the risk of testicular damage and a large number of local haematoma[24,25].

The open posterior preperitoneal mesh repair was popularized by Nhyus[26] as a good alternative for recurrent inguinal hernias. The main advantages of the preperitoneal approach are mesh placement in the preperitoneal space where the hernia is produced and avoiding the disadvantage of reoperating through scar tissue[24,27]. From the molecular point of view, the approach to the inguinal canal through the preperitoneal space appears less invasive than the transinguinal anterior approach where TNF-alpha levels are highest in the open anterior group[28].

In a study comparing the anterior mesh repair approach with laparoscopy, with a median follow-up of 607 days, 6% in the open-surgery group had recurrences, as compared with 3% in the laparoscopic-surgery group ($P = 0.05$). All but three of the recurrences in the latter group were within one year after surgery and were caused by surgeon-related errors. In the open-surgery group, 15 patients had recurrences during the first year, and 16 during the second year. Follow-up was complete for 97 percent of the patients[28].

Early recurrences in general may be caused by technical errors[29]. Insufficient lateral preperitoneal dissection, resulting in furled mesh, is a common mistake[30].

Physical examination during follow-up is indispensable for obtaining reliable data on rates of recurrence, because follow-up by telephone or mail is unreliable[31]. All of our patients were advised to follow-up on physical examinations performed by experienced surgeon. Kaynak et al[31]. concluded that there was no difference in the early complication rates and recurrence rates between the two groups. Zeybek et al[32] used a different modified darn method and used supporting sutures through the side-loop to prevent the rupture of fibrils. They claim that this method is superior to the original darn method. There was no recurrence in their modified darn method and a complication rate of only 1.9%.

The ideal method of hernia repair would cause minimal discomfort to the patient, both during the surgical procedure and in the postoperative course. It would be technically simple to perform and easy to learn, would have a low rate of complications and recurrence, and would require only a short period of convalescence. Finally, cost-effectiveness is important.

CONCLUSION

Posterior mesh repair is effective than anterior mesh repair for inguinal hernia surgery in terms of recurrence. We recommend more research comparing these two methods with other methods and also finding the complication rates between two procedures before recommending posterior approach as a routine for inguinal hernia repair.

REFERENCES

1. Kashif M, Khattak B, Haq MIU, Jan WA. Frequency of surgical site infection in Mesh Repair for Inguinal Hernia. J Med Sci April 2012, 20(2),98-101.
2. Memon AA, Siddiqui FG, Abro AH, Agha AH, Lubna S, Memon AS. Management of recurrent inguinal hernia at a tertiary care hospital of Southern Sindh, Pakistan. World J Surg. 2013; 37(3):510-5.
3. Khan AH, Zakaria AD, Hassan S, Merican SRHI, Syed Azhar Syed Sulaiman SAS. Prospective study of open inguinal hernioplasty and short-term outcomes J Surg Res. 2013; 2(3):13-5.
4. Aslam R, Shamsi HK, Gul A, Aman Z. Inguinal hernia; mesh repair recurrence. Professional Med J Aug 2013; 20(4):562-5.
5. Sajid MS, Craciunas L, Singh KK, Sains P, Baig MK. Open transinguinal peritoneal mesh repair of inguinal hernia: a target systematic review and meta analysis of published randomized controlled trials. Gastroenterol Report 2013; 1-12.
6. Karatepe O, Acet E, Altiok M, Adas G, Cak RA, Karahan S. Preperitoneal repair (open posterior approach) for recurrent inguinal hernias previously treated with lichtenstein tension-free hernioplasty. Hippokratia. 2010 Apr; 14(2):119-21.
7. Lerfkarnchang S, Trivej T. Prospective study of open peritoneal mesh hernioplasty: an early experience of 25 consecutive cases with good short- term out-

come. Thai J Surg. 2008; 29:69-72.

8. Manenti A. The preperitoneal inguinal hernia prosthetic repair: indications and technical notes. Webmed central Surg Tech. 2011; 2(12).

9. Saber A, Ellabban GM, Gad MA, Elsayem K. Open Preperitoneal versus anterior approach for recurrent inguinal hernia: a randomized study. BMC Surg. 2012; 12:22.

10. Luijendijk RW, Hop WC, van den Tol MP, de Lange DC, Braaksma MM, IJzermans JN, et al. A comparison of suture repair with mesh repair for incisional hernia. N Engl J Med 2000; 343:392-8.

11. Flum DR, Horvath K, Koepsell T. Have outcomes of incisional hernia repair improved with time? A populationbased analysis. Ann Surg 2003; 237:129-35.

12. Ramirez OM, Ruas E, Dellon AL. ''Components separation'' method for closure of abdominal-wall defects: an anatomic and clinical study. Plast Reconstr Surg 1990;86:519-26.

13. Burger JW, Luijendijk RW, Hop WC, Halm JA, Verdaasdonk EG, Jeekel J. Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. Ann Surg 2004; 240:578-83.

14. Voyles CR, Richardson JD, Bland KI, Tobin GR, Flint LM, Polk HC Jr. Emergency abdominal wall reconstruction with polypropylene mesh: short-term benefits versus longterm complications. Ann Surg 1981; 194:219-23.

15. Leber GE, Garb JL, Alexander AI, Reed WP. Long-term complications associated with prosthetic repair of incisional hernias. Arch Surg 1998; 133:378-82.

16. Sadiq I, Bhatti I, Malik AU, Choudhary MS. Open preperitoneal (posterior approach) vs Darning repair (anterior approach) for inguinal herniorraphy Esculapio J Services Inst Med Sci Oct - Dec 2006; 2(3):3-5.

17. Zhou X. Comparison of the posterior approach and anterior approach for a Kugel repair of treatment of inguinal hernias. Surgery today, 2011; 43(4):403-407.

18. Richards SK, Vipond MN, Earnshaw JJ: Review of the management of recurrent inguinal hernia. Hernia 2004; 8(2):144-148.

19. Campanelli G, Pettinari D, Nicolosi FM, Cavalli M, Avesani EC: Inguinal hernia recurrence: classification and approach. Hernia 2006; 10(2):159-161.

20. Memon MA, Feliu X, Sallent EF, Camps J, Fitzgibbons RJ Jr: Laparoscopic repair of recurrent hernias. Surg Endosc 1999; 13(8):807-810.

21. Nyhus LM, Pollak R, Bombeck CT, Donahue PE: The preperitoneal approach and prosthetic buttress repair for recurrent hernia. The evolution of a technique. Ann Surg 1988; 208(6):733-737.

22. Schwab R, Conze J, Willms A, Klinge U, Becker HP, Schumpelick V: Management of recurrent inguinal hernia after previous mesh repair: a challenge. Chirurg 2006; 77(6):523-530.

23. Kouhia ST, Huttunen R, Silvasti SO, Heiskanen JT, Ahtola H, Uotila-Nieminen M, Kiviniemi VV, Hakala T: Lichtenstein hernioplasty versus totally extraperitoneal laparoscopic hernioplasty in treatment of recurrent inguinalhernia- a prospective randomized trial. Ann Surg 2009; 249(3):384-387.

24. Katri KM: Open preperitoneal mesh repair of recurrent inguinal hernia. Hernia 2009; 13:585-589.

25. Whitley E, Ball J: Statistics review 4: sample size calculations. Crit Care 2002; 6(4):335-341.

26. Nyhus LM, Pollak R, Bombeck CT, Donahue PE: The preperitoneal approach and prosthetic buttress repair for recurrent hernia. The evolution of a technique. Ann Surg 1988; 208(6):733-737.

27. Farooq O, Batool Z, Din AU, Ullah AA, Butt Q, Kibryia RI: Anterior tension - free repair versus posterior preperitoneal repair for recurrent hernia. J Coll Physicians Surg Pak 2007; 17(8):465-468.

28. Nyhus LM: Iliopubic tract repair of inguinal and femoral hernia. The posterior (preperitoneal) approach. Surg Clin North Am 1993; 73:487-499.

29. Koning GG, Koeslag K, Avçic C, van Laarhoven PWHE. Randomized clinical trial of chronic pain after the transinguinal preperitoneal technique compared with Lichtenstein's method for inguinal hernia repair. British Journal of Surgery 2012; 99:10.

30. Shahzad M, AliBenjamin, Siddhant S, YadavRoberto C, Hernandez-IrizarryChristine M, LohseDavid R, Farley. Predictors of Chronic Groin Discomfort after Laparoscopic Totally Extraperitoneal Inguinal Hernia Repair. Journal of the American College of Surgeons 2013; 217:72-78.

31. Kaynak B, Celik F, Guner A, Guler K, Kaya MA, Celik M. Moloney darn repair versus Lichtenstein mesh hernioplasty for open inguinal hernia repair. Surg Today 2007; 37:958–960.

32. Zeybek N, Tas H, Peker Y, Yildiz F, Akdeniz A, Tufan T. Comparison of modified darn repair and Lichtenstein repair of primary inguinal hernias. J Surg Res 2008; 146:225–229.