ORIGINAL ARTICLE

A Comparative Study between Lichenstein and Sutureless Inguinal Mesh Hernioplasty

SIKANDER H GONDAL, TANVEER ANWER, AFSAR A BHATTI

ABSTRACT

Aim: To compare the outcome of Lichtenstein vs. suture less inguinal hernioplasty in patients with inguinal hernia

Methods: This was a randomized controlled trial conducted in the Department of Surgery, Lahore General Hospital, Lahore. Total 300 patients were included in the study. Patients were randomly divided into 2 groups. Each group consists of 150 patients each. Those patients undergoing Lichtenstein repair was grouped as A and those undergoing suture less repair was grouped as B. Hernioplasty was done under general anesthesia. Patients were followed by researcher himself at 7th post-operative day for assessment of hematoma and pain.

Results: Mean age in Group-A and Group-B was 45.46±7.62 and 43.81±7.78 years. In Group-A 25(16.7%) patients had direct and 125(83.3%) had indirect hernia. In Group-B 20(13.3%) patients had direct and 130(86.7%) had indirect hernia. At 7th day post operative in Group-A 12 patients had hematoma while in Group-B 3 patients had Hematoma. Hematoma formation in both treatment groups at 7th day was statistically different i.e., p-value (7th day)=0.017 In Group-B rate of hematoma formation was less as compared to Group-A..

Conclusion: Sutureless hernia repair is a promising and superior approach as compared to Lichtenstein technique for inguinal hernia surgery in terms of postop pain and hematoma formation.

Keywords: Sutureless, Lichtenstein mesh hernioplasty, inguinal hernia, post operative pain

INTRODUCTION

Inguinal hernia is defined as abnormal protrusion of viscus or a part of viscus through a weak point in inguinal canal. Approximately 75% of all hernias occur in the groin with a lifetime risk of 27% in men and 3% in women[1]. About 2/3 of these hernias are indirect and one third direct[2]. The weakness of the abdominal wall and the increase in abdominal pressure has been regarded as the main mechanism thus chronic cough (smokers or COPD) and constipation are major risk factors for hernia[3].

Surgery is the treatment of choice varying from nylon darn, ice layered, Lichtenstein mesh to a laparoscopic repair. While numerous surgical approaches exist to treat inguinal hernias, the Lichtenstein tension-free mesh-based repair remains the criterion standard for primary hernia. In a Cochrane review comparing mesh to non-mesh open repair, it was found that former has low rate of recurrence, almost quarter of those of latter. Laparoscopic repair is suggested for recurrent and bilateral inguinal hernias, though it may also be offered for primary inguinal hernia repair; have certain technical limitations[4].

Department of Surgery, Lahore General Hospital, Lahore
Correspondence to Dr. Afsar Ali Bhatti, Associate Professor Email: afsarbhatti@hotmail.com

Two techniques have been described to use a mesh in open procedure i.e., sutured (traditional Lichtenstein) and suture less. Those advocating suture less mesh hernioplasty, are of the opinion that decrease tension in suture line and a better leveling leads to rapid embodiment of mesh without formation of dead space therefore chances of nerve entrapment and post operative complications are reduced, so that post operative recovery and post operative hospital stay will be decreased. On the other hand some studies claim that chances of displacement, migration and folding of mesh are more in suture less mesh hernioplasty than traditional Lichtenstein technique, resulting in the failure of the whole procedure[5,6,7,8,9].

One study reported earlier in 2011 reported that pain with suture less technique was 2.5±1.7 while with Lichtenstein was 3.2±1.8 and hematoma was present in 1.7% cases with suture less technique while in 8.2% with Lichtenstein technique. There was significant difference between both study groups for both outcome variables[10]. But another study conducted in 2012 reported that there is significant difference between both groups for intensity of pain [2.2±1.0 with suture less vs. 4.0±1.1 with Lichtenstein technique] but hematoma was found to be insignificantly different in both groups [1.4% with suture less vs. 3.9% with Lichtenstein technique][11].

MATERIAL & METHODS

This randomized controlled trial was conducted in the Department of Surgery, Lahore General Hospital, Lahore for a period 6 months. Sample size of 300 cases (150 in each group) is calculated with 80% power of test, 5% level o significance and taking expected percentage of hematoma i.e., 1.7% with suture less and 8.2%[10] with Lichtenstein procedure in patients with inguinal hernia. Sampling technique non probability, consecutive sampling was used. All patients aged 20-80 years of either gender, with clinically reducible inguinal hernia, diagnosed on clinical examination were included in the study. The following patients were excluded from the study:

- All patients not fit for surgery due to co morbidities like uncontrolled hypertension (BP≥140/90mmHg), diabetes (BSR>189mg/dl) or ischemic heart disease (abnormal ECG changes).
- Incarcerated, obstructed or strangulated inguinal hernia on clinical assessment.
- Patients with signs and symptoms of benign prostatic hypertrophy (BPH) confirmed on ultrasound.

After approval from hospital ethical committee, 300 patients fulfilling the inclusion criteria was selected from inpatient department of the hospital. Patients were divided into 2 groups randomly. Those undergoing Lichtenstein repair was grouped as A and those undergoing suture less repair was grouped as B. Hernioplasty was done under general anesthesia by same consultant and all surgeries were performed by a single surgical team. Patients were followed by researcher himself at 7th post-operative day for assessment of hematoma and pain statistical analysis of data was done using SPSS-12. Mean and Standard deviation was calculated for age and pain. Frequency and percentages was determined for qualitative variables i.e., gender and hematoma. Chi square test was used to compare the hematoma in both groups while t-test was used to compare mean pain score in both groups. P-value ≤0.05 was considered as significant.

RESULTS

Total 300 patients were selected who were presented with inguinal hernia problem. These patients were randomly divided into 2 groups. In Group-A patients were treated with Lichtenstein Hernioplasty and in Group-B patients were treated with Suture less technique. Each group consists of 150 patients each. Mean age of all 300 patients was 44.64±7.73 years. While mean age patients in Group-A and Group-B was 45.46±7.62 and 43.81±7.78 years respectively (Table 1).

In Group-A there were 90(60%) male and 60(40%) female patients. Whereas in Group-A 103(68.7) patients were male and 47(31.3%) were female (Table 2)**.** Type of Inguinal hernia shows that in Group-A 25(16.7%) patients had direct and 125(83.3%) had indirect hernia. In Group-B 20(13.3%) patients had direct and 130(86.7%) had indirect hernia (Table 3).

Table-1: Age (years) of patients in treatment group

	Group-A	Group-B	Total
Mean±SD	45.46±7.62	43.81±7.78	44.64±7.73
Minimum	28.00	33.00	28
Maximum	71.00	71.00	71

Table-2: Gender distribution of Patients (n=300)

Gender	Group-A	Group-B	Total
Male	90(60%)	103(68.7%)	193(64.3%)
Female	60(40)	47(31.3%)	107(35.7%)

Table-3: Type of Inguinal Hernia

Type	Group-A	Group-B	Total
Direct	25(16.7%)	20(13.3%)	45(15%)
Indirect	125(83.3%)	130(86.7%)	255(85%)

Table-4: Hematoma Formation at Day 1st, 2nd, 4th & 7th Post Operative in Treatment Groups

	Group-A	Group-B	P value
Haematoma Day 1			
Yes	0(0%)	2(1.3%)	*0.156*
No	150(100%)	148(98.7%)	
Haematoma Day 2			
Yes	0(0%)	2(1.3%)	*0.156*
No	150(100%)	148(98.7%)	
Hematoma at Day-4			
Yes	0(0%)	3(2%)	
No	150(100%)	147(98%)	
Hematoma at Day-7			
Yes	12(8%)	3(2%)	*0.017*
No	138(92%)	147(98%)	

Table-5: Post Operative pain at day 1st, 2nd, 4th & 7th in Treatment Groups

	Group-A	Group-B	P value
Pain at Day 1			
Mean	7.1	5.8	0.000
SD	2.3	1.9	
Pain at Day 2			
Mean	6.5	5.1	0.000
SD	1.8	1.5	
Pain at at Day-4			
Mean	5.1	4.3	0.000
SD	1.6	1.3	
Pain at Day-7			
Mean		3.5	0.000
SD	1.3	1.0	

Hematoma formation was assessed in both treatment groups post operatively. Patients were followed at 1st, 2nd, 4th and at 7th day to see hematoma formation in both treatment groups. At 1st and 2nd day no patient in Group-A and 2 patients in Group-B had hematoma. At 4th day no patient in Group-A and 3 patients in Group-B had hematoma. Hematoma formation was statistically same in both treatment group at 1st, 2nd and at 4th day respectively. i.e. [p-value (1st & 2nd Day)=0.156, p-value (4th Day)=0.082] At 7th day post operative in Group-A 12 patients had hematoma while in Group-B 3 patients had Hematoma. Hematoma formation in both treatment groups at 7th day was statistically different. i.e., p-value (7th Day)=0.017 In Group-B rate of hematoma formation was less as compared to Group-A (Table 4).

Post operative pain was assessed in both treatment groups. Patients were followed at 1st, 2nd, 4th and at 7th day to see pain status in patients in treatment groups. Pain was assessed by using visual analogue scale. At 1st day mean pain score in Group-A and -B was 7.1±2.3 and 5.8±1.9. Mean pain score at 2nd day in Group-A and B was 6.5±1.8 and 5.1±1.5. At 4th day mean pain score in Group-A was 5.1±1.6 and in Group-B was 4.3±1.3. At 7th Day mean pain score in Group-A was 4.6±1.3 and in Group-B was 3.5±1.0 respectively. Pain score in both treatment groups was statistically different at 1st, 2nd, 4th and at 7th day post operatively. Patients in Group-B had less pain score as compared to Group-A patients. i.e. [p-value (1st & 2nd Day)=0.000, p-value (4th & 7th day Day)=0.000] (Table 5).

Hematoma formation in both treatment groups was stratified in relation to direct and indirect hernia type. There were total 45 patients who had direct inguinal hernia. Among them 25 were in Group-A and 20 were in Group-B. At 1st, 2nd and at 4th day none of the patients in both treatment groups had hematoma. While at 7th day only 1 patient had hematoma formation in Group-A while in Group-B no patient had hematoma. There were 253 patients who had indirect hematoma. Among these patients 125 were in Group-A and 128 were in Group-B. At 1st 2nd and 4th day no patient had hematoma in Group-A while at 7th day 11(8.8%) patients had hematoma in Group-A. In Group-B there were only 2 patients who had hematoma formation at day 1st and 2nd. While at 4th and 7th day only 3 patients had hematoma. According to p-value rate of hematoma formation was statistically same in both treatment groups at 1st, 2nd, 4th and 7th day post operative respectively (Table 6)

Table-6: Hematoma Formation at Day 1st, 2nd, 4th & 7th Post Operative in Treatment Groups

	Direct Inguinal Hernia		P value	Indirect Inguinal Herna		P value
	Group A	Group B		Group A	Group B	
Haematoma Day 1						
Yes	0(0%)	0(0%)	-	0(0%)	2(1.56%)	***0.164***
No	25(100%)	20(100%)		125(100%)	128(98.44%)	
Haematoma Day 2						
Yes	0(0%)	0(0%)	-	0(0%)	2(1.56%)	***0.164***
No	25(100%)	20(100%)		125(100%)	128(98.44%)	
Haematoma Day 4						
Yes	0(0%)	0(0%)	-	0(0%)	3(2.30%)	***0.088***
No	25(100%)	20(100%)		125(100%)	127(97.70)	
Haematoma Day 7						
Yes		0(0%)	***0.366***	11(8.8%)	3(2.30%)	***0.023***
No	24(96%)	20(100%)		114(91.2%)	127(97.70)	

DISCUSSION

The increasing use of mesh procedures in inguinal hernia surgery has led to a substantial decrease in the incidence of hernia recurrence. As a result, surgeons (and, increasingly, their patients) are now focused on other measures reflecting the success of hernia repair. The prevalence of postoperative pain syndromes after open and laparoscopic procedures has been reported to be as high as 30%, and some analysts estimate that 12% of patients feel themselves to be restricted in their daily activities because of pain. Clinical studies have shown that both recurrence and chronic pain after hernia repair are influenced by the type of mesh implanted and its method of fixation. The ideal mesh fixation should produce no structural damage and be biocompatible in order to reduce the risk of hematoma and seroma. Conventionally, the mesh prosthesis is secured by either sutures or staples. Despite the ‘‘tension-free’’ nature of these hernioplasties, sutures and staples may strangulate muscle fibers, compress regional nerves, or give rise to a lesion, leading to incapacitating pain or dysesthesia[12-21].

Nowadays, mesh repair has become the gold standard for hernia repair, assuring excellent repair

results and a low recurrence rate. According to the international literature, pain (both early and late onset) is an important and frequent complication of hernia surgery, causing varying degrees of discomfort to the patient. McGrath states that 30% of patients ascribe some degree of post-operative pain to discharge delay, while Al Weri reports that post-operative chronic pain is still present in 9.7% after 6 months and in 4.1% of cases after 1 year. Indeed, chronic post herniorrhaphy groin pain is defined as a persistent postoperative pain that fails to resolve 3 months after surgery, and can lead to depression and inability to work[22,23,24,25].

Lionetti in his study compared the suture less hernioplasty with Lichtenstein hernioplasty. He reported that average VAS scores were significantly lower in suture less hernioplasty than in Lichtenstein hernioplasty. [2.2±1.0 vs. 4.0±1.1] but hematoma was found to be insignificantly different in both groups [1.4% vs. 3.9%][11].

Negro and his team study reported earlier in 2011 that pain with suture less technique was 2.5±1.7 while with Lichtenstein was 3.2±1.8 and hematoma was present in 1.7% cases with suture less technique while in 8.2% with Lichtenstein technique. There was significant difference between both study groups for both outcome variables[10].

Morbidity in terms of chronic pain varies from 5 % to 10 % in different randomized controlled trails of different surgical techniques and epidemiological data. Post hernioplasty neuralgia can be reduced by use of different materials like fibrin glue instead of sutures[26].

Fuchs and his colleagues in their prospective randomized study compared mesh fixation with sutures to sutureless mesh Wxation with glue in Lichtenstein hernia repair. It provides the Wrst evidence that Wxation with glue is not inferior to the standard sutured technique on long-term outcomes. These results suggest a trend toward less pain and more recurrences for the sutureless technique. Therefore Lichtenstein hernia repair with sutureless mesh fixation is a valid alternative to fixation by sutures, especially in patients prone to pain[27].

Several authors have reported high rates of patients with chronic pain after at least 3 months. A large randomized multicenter trial from Sweden has shown 24.8% of patients with chronic pain after 1 year; at 5-year follow-up, the authors found 18.8% of the patients with groin discomfort, and 3.5% with moderate or severe pain. Although the Lichtenstein hernia repair is a tension-free method, pain may originate from nerve resection, a periostal reaction, tension on muscle Wbers, nerve compression due to the sutures, or a foreign-body reaction caused by the mesh itself. One method to reduce postoperative pain was thought to be the use of a sutureless technique[27,28,29,30,31].

Lichtenstein hernia repair is well known, safe, easy to teach and has a low morbidity and mortality rate. Nevertheless, several authors have recently published high percentages of postoperative discomfort and chronic pain. In this study it was shown that a modified sutureless alternative is superior to the sutured technique. The sutureless technique tends to result in less pain. Therefore it is sensible to use the sutureless technique for patients prone to pain. In the current economic setting it is important to minimize pain to get patients back to work quickly, even at the price of a higher recurrence rate[27,28,29,30,31,32,33].

CONCLUSION

Suture less hernia repair is a superior approach as compared to Lichtenstein technique for inguinal hernia surgery in terms of post operative Hematoma formation and pain status Suture-less technique is effective and should be considered as first line of option as compared to Lichtenstein hernioplasty.

REFERENCES

1. Jenkins JT, O'Dwyer PJ. Inguinal hernias. BMJ: British Medical Journal. 2008;336(7638):269-72.
2. Manthey D, Nicks B. 2012. [Cited 2010]. Available from: http://emedicine.medscape.com/article/775630-overview. 2008.
3. Queroz T, Sperandio WT, Soares RP, Kelmann G, Bernardo WM. What are the risk factors for inguinal hernia in adults? Rev Assoc Médica Bras. 2008;54(2):98.
4. Neumayer L, Giobbie-Hurder A, Jonasson O, Fitzgibbons Jr R, Dunlop D, Gibbs J, et al. Open mesh versus laparoscopic mesh repair of inguinal hernia. New england journal of medicine. 2004;350(18):1819-27.
5. Millikan K, Doolas A. A long-term evaluation of the modified mesh-plug hernioplasty in over 2,000 patients. Hernia. 2008;12(3):257-60.
6. Altan A. A Different Technique of Primary Indirect Inguinal Hernia Repair by Inserting a Synthetic Mesh into the Pre and Retroperitoneal Spaces to Wrap the Peritoneal Reflection: Preliminary Report. Internet Journal of Medical Update-EJOURNAL. 2010;5(1) :29-34.
7. Garg P, Rajagopal M, Varghese V, Ismail M. Laparoscopic total extraperitoneal inguinal hernia repair with nonfixation of the mesh for 1,692 hernias. Surgical endoscopy. 2009;23(6):1241-5.
8. Plisko R, Metz L, Dziewiatka M. PHC8 cost-effectiveness comparison of tension-free mesh repair vs. tension suture repair methods of inguinal hernia in slovakia. Value in Health. 2008;11(3):A243-A4.
9. Jeans S, Williams GL, Stephenson BM. Migration after open mesh plug inguinal hernioplasty: a review of the literature. The American surgeon. 2007;73(3):207-9.
10. Negro P, Basile F, Brescia A, Buonanno G, Campanelli G, Canonico S, et al. Open tension-free Lichtenstein

repair of inguinal hernia: use of fibrin glue versus sutures for mesh fixation. Hernia. 2011;15(1):7-14.
11. Lionetti R, Neola B, Dilillo S, Bruzzese D, Ferulano G. Sutureless hernioplasty with light-weight mesh and fibrin glue versus Lichtenstein procedure: a comparison of outcomes focusing on chronic postoperative pain. Hernia. 2012;16(2):127-31.
12. Hidalgo M, Castillo M, Eymar J, Hidalgo A. Lichtenstein inguinal hernioplasty: sutures versus glue. Hernia. 2005;9(3):242-4.
13. Aasvang E, Kehlet H. Surgical management of chronic pain after inguinal hernia repair. British Journal of Surgery. 2005;92(7):795-801.
14. Katkhouda N, Mavor E, Friedlander MH, Mason RJ, Kiyabu M, Grant SW, et al. Use of fibrin sealant for prosthetic mesh fixation in laparoscopic extraperitoneal inguinal hernia repair. Annals of surgery. 2001;233(1):18-25.
15. Junge K, Rosch R, Krones C, Klinge U, Mertens P, Lynen P, et al. Influence of polyglecaprone 25 (Monocryl) supplementation on the biocompatibility of a polypropylene mesh for hernia repair. Hernia. 2005;9(3):212-7.
16. Amid P. Classification of biomaterials and their related complications in abdominal wall hernia surgery. Hernia. 1997;1(1):15-21.
17. Campanelli G, Champault G, Pascual MH, Hoeferlin A, Kingsnorth A, Rosenberg J, et al. Randomized, controlled, blinded trial of Tissucol/Tisseel for mesh fixation in patients undergoing Lichtenstein technique for primary inguinal hernia repair: rationale and study design of the TIMELI trial. Hernia. 2008;12(2):159-65.
18. Canonico S, Santoriello A, Campitiello F, Fattopace A, Della Corte A, Sordelli I, et al. Mesh fixation with human fibrin glue (Tissucol) in open tension-free inguinal hernia repair: a preliminary report. Hernia. 2005;9(4):330-3.
19. Katkhouda N. A new technique for laparoscopic hernia repair using fibrin sealant. Surgical technology international. 2003;12:120-6.
20. Lau H. Fibrin sealant versus mechanical stapling for mesh fixation during endoscopic extraperitoneal inguinal hernioplasty: a randomized prospective trial. Annals of surgery. 2005;242(5):670.
21. Mui WL-M, Ng CS, Fung TM-K, Cheung FKY, Wong C-M, Ma T-H, et al. Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a double-blind randomized controlled trial. Annals of surgery. 2006;244(1):27-33.
22. McGrath B, Elgendy H, Chung F, Kamming D, Curti B, King S. Thirty percent of patients have moderate to severe pain 24 hr after ambulatory surgery: a survey of 5,703 patients. Canadian Journal of Anesthesia. 2004;51(9):886-91.
23. Alfieri S, Rotondi F, Di Giorgio A, Fumagalli U, Salzano A, Di Miceli D, et al. Influence of preservation versus division of ilioinguinal, iliohypogastric, and genital nerves during open mesh herniorrhaphy: prospective multicentric study of chronic pain. Annals of surgery. 2006;243(4):553-8.
24. Fountain Y. The chronic pain policy coalition. Bulletin of The Royal College of Surgeons of England. 2006;88(8):279.
25. 119. Malekpour F, Mirhashemi SH, Hajinasrolah E, Salehi N, Khoshkar A, Kolahi AA. Ilioinguinal nerve excision in open mesh repair of inguinal hernia—results of a randomized clinical trial: simple solution for a difficult problem? The American journal of surgery. 2008;195(6):735-40.
26. Canonico S, Benevento R, Della Corte A, Fattopace A, Canonico R. Sutureless tension-free hernia repair with human fibrin glue (tissucol) in soccer players with chronic inguinal pain: initial experience. International journal of sports medicine. 2007;28(10):873-6.
27. Kim-Fuchs C, Angst E, Vorburger S, Helbling C, Candinas D, Schlumpf R. Prospective randomized trial comparing sutured with sutureless mesh fixation for Lichtenstein hernia repair: long-term results. Hernia. 2012;16(1):21-7.
28. Nienhuijs S, Staal E, Strobbe L, Rosman C, Groenewoud H, Bleichrodt R. Chronic pain after mesh repair of inguinal hernia: a systematic review. The American journal of surgery. 2007;194(3):394-400.
29. Nowobilski W, Dobosz M, Wojciechowicz T, Mionskowska L. Lichtenstein Inguinal Hernioplasty Using Butyl-2-Cyanoacrylate versus Sutures. European surgical research. 2004;36(6):367-70.
30. Frey D, Wildisen A, Hamel C, Zuber M, Oertli D, Metzger J. Randomized clinical trial of Lichtenstein's operation versus mesh plug for inguinal hernia repair. British Journal of Surgery. 2007;94(1):36-41.
31. Hasegawa S, Yoshikawa T, Yamamoto Y, Ishiwa N, Morinaga S, Noguchi Y, et al. Long-term outcome after hernia repair with the prolene hernia system. Surgery today. 2006;36(12):1058-62.
32. Eklund A, Montgomery A, Bergkvist L, Rudberg C. Chronic pain 5 years after randomized comparison of laparoscopic and Lichtenstein inguinal hernia repair. British Journal of Surgery. 2010;97(4):600-8.
33. Amid P, Shulman A, Lichtenstein I. A critical evaluation of the Lichtenstein tension-free hernioplasty. International surgery. 1994;79(1):76.