SECURING MESH WITH SKIN STAPLES VERSUS PROLENE SUTURE IN INGUINAL HERNIA REPAIR: EFFECTS ON POST-OPERATIVE COMPLICATIONS

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ABSTRACT

Objective: To compare the frequency of surgical site infection, Seroma formation and urinary retention in patients undergoing Lichtenstein inguinal hernia repair using staples and polypropylene for securing the mesh.
Study Design: Randomized controlled trial.
Place and Duration of Study: Department of Surgery, Combined Military Hospital Rawalpindi, from Oct 2015 to Nov 2017.
Methods: Patients diagnosed as cases of inguinal hernia, planned to undergo open lichenstein mesh repair were randomly divided into group A and group B having 65 patients in each group. Among group A patients, mesh was secured using skin staples while in group B patients, mesh was secured using conventional prolene 2/0 sutures. Development of postoperative surgical site infection (SSI), seromas formation and urinary retention was checked post-operatively.
Results: Frequency of postoperative surgical site infection was comparatively less in group A (3.1%) as compared to group B (12.3%) which was found to be statistically significant (*p*-value 0.048). However, frequency of seroma formation and urinary retention was found to be insignificantly altered using both techniques (*p*-value 0.403 and 0.38 respectively).
Conclusion: Securing mesh with skin staples is superior to prolene in term of frequency of surgical site infection. However, rate of development of seromas and urinary retention is not altered significantly using any of the techniques.

Keywords: Inguinal hernia, Lichenstein mesh repair, Surgical site infection.

INTRODUCTION

Protrusion of a viscus or a part of viscus through an abnormal opening in the wall of its containing cavity is defined as hernia. It is seen that clinically the most common type of hernia is inguinalhernia with approx 27% to 43% rate of occurrence in males and it is 3-6% in females[1]. It is seen that inguinal hernia is one of the most common surgical procedure carried out world-wide, more than 20 million people undergo inguinal hernial repair annually[2]. The Lichtenstein repair is a widely accepted and durable treatment option for a tension-free repair of inguinal hernias[3]. However, acute and chronic postoperative pain remains a significant issue[4]. The use of prosthetic non-absorbable mesh grafts (e.g, polypropylene) has improved success of hernia repair but has been associated with different complications including infections, seroma and urinary retention[5]. The standard method of securing the mesh in position on the posterior wall of the inguinal canal is with polypropylene sutures[6].

Different prosthetic materials are used for reinforcing the posterior wall of inguinal canal to achieve least recurrence rates[7]. The idealrepair of an inguinal must be safe, cost effective, easy to perform, demands less dissection and has a minimum operative time[8]. Several ways of reducing the incidence of infection, seroma formation and urinary retention after hernia repair have been studied. It is seen that use of securing the mesh with skin staples is claimed to have many advantages including reduction in operative time, rate

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of SSIs, post-operative seroma formation and urinary retention[9,10].

The rationale of our study was to find out an ideal method for securing the mesh during Lichenstein mesh repair. We compared conventional use of prolene 2/0 sutures to skin staples in securing mesh to the posterior wall of inguinal canal and studied effects on post-operative SSI, seroma formation and urinary retention.

METHODOLOGY

This study was carried out at Combined Military Hospital (CMH) Rawalpindi for 24 months from October 31, 2015 to October 30, 2017. Sample size was calculated using WHO sample size calculator (Confidence level 95%, Power=80). Sampling technique was non-probability consecutive sampling. A total of 130 patients were included in the study. Clearance from institutional ethical committee was obtained and informed written consent was taken from every individual. Patients of who were diagnosed to have inguinal hernia and planned to undergo open mesh repair were included in study. All patients included in study were randomly distributed in group A and B by lottery method. Patients having female gender, recurrent hernia, diabetes mellitus, chronic liver disease, abdominal malignancies and patients using steroids were excluded from study. Non absorbable polypropylene mesh was used in all patients. Mesh placed in the wound was secured by staples in group A patients while group B patients had their mesh secured in its place using Prolene 2/0 sutures. External oblique aponeuroses was closed using Vicryl 2/0 continous suture in a standard fashion in all patients. In both groups wound was irrigated with 100ml of Normal saline and then subcutaneous tissue was closed with interrupted vicryl 2/0 sutures. Skin was closed using subcutaneous sutures with prolene 3/0. All patients received prophylactic intravenous ceftriaxone at the time of induction. Dressing protocol and techniques for all patients remained same (Mepore dressing opened 72 hrs post-operatively and onwards changed 24 hrly). All the surgeries were performed by same surgical team and patients were followeduptill 30 days post-operatively to look for development of SSI and seromas formation. Urinary retention was observed till 24 hours postoperatively. Wounds were graded as per Southampton Wound grading system (Annx) and wounds fulfilling criteria of class II and above were considered positive for SSI. Patients experiencing serous discharge from wound were considered positive for seromas formation and were managed conservatively till discharge settled. Urinary retention was observed and managed with insertion of Foley catheter using standard sterile technique. Contact numbers of patients were taken and all data was entered in the data collection performa. All collected data was analyse dusing SPSS-14. Mean and standard deviation was calculated for quantitative variables like age. The categorical or Qualitative variables including SSI, seromas formation and urinary retention were presented in terms of percentages and frequencies. Both groups were compared for SSI, seromas and urinary retention applying chi-square test. *p*-value ≤0.05 was considered statistically significant.

RESULTS

A total of 130 patients who underwent inguinal hernia mesh repair were included and were randomly divided into two equal groups of 65 each. The age distribution ranged from 16-77 years in the study. Minimum age was 16 years (n=1) and maximum age was 77 years (n=1) with Mean age of 39.91+ 13.22. Mean age in group A was 40.86 ± 12.92 while mean age in group B was 38.96 ± 13.56 (*p*-value 0.417). Surgical Site infectionwas checked till 30th post op day. Group Arevealed 2 (3.1%) SSI rate as compared to group B which was 8 (12.3%). The groups had a statistically significant difference in the frequency of Surgical Site Infection with a chi-square *p*-value 0.045. Comparison between frequencies is given in table-I. Rate of seroma formation in group A was 2 (3.1%) while it was 4 (6.2%) in group B (*p*-value 0.384). Overall rate of seroma formation was found to be 4.6% with comparison between groups depicted in table-II. Post-operative

urinary retention occurred in 13 (10%). Group A patients revealed 5 (7.7%) urinary retention rate while it was found to be 8 (12.3%) in group B (*p*-value 0.38). Comparison of urinary retention in the groups is shown in table-III.

Table-I: Comparison of groups in terms of SSI (*p*-value 0.048).

SSI	Study Group		Total
	A (Stapler) n (%)	B (Prolene) n (%)	
Yes	2 (3.1)	8 (12.3)	10 (7.7)
No	63 (96.9)	57 (87.7%)	120 (92.3)
Total	65 (100)	65 (100)	130 (100)

Table-II: Comparison of groups in terms of seromas formation (*p*=0.384).

Seroma	Study Group		Total
	A (Stapler) n (%)	B (Prolene) n (%)	
Yes	2 (3.1)	4 (6.2)	6 (4.6)
No	63 (96.9)	61 (93.8)	124 (95.4)
Total	65 (100)	65 (100)	130 (100)

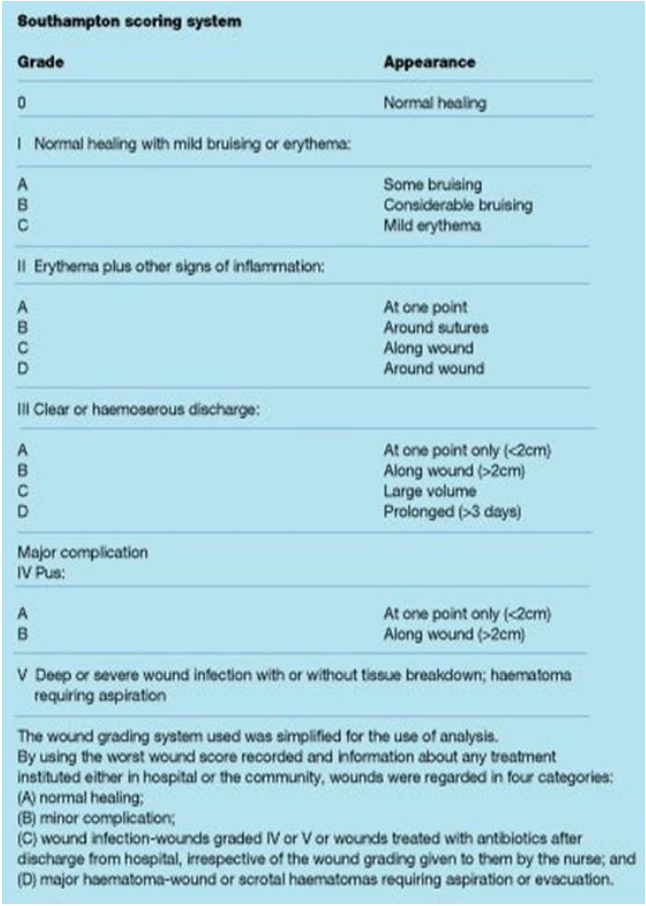
Table-III: Comparison of groups in terms of Urinary Retention (*p*=0.38).

Urinary Retention	Study Group		Total
	A (Staples) n (%)	B (Prolene) n (%)	
Yes	5 (7.7)	8 (12.3)	13 (10)
No	60 (92.3)	57 (87.7)	117 (90)
Total	65 (100)	65 (100)	130 (100)

DISCUSSION

In general surgery inguinal hernia repair is one of the most common procedures in world wide and its surgical repair can be performed with both an open or laparoscopic approach. In USA every year more than 800,000 IHRs are performed[11-16]. It is estimated that in men Lifetime occurrence of groin hernia is 27-43% and in women it is 3-6%[17,18]. Inguinal hernia is a surgical condition which is commonly found in surgical outpatient department and they usually needs surgical procedures[11]. Inguinal hernia is one of the common problem. Currently it requires surgical repair on the other side those patients who are asymptomatic or minimally symptomatic hernia patients can be managed by watchful waiting[19]. There are both open and laparoscopic methods of repair[20]. Every surgical procedure has some complications in the same way mesh inguinal hernia repair has common complications including (SSI) (5%), seroma (0.6%)[13].

Open inguinal hernia approaches are varied, Bassini Inguinal hernia repair, Lichtenstein, Mesh, Shouldice[14]. Throughout the world Surgical site infections (SSI) is one of the important element in surgical practice and can change the outcome of surgery and always important steps are in trial to prevent this complications[15]. The Lichtenstein repair is a widely accepted and durable treatment option for a tension-free repair of inguinal hernias[3]. The use of prosthetic nonabsorbable mesh grafts (e.g., polypropylene) has improved success of hernia repair but has been associated with different complications including infections[5]. The standard way of securing the mesh in position on the posterior wall of the inguinal canal is with polypropylene sutures



Southampton scoring system

Grade	Appearance
0	Normal healing
I Normal healing with mild bruising or erythema:	
A	Some bruising
B	Considerable bruising
C	Mild erythema
II Erythema plus other signs of inflammation:	
A	At one point
B	Around sutures
C	Along wound
D	Around wound
III Clear or haemoserous discharge:	
A	At one point only (<2cm)
B	Along wound (>2cm)
C	Large volume
D	Prolonged (>3 days)
Major complication IV Pus:	
A	At one point only (<2cm)
B	Along wound (>2cm)
V Deep or severe wound infection with or without tissue breakdown; haematoma requiring aspiration	

The wound grading system used was simplified for the use of analysis. By using the worst wound score recorded and information about any treatment instituted either in hospital or the community, wounds were regarded in four categories: (A) normal healing; (B) minor complication; (C) wound infection-wounds graded IV or V or wounds treated with antibiotics after discharge from hospital, irrespective of the wound grading given to them by the nurse; and (D) major haematoma-wound or scrotal haematomas requiring aspiration or evacuation.

Figure: Annexure.

which takes more time to fix mesh[6] on the other hand use of skin staples to fix the mesh reduces operative time and leading to reduce post-operative complications.

Number of studies are conducted to compare skin staples with prolene mesh in terms of SSI and it was seen that (8.3%) patients ha SSI[19-21]. Operation time has a great influence on surgical out come and can reduce post-operative complications, it was seen that patients in whom mesh was fixed with the skin staples the operative time was 12 minute less then prolene fixation giving advantage of reducing the operating time, minimizing tissue dissections along with that it also reducing the rate of wound infection and risks associated with prolonged anaesthesia[17]. Another study also concluded that duration of surgery and postoperative outcome of securing mesh with skin staples versus polypropylene sutures in Lichtenstein hernia repair and concluded that when skin staples used to fix the mesh has the same effect as sutures with extra advantages of significant minimizing the operating time along with complications or recurrence. It is seen that skin staples can be applied very easy with significant minimized operating time with significant infections rate, these findings also support with our findings[18].

CONCLUSION

The study presents a tendency for lesser frequency of wound infection rates in patients among whom, mesh is secured using skin staples as compared to patients in whom mesh is secured using conventional prolene 2/0 sutures. However, rate of development of seromas formation and urinary retention is not significantly altered with either of the techniques.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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