ORIGINAL ARTICLE

Outcome of prolene sutures and skin staples for mesh fixation in inguinal hernioplasty - a comparative study

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ABSTRACT

Background and Objective: Inguinal hernia is one of the most common type of hernia affecting both genders. New surgical interventions to repair hernia are being developed for the better outcome of patients by reducing the operative time and postoperative complications. The objective of this study was to compare the prolene sutures and skin staples for mesh fixation in inguinal hernioplasty with mean operative time and post-operative pain as outcome determinants.

Methods: This randomized controlled trial was conducted in the Department of General Surgery, District Head Quarter Hospital (DHQ) Teaching Hospital, Sahiwal Medical College, Pakistan from 1st January, 2019 to 31st December, 2019. A total of 180 patients admitted for hernioplasty were recruited after institutional ethical approval. The study participants were randomized into group A and B. Mesh fixation was done by using prolene suture in group A, while skin staples were used in group B. The duration of procedure and post-operative pain after 1 week was noted using visual analogue scoring system. The comparison between groups was done through independent sample *t*-test. *p* value $\leq$ 0.05 was considered to be statistically significant.

Results: Mean age of the patients in group A and B was 39.21 ± 11 years and 40.16 ± 5.72 years respectively. The mean operative time was 52.15 ± 9.78 minutes in group A and 36.92 ± 3.95 minutes in group B (p = 0.000). Post-operative pain after 1 week was reported in 26.7% cases in group A while it was seen in only 10% cases in group B (p = 0.004).

Conclusion: The outcome determinants of mean operative time and postoperative pain after inguinal hernioplasty were better achieved in cases treated by skin staples as compared to prolene sutures.

Keywords: Inguinal hernioplasty, skin staple, prolene suture, post-operative pain, outcome.

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Introduction

Inguinal hernia repair is among the most commonly performed surgical procedures in the world. Inguinal hernia is an opening in the myofascial plain of the oblique and transversalis muscles causing the herniation of intraabdominal or extraperitoneal organs [1]. It can be indirect or direct, based on relation to the underlying epigastric vessels. Abdominal contents protrude through the deep inguinal ring lateral or medial to the inferior epigastric vessels in indirect or direct inguinal hernia respectively [2]. Groin hernias are more common in males than females occurring at the extremes of ages; 1 year and after 50 years of age [3,4].

Both symptomatic and asymptomatic hernias are repaired through surgery either through laparoscopy or open surgery. Femoral and strangulated hernias need immediate repairing because of the possible complications associated with them [5]. Open surgery is more preferable as it can be performed under spinal or local anesthesia while laparoscopic surgery requires general anesthesia. Also, postoperative pain is far less in laparoscopic surgery than open surgery [1,5]. The gold standard treatment for the prevention of complications of hernias is the surgery [6]. In most of the techniques for repairing the indirect inguinal hernia, meshes are used to sandwich the edges with plastic and this is also known as Liechtenstein hernioplasty [7].

Over the past two decades, the discussion regarding the importance of mesh prostheses shows a decrease in

recurrence of hernia [2]. Polypropylene mesh is mostly used to reinforce the floor resulting in excellent outcome and tension free repair; however, it is associated with slightly increased risk of wound infection; it can underlay, overlay, or sandwich the affected area and can also be used as a plug [7]. Mesh repair uses staples, tacks, sutures, or anchor devices. The complications that might occur during fixation of the mesh include injury to femoral nerve, vein, or artery. Polypropylene sutures are most commonly used for mesh fixation [8].

The aim of this study was to compare prolene sutures and skin staples for mesh fixation in inguinal hernioplasty in terms of post-operative pain and mean operative time.

Methods

This randomized controlled trail was conducted at the Department of General Surgery, DHQ Teaching Hospital/ Sahiwal Medical College Sahiwal, Pakistan from 1st January, 2019 to 31st December, 2019 after getting approval from the institutional ethical committee. Eligibility criteria of participants were adults of both genders, aged between 20 and 60 years, reducible inguinoscrotal hernia and inguinal or scrotal swelling for more than 5 months. While patients presenting with irreducible, recurrent, bilateral inguinal, strangulated and obstructed hernia, bleeding disorders, any other chronic disease, such as diabetes mellitus, renal failure, or compromised immune system were excluded. One hundred and eighty (n = 180) patients were recruited for this study after taking written informed consent. The enrolled participants were randomized equally (n = 90) in two groups, A and B. Lichtenstein repair technique was used for hernioplasty by an experienced surgeon. In group A, mesh fixation was done by using prolene sutures, while skin staples were used in group B.

The time duration of surgery was recorded in both groups. Patients were followed up after 1 week postoperatively for assessment of pain. At the end of the week, final score of postoperative pain was recorded using the visual analogue scoring (VAS) system.

Statistical analysis

Data were analyzed using IBM Statistical Package for the Social Sciences (Version 25.0). Gender was presented as frequency and percentage while means and standard deviations were determined for age, duration of disease and operative time. Comparison between the two groups was done using Chi-square test for qualitative variables and Student's t-test for quantitative variables. p value ≤ 0.05 was considered to be statistically significant.

Results

A total of 180 patients were included in the study. In group A, there were 78 (86.7%) males and 12 (13.3%) females. Similarly, there were more males 69 (76.7%) in group B. Mean age of the patients was 39.21 ± 11.87 years and 40.16 ± 5.72 years in group A and B, respectively. The duration of disease was slightly higher in group B and the difference in duration of disease between two groups was statistically significant (p = 0.040) (Table 1).

Mean operative time was noted as 52.15 ± 9.78 minutes in group A and 36.92 ± 3.95 minutes in group B (p = 0.000). Regarding post-operative pain after 1 week, only 10% participants from group B presented with pain on VAS system (p = 0.004) (Table 2).

Discussion

Lichtenstein repair technique is frequently used for treating inguinal hernia because of good tissue tolerability of mesh,

Table 1. *Distribution of demographics in both groups.*

VARIABLE	GROUP-A (N = 90)	GROUP-B (N = 90)	P-VALUE*
Age (years)	39.21 ± 11.87	40.16 ± 5.72	0.493
Duration of disease (months)	5.86 ± 3.22	6.76 ± 2.58	0.040
Gender			
Male	n = 78 (86.7%)	n = 69 (76.7%)	0.083
Female	n = 12 (13.3%)	n = 21 (23.3%)	

*Chi-square and student t-test.

Table 2. *Comparison of operative time and post-operative pain.*

VARIABLE	GROUP A (N = 90)	GROUP B (N = 90)	P-VALUE*
Operative time (minute)	52.15 ± 9.78	36.92 ± 3.95	0.000
Post-operative pain	24 (26.7%)	n = 9 (10%)	0.004

*Chi-square and student t-test.

hence lowering the chance of wound infection [6]. A study performed by Khan et al. [9] showed significant difference in operation time and postoperative pain in patients with skin staples while comparing to standard polypropylene sutures. Mean duration of surgery was 37.42 ± 2.69 minutes in patients whose mesh fixation was done by using skin staples. Good post-operative pain control was seen in patients with skin staples while comparing to polypropylene suture [9]. Similar findings were observed in the current study.

Polypropylene sutures are very commonly used in anchoring of the mesh during hernioplasty. Despite being tension free repair, it can compress regional nerves that may cause strangulation of the muscles. The most common complication of inguinal hernioplasty is the postoperative pain which can affect the quality of life [10]. Another study reported a reduced operative time with fewer complications while using the rotated skin staple to fix the mesh [11,12].

Different studies show significantly reduced duration of the operation while using skin staples to secure mesh in the Lichtenstein inguinal hernia repair. But no significant difference in the postoperative complications or pain score was reported [13,14]. Recurrence is very less in Lichtenstein hernioplasty [15]. Recently, postoperative pain is the main the focus of discussion in terms of postoperative complications [16]. The penetration of tissue by mesh fixation is thought to be the reason of this chronic discomfort [17]. Therefore, the removal of the fixation material most commonly relieves the pain [18].

Sakorafas et al. [19] conducted a study on 540 patients undergoing Lichtenstein repair and reported the use of polypropylene sutures as an effective mean for mesh fixation. Only one case of recurrence over 1 year of follow up and five cases of postoperative neuralgia were observed. Although both the staples and prolene sutures are almost equally effective and safe in treating the inguinal hernias, the use of staples has an advantage in terms of operative time and postoperative pain. However, a small sized single-center trial does not serve the purpose, thereby larger, multi-center studies are needed in order to find the evidence for validated comparison between the mesh fixation techniques used in inguinal hernia repair.

Conclusion

Outcome in terms of mean operative time and postoperative pain in patients undergoing inguinal hernioplasty is better in in mesh fixation by skin staples technique as compared to prolene sutures. Therefore, skin staples may preferably be used by experienced surgeons for routine mesh fixation in repairing inguinal hernia.

Limitations

As it is a single institution-based study, hence results cannot be generalized. Larger scale studies may be carried out to determine the validated comparison between the mesh fixation techniques used in inguinal hernia repair that may also strengthen the conclusions drawn from this study.

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Conflict of interest

None to declare.

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None to disclose.

Ethical approval

This study conducted was approved by the institutional ethical committee of DHQ Teaching Hospital/Sahiwal Medical College Sahiwal, Pakistan vide letter number 657/DME/SLMC dated 10/02/2018.

Author's contribution

MNI: Conceptualization and design of study, Drafting of manuscript.
AM and UF: Acquisition and analysis of data. Drafting of manuscript.
SM: Critical revision of the manuscript for intellectual content
WH and AA: Acquisition of data and critical revision of the manuscript for intellectual content.
ALL AUTHORS: Approval of the final version of the manuscript to be published.

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