

A Comparative Study of 3 Stitch Mesh Hernioplasty versus Conventional Lichtenstein Inguinal Hernia Repair

¹Dr. Pankaj Kumar Sharma, Resident Doctor, Department of General Surgery, Govt. Medical College, Kota, Rajasthan

²Dr. Radhey Shyam Meena, Senior Professor, Department of General Surgery, Govt. Medical College, Kota, Rajasthan

³Dr. Dharamraj Meena, Associate Professor, Department of General Surgery, Govt. Medical College, Kota, Rajasthan

⁴Dr. Ravindra Kumar, Resident Doctor, Department of General Surgery, Govt. Medical College, Kota, Rajasthan

Corresponding Author: Dr. Dharamraj Meena, Associate Professor, Department of General Surgery, Govt. Medical College, Kota, Rajasthan

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Abstract

Background: The purpose of this study is to report the observations made of hernia repair by three stitch hernioplasty methods and compare it with conventional Lichtenstein’s mesh repair in the Department of General Surgery, Government Medical College, Kota.

Methods- This study is a prospective study. After obtaining detailed history, complete general physical and systemic examination, the patients was subjected to relevant investigations. The complete data was collected in a specially designed case recording form. The data collected was transferred into a master chart which is then subjected for statistical analysis. Patients were selected with following inclusion and exclusion criteria.

Results: The postoperative pain is significantly lesser in patients who underwent 3 point fixation of mesh compared to patients who underwent classical fixation of mesh in the early (POD1,POD3,POD7, POD15) and late post-operative period (1month and 3 months).

Conclusion: The three stitch hernioplasty method is a simple method, easy for the beginners to adopt, is less time consuming, has less foreign body reaction, causes less tissue trauma and lesser chance for vascular injury.

Keywords: Hernioplasty, Inguinal hernia, VAS score.

Introduction

Inguinal hernia is the protrusion of abdominal organs into the inguinal canal through the natural or acquired defect of the abdominal wall. It is the most common surgical ailments faced by primary care physicians. Hernia operations are one of the earliest forms of surgery.

There are numerous articles on the prevention and pain occurrence after inguinal hernia repair in the literature. Reports concerning chronic pain after hernia repair are especially disturbing. Pain is diversely defined. In the following report, the British Pain Society definition was accepted: chronic pain is continuous pain, lasting over 12 weeks or – in case of surgical procedures or damages – it is pain occurring after tissues have healed.

According to the International Association for the Study of Pain (IASP), chronic pain is recognized when it occurs after the surgery and lasts minimum 2 months. This definition is criticized as it does not take into account changes occurring later on when the pain starts to decrease gradually e.g. due to the termination of inflammation. Such sequence of events may be expected in hernioplasty: after tissue structures have been strengthened by synthetic material. Those issues are recapped in the newest reports ¹. Apposition of tissues without excessive tension is a relatively new factor mentioned, which corresponds to the experience of the surgical team. Too energetic surgical maneuvers (the strength applied here amounts up to 20 N) cause micro damages of the surrounding tissue which activates painful sensations occurring regardless of other prophylactic treatment. Two groups of patients should be acknowledged in pain assessment: young people, professionally and physically active and middle-aged or older patients with limited physical activity. The risk of chronic pain occurrence in the 2nd group is significantly lower ²

Recently, the methods of implant fixation have been discussed during meetings. Penetrating (sutures/staplers/tackers) and adhesive (sealants) methods of fixation are compared and situations when an implant does not have to be fixed to the surrounding tissues are defined.

Prosthetic meshes are routinely used to repair abdominal wall hernias ³⁻⁵. Several techniques are used for mesh implantation but most involve sutures to anchor mesh in position thereby preventing migration, wrinkling and curling.

Suture placement is time consuming and often challenging ⁶. In addition, these sutures cause extensive tissue tension, predisposition to infection and nerve

entrapment, causing prolonged postoperative pain⁷⁻⁹. Even the application of absorbable sutures instead of nonabsorbable ones doesn't solve the problem ¹⁰. In order to avoid the above disadvantages, it was proposed that polypropylene mesh be applied with less or without suture fixation to surrounding tissue. The purpose of this study is to report the observations made of hernia repair by three stitch hernioplasty method and compare it with conventional Lichtenstein's mesh repair in the Department of General Surgery, Government Medical College, Kota.

Material and Methods

1. **Source of Data:** Total of 59 patients with inguinal hernia who would present under surgical units at Govt. Medical College & Associated Group of Hospitals, Kota.
2. **Duration of the study:** July 2018- December 2019.
3. **Methods of collection of Data:** This study is a prospective study. After obtaining detailed history, complete general physical and systemic examination, the patients was subjected to relevant investigations. The complete data was collected in a specially designed case recording form. The data collected was transferred into a master chart which is then subjected for statistical analysis. Patients were selected with following inclusion and exclusion criteria.
4. Design of the study: Prospective, Randomized study.

Inclusion Criteria

- All patients with evidence of primary uncomplicated inguinal hernia admitted under Surgical Unit at Govt. Medical College & Attached Hospitals, Kota.
- Patients from 18 years to 60 years of age.

- Patients undergoing elective Lichtenstein mesh hernioplasty.
- Patients with bilateral inguinal hernia.

Exclusion Criteria

- Age less than 18 years and more than 60 years.
- Patients with recurrent and complicated hernias.
- Emergency inguinal hernia repair.
- Laparoscopic inguinal hernia repair.
- Chronic steroid treatment.
- Coagulation disorders.
- Ongoing Chemotherapy.
- Connective tissue disorders.
- Psychological or physical disorders that could affect the ability to feel and elaborate pain.

Method: A total of 59 patients will be included in study. An informed consent form will be taken and patients were counselled about the detailed procedure, merits and demerits of operation. Patients will be randomized divided into two groups (group A and B). Group A contains 30 patients while Group B contains 29 patients.

A. Classical Lichtenstein technique

B. Lichtenstein technique with 3 Stitch fixation methods.

Randomization will be conducted with the numbered closed envelopes method and will occur at the operation. The first part of the operation will be the same in the two groups, according to the original description by Lichtenstein. Inguinal canal will be prepared, alongside with the anatomical landmarks – pubic tubercle, conjoint area, inguinal ligament. The hernia sac will be prepared and reduced. The mesh will be shaped according to shape and size of the inguinal canal and put in place. In group A the mesh will be

fixed with one running suture starting from the first stitch passed on the tissue above the pubic tubercle (avoiding the periosteum and with a 2 cm overlap of the mesh above the tubercle) and passed on the inguinal ligament and few interrupted sutures in conjoint area. The two posterior wings of the mesh will be sutured together single prolene stitch to the inguinal ligament.

In Group B the mesh will be fixed with only 3 prolene stitches. The first stitch is made in pubic tubercle. The second stitch is taken in inguinal ligament (1.5cm lateral to pubic tubercle) and the third stitch is from the medial most part of conjoint tendon. The two posterior wings of the mesh will be stitched with a single prolene stitch paying attention to take only the mesh and not any tissue. All patients will have the same polypropylene kind of mesh, irrespective of the fixation method. The fascia will be closed in both groups with a vicryl running suture. Skin will be closed with nylon simple/mattress interrupted suture. Nerves will never be prepared or cut, in either group.

Statistical Methods: Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean \pm SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. The following assumptions on data is made, Assumptions: 1. Dependent variables should be normally distributed, 2. Samples drawn from the population should be random, Cases of the samples should be independent. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters.

Chi-square test has been used to find the significance of study parameters on categorical scale between two or

more groups, Non-parametric setting for Qualitative data analysis.

Significant figures

+ Suggestive significance (P value: 0.05<P<0.10)

* Moderately significant (P value:0.01<P < 0.05)

** Strongly significant (P value : P<0.01)

Statistical software: The Statistical analysis was performed with SPSS, version 21 for Windows statistical software package (SPSS inc., Chicago, IL, USA) and used for the analysis of the data. Microsoft word and Excel have been used to generate graphs, tables etc.

Results: The present study was carried out at Department of General Surgery, at Maharao Bhim Singh Hospital attached to Govt. Medical College, Kota.

Study Design: Prospective, Randomized Two group comparative Surgical Study in a Single Centre.

Total Subjects: A total of 59 patients were enrolled in this study. They were randomized into two groups Group A and Group B.

Group A: This group included 30 patients who underwent conventional method of mesh fixation in Lichtenstein’s Procedure.

Group B: This group included 29 patients who underwent 3 point fixation of mesh in inguinal hernia repair.

Table 1: Socio-demographic profile

	Group A	Group B
Age in Yrs (Mean±SD)	43.60±11.37	49.41±7.72
Male : Female	30:0	29:0
Right : Left : Bilateral	15:11:4	12:14:3

The mean age of presentation in Group A was 43.60±11.37 and in Group B was 49.41±7.72. There was no significant difference in the age in both the groups. Samples are age matched with p – value = 0.086, student t test. All patients in the study were Males out of which 30 were in Group A and 29 were in Group B. The most common type of hernia in Group A was Right Inguinal Hernia (50%) while in Group B, it was Left Inguinal Hernia (48.28%). The difference was not statistically significant with a p- value of 0.664.

Table 2: Post operative duration (days)

	Group A		Group B	
	No.	%	No.	%
1-2	3	10.00	3	10.34
3-6	24	80.00	25	86.20
7-12	3	10.00	1	3.44
Mean±SD	4.43±1.45		4.10±1.26	
P value	0.356 (NS)			

The mean duration of postoperative hospital stay in Group A was 4.45±1.45 while in Group B, it was 4.10±1.26, which was statistically not significant with a P-value of 0.356. Though some patients had to stay for prolonged duration due to complications, it was not statistically significant as complications occurred in both groups. This may be due to the fact that this study took place in an institution which had a government funded scheme which took time (average of 3 days) for approval for surgery (Bhamashah Yojna). Hence, the hospital stay was nearly similar in two groups studied.

Table 3: Duration of Operation

	Group A		Group B		P value	Difference in time in minutes
	Mean	SD	Mean	SD		
Time taken from skin incision to beginning of mesh fixation(mins)	24.60	2.50	23.93	2.20	0.280	0.67
Time taken in fixation of mesh(mins)	5.52	0.59	3.41	0.58	P<0.001	2.11
Total duration of surgery(mins)	37.23	2.88	32.11	2.49	P<0.001	5.12

The mean duration of total surgery in Group-A was 37.23±2.88 minutes while that in Group-B was 32.11±2.49 minutes. Significant difference of 5.12 minutes with P-value < 0.001 was present.

Table 4: Visual Analogue Scale (Vas)

	Group A		Group B		
	Mean	SD	Mean	SD	
POD 1	3.30	0.70	2.31	0.76	P<0.001 (S)
POD 3	2.30	0.70	1.34	0.55	P<0.001(S)
POD 7	1.60	0.67	0.76	0.64	P<0.001(S)
POD 15	0.83	0.70	0.21	0.41	0.0001(S)

- a) On POD 1, the mean VAS score in Group-A was 3.30±0.70, while that in Group-B was 2.31±0.76. This difference in mean VAS score is statistically significant with a P-value <0.001.
- b) On POD 3, the mean VAS score in Group-A was 2.30±0.70, while that in Group-B was 21.34±0.55 which was statistically significant with a P-value <0.001.
- c) On POD 7, the mean VAS score in Group-A was 1.60±0.67, while that in Group-B was 20.76±0.64 which was statistically significant with a P-value <0.001.
- d) On POD 15, the mean VAS score in Group-A was 0.83±0.70, while that in Group-B was 0.21±0.41.

This difference in mean VAS score is statistically significant with a P-value <0.001.

- Overall Group-B experienced significantly less pain compared to Group-A.

Discussion

We have come a long way since Bassini first described hernia repair hundred years ago. Now many newer procedures are available for the repair of hernia being practiced in various institutions with latest technologies, but the older techniques have not been totally abandoned. Even though there are various laparoscopic procedures for inguinal hernia repair, they are effective only in experienced hands. But for the beginners or learners the experience in open hernia surgery is mandatory. The aim of our study is to know

the efficacy of three stitch hernia repair which when done, with care and precision in selected patients. With careful dissection and proper repair is as effective as any other tension free/laparoscopic procedures.

The main problem of the conventional hernia repair techniques is the tension on the suture tract, which can be decreased by a relaxation incision but not avoided completely. The primary etiologic factor of the insufficiency of herniorrhaphy is to suture two tissues which do not meet with each other in normal anatomy, in a tense manner, which is also adverse to general surgical principles. Because of the tension, sutures tear the tissues and cause necrosis. Conversely, mesh repairs do not cause tension on the suture tract, enable a repair without changing the normal anatomic configuration, and result in decreased recurrence rates. Additionally, the technique is simple and more effective and causes less pain. Tension-free method also enables performing bilateral hernia repair¹¹.

In the present study the mean time difference between the Group-A and Group-B with respect to operative time in the current study is 5.12 minutes. The duration of surgery was shorter in the Group- B. The mean time difference in Kim-Fuchs et al was 7 minutes while in Abhilash Singh et al ¹²was 10 minutes. So, the difference are quite low in our study as compared to other two studies.

The post operative VAS scores in the Group B was significantly lower than the Group A in post op days 1,3,7 and 15 in the present study. While in study by Testini et al¹³, immediate post operative pain was higher in conventional Lichtenstein repair which means pain is quite low in Group B cases.

In the present study the mean duration of post op hospital stay was 4.43±1.45 and 4.10±1.26 days respectively. The comparison of this parameter with

other studies was not possible due to the different operational definitions of these variables in different studies. This is due to the fact that the present study is an institutional study and patients in both the groups had to wait for a similar number of days for the government scheme to get approved and hence days of hospital stay were almost the same in both the groups. However a common trend of earlier mobilization and discharge was noted in Group B in all the studies.

The duration of hospital stay depends on a variety of factors including patients wish, cost of hospital stay, doctors advice etc. and hence duration of hospital stay is highly variable. Now we are in an era in which inguinal hernia repairs are done as a daycare procedure at many hospitals and hence not much importance is given to total number of days of hospital stay.

Conclusion

The three stitch hernioplasty method is a simple method, easy for the beginners to adopt, is less time consuming, has less foreign body reaction, causes less tissue trauma and lesser chance for vascular injury.

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