

SHORT-TERM OUTCOME AFTER POLYPROPYLENE DARN AND LICHTENSTEIN'S HERNIOPLASTY: A RANDOMIZED PROSPECTIVE STUDY

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ABSTRACT

Objective: To evaluate and compare the short term outcome of polypropylene darning with Lichtenstein's Hernioplasty for primary inguinal hernia

Study Design: Randomized control trail.

Place and Duration of Study: The study was conducted in CMH Sialkot, CMH Jhelum and PAF Hospital Mianwali from October 2000 to March 2005

Patients and Methods: A study of 270 patients with primary inguinal hernias was conducted in different hospitals. Group I (n=132) underwent darning with polypropylene while Group II (n=140) was subjected to Liechtenstein's operation. It was a simple randomization using random number tables. Patients above 18 and below 75 years age were included in the study and those with gross obesity basal metabolic rate (BMR) > 35; chronic obstructive pulmonary disease (COPD) and other chronic ailments were excluded from study. The patients were randomized and placed in either of the groups. Both the procedures were evaluated post-operatively for pain, inflammatory response (by measuring C-reactive protein (CRP) levels in blood), operation time, cost of procedure and various complications. All patients were discharged after 48 hours and were called again after 7 days for removal of stitches and then after 14 days for any post op evaluation. Patients were then examined after 3 months and then yearly for 3 years. Any complication in the intervening period, or thereafter, was also reported by the patient.

Results: There is insignificant difference in short-term outcome of both the procedure in terms of recurrence rate and other complications. The recurrence rate was 2.27 % in group I while it was 2.14 % in group II. Other complications like hematoma / seroma formation, infection, ischemic orchitis, hydrocele, ingynodynia and post-operative pain did not show significant difference in both the groups. Total cost of biomaterial in Lichtenstein's operation exceeds Rs 1800 as compare to Rs 200 for darning.

Conclusion: Darning with polypropylene is still cost effective and comparable with Lichtenstein's operation when dealing with a large majority of patients with primary inguinal hernia in our setup. Improving the technique and better patient selection can further decrease the recurrence rate.

Keywords: Lichtenstein's operation, Inguinal hernia, Polypropylene darn

INTRODUCTION

Inguinal hernias are amongst the most common of all surgical problems. They are a leading cause of work loss and disability and are sometimes lethal when complicated by strangulation and not treated in time. Knowledge of hernias goes back to Hippocrates when he used the Greek word 'hernios' for a bulge or bud in the abdominal

wall and its treatment by truss was advised by Ebers Papyrus as early as 1550 BC [1]. Surgical treatment for inguinal hernia has undergone tremendous changes. The earliest recorded surgical efforts were to reduce the hernia through scrotal incision, remove the sac and testis and close the area with sutures. In the late eighteenth century surgeons/anatomists began to publish their studies of inguinal hernia and during this period various terminologies related to inguinal hernia were developed [2]. Most of the surgical procedures were followed by sepsis resulting in failure or even death of the

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Received: 18 April 2008; Accepted: 14 Nov 2008

patient. After the advent of antisepsis by Lister in 1865 Marcy, Annandale and Bassini developed more precise methods of hernia repair. Since the introduction of Bassini's method in 1887 more than 70 methods have been reported [3]. All these methods involve tissue approximation with various modifications. After a better understanding of metabolic origin of inguinal hernias and unacceptable higher recurrence rates these methods were replaced by tension free repair. In these methods reinforcement of posterior inguinal wall is done by suitable material instead of approximating the original tissues. This may be done either by darning or placing a suitable biomaterial like polypropylene mesh (Lichtenstein's operation). The methods used in one part of the world may not be so popular in other parts of the world due to difference in availability of resources and cost effectiveness. In Pakistan repair by polypropylene darn and Lichtenstein's operation are equally popular while in many centers laparoscopic total extra peritoneal hernioplasty (TEP) is also performed. A carefully performed darning is cost effective and easy to learn than the Lichtenstein's operation. With this in mind a study was conducted to evaluate and compare the short term outcome of polypropylene darning with Lichtenstein's hernioplasty for primary inguinal hernia.

PATIENTS AND METHODS

A study of 270 patients with primary inguinal hernias was conducted at CMH Sialkot, Jhelum, and PAF Hospital Mianwali between October 2000 and March 2005. Majority of the patients comprised of serving / retired military personnel and their dependents while some civilian non-entitled patients were also included. Demographics in both groups were similar at the start of the trial. All diabetics, grossly obese (BMI >35), and those with COPD and other chronic ailments were excluded. Only patients above 18 and below 75 years were included in the study. Patients were randomly selected in operation theatre to be placed in either of the two groups by simple randomization. Group I

comprised of those patients undergoing polypropylene darning and group II undergoing Lichtenstein's hernioplasty. Standard methods in both the procedures were followed. Type of anesthesia (general, spinal, epidural or local) was decided by the anesthetist. Injection amoxicillin/clavulanic acid was given as in three doses; one pre-op and other two doses post operatively at 8 hourly interval. The inguinal canal was opened along the line of the fibers of external oblique aponeurosis. After reducing the sac the darning was performed using No.1 polypropylene suture material. Repair was started medially and continued laterally picking up inguinal ligament inferiorly in a staggered manner and aponeurotic part of conjoined tendon displacing the cord laterally and narrowing stretched internal ring. It was then reflected back as the second layer tying with left over thread at the pubic tubercle. The other layers were closed as usual. For Lichtenstein's repair the inguinal canal was opened as usual gaining enough space by opening up the plane between the external oblique and conjoined tendon as widely as possible. Full length of inguinal canal was exposed inferiorly. A polypropylene mesh (6×11 cm) is used to reinforce the posterior wall of inguinal canal. The mesh was suitably tailored to accommodate the cord. Starting from the pubic tubercle lower edge of the mesh was sutured to the inguinal ligament with 2/0 polypropylene in a continuous but staggered way securing the medial and upper margins of the mesh with about 6 interrupted sutures. The mesh was extended 2-4 cm beyond the margins of Hesselbach's Triangle to effectively seal any tissue weakness. The slit in the mesh was secured by interrupted 2/0 polypropylene sutures after overlapping two leaves of the mesh and closing the other layers in the usual way. Polypropylene mesh was used due to its monofilament nature containing pore size of more than 10µm in diameter thus reducing the chances of harboring bacteria inaccessible to leucocytes and promoting most rapid ingrowth of blood vessels and fibroblasts and optimal laying down of collagen [4].

Both the procedures were evaluated post operatively for pain, inflammatory response by measuring C-reactive protein level (CRP) levels, operation time, cost of procedure, hematoma or seroma formation, infection, ischemic orchitis, hydrocele or inguinodynia. Serum concentration of C-reactive protein, which is an acute phase reaction protein, has been used to measure inflammatory response post-operatively in various hernia repair techniques [5]. The same marker of inflammatory response to surgery was incorporated in this study by measuring CRP levels (pre -op and 24 hours and 48 hours post-op). Observer based 4-point pain score system (visual analogue score) was used to assess post op pain within first 48 hours (Table 1). The pain score was regularly charted by the nursing staff along with other post-operative recordings. Pain score of 2 and 3 were treated by giving intramuscular injections of diclofenac sodium. All patients were discharged after 48 hours and were advised to avoid strenuous physical activity for three months. Patients were called again after 7 days for removal of stitches and then after 14 days for detection of post op complication. Any such complication appearing in the intervening period was also reported by the patient. Follow up examination was also made at 3 monthly

intervals and the yearly for three years.

RESULTS

A total of 270 patients were included in this study. Though younger patients were also encountered but the majority of patient was above fifty years of age. Mean age, was 54 years (SD=8.1). Eighty one patients had direct inguinal hernia while 189 (70%) patients were suffering from direct variety. Left side was involved in 29 (11%) cases while 220 (81%) were on right side, 21(8%) patients had bilateral inguinal hernia. Amongst indirect type majority had funicular variety. Thirteen cases were irreducible and were operated in emergency. All were indirect type. One had gangrenous enterocele in which resection of affected loop and end-to-end anastomosis was carried out followed by darning. Average operating time was 35 minutes in darning while it was 45 minutes in Lichtenstein's operation. Post operative serum CRP levels was 137.8+/-51mg/L in group II while in group I it was 132.1+/- 42mg/L) (p=0.31). Mean post- operative pain score was

Table-1: Observer Based 4-Point Pain Score

0	No pain at rest
1	No pain at rest, slight on movement.
2	Intermittent pain at rest, moderate on movement
3	Continuous pain at rest, severe on movement

Table-2: comparison of complication in the present study with various other studies.

S.No.	Criteria	Present Study		Samieullah & co-Workers (n=390)	Hussain & co-Workers		Koukourou & co-Workers	
		Group I Darnin g (n=132)	Group I Lichten stein's Operati	Darnin g (N=390)	Darnin g (N=50)	Lichten stein's. (N=50)	Darnin g.N=51	Lichten stein's N=54
1.	Average rise in CRP level	132.1+/- 42 mg/L	137.8+/- 51 mg/L	NA	NA	NA	NA	NA
2.	Hematoma/ Seroma formation	Nil	4	0.76%	14.89%	8.33%	NA	NA
3.	Infection	1.9%	2%	5.12%	8.51%	2.08%	NA	NA
4.	Ischemic orchitis	1	0	NA	2.13%	0%	NA	NA
5.	Hydrocele	4	3	0.25%	NA	NA	NA	NA
7.	Ingyndynia	5	3	0.51%	6.38%	2.08%	NA	NA
8.	Average Pain score	3.42+/-1.2	3.68+/- 1.32	NA	NA	NA	NA	NA
9.	Recurrence	3 (2.27 %)	3 (2.14 %)	0.5%	4%	0%	4%	4%

3.42+/-1.2 in group I and 3.68 +/-1.32 in group II (p=0.09).

There were 4 cases of hematoma / seroma formation in group II and none in group I (P=0.99). Other complications were almost equal in both the groups (Table 2). Infection was superficial and in not a single case mesh had to be removed. One of the patients underwent repeated aspirations for seroma formation. Recurrence rate within a period of three years was 2.27 % in group I and 2.14 % in group II (P=0.09). Two cases in group II reported back with recurrence just after 8 weeks; the reason might be faulty technique or giving way of anchor stitches in immediate post operative period due to coughing / straining.

DISCUSSION

Inguinal hernia repair is the most commonly performed general surgical procedure. About 100,000 procedures in UK, 700,000 in United States and over 20 million are done annually world wide [6]. Despite this the best choice for surgeons to treat inguinal hernias is still under discussion. Starting from classical Bassini's repair to laparoscopic total extraperitoneal hernioplasty (TEP), no single method of hernia repair is agreed upon by all surgeons. This is the reason for continuous evolution of various surgical procedures. In this decision making, extent and type of hernia, age and co-morbid conditions, availability of high tech instruments and expertise available play a major role.

Keeping all these factors in mind, polypropylene darning and Lichtenstein's hernioplasty are quite comparable and the short term results of our study revealed that postoperative complications are almost the same in both the groups. These results are similar to many other studies comparing conventional and non-conventional methods. The recurrence rate is an important factor determining the choice of procedure. In our study the recurrence rate is 2.27 % in group I and 2.14% in group II which is not significantly different from each other. Kaukourou and co-workers [7] in their study

mentioned 4% recurrence rate in both the procedures while Kaynak and co-workers found almost similar complication rates in both the procedures with no added advantage of one method over the other [8]. Similar results have been shown in various studies conducted locally under similar circumstances [9-11]. The actual number of recurrent cases may not be apparent for 5-10 years. In military setup of hospitals long term follow up study is difficult to conduct due to frequent change over of operating surgeons and the patients themselves due to exigencies of military services. The infection rate was just 2% with almost equal distribution in both the groups. The infection was superficial and was treated by removal of affected sutures, dressings and antibiotics. As already mentioned not even a single case required removal of mesh. The only significant difference in post op complications amongst two groups was hematoma / seroma formation (nil in group I and 4 in group II). It responded to repeated percutaneous aspirations. This might be due to foreign body reaction. The cost of surgery is different in both the groups. Polypropylene darning requires one packet of No 1 Polypropylene suture material which costs about Rs.200. Lichtenstein's operation involves one 6X11 cm polypropylene mesh (Rs.1500.00) and one or two packets of 2/0 polypropylene suture material (Rs.300). The total cost of biomaterial in Lichtenstein's operation exceeds Rs.1800 as compared to Rs.200 for darning. In addition Lichtenstein's operation takes longer operation time thus adding extra cost. Thus darn repair is more cost effective than Lichtenstein's hernioplasty.

In our setup where cost is a major factor in any kind of treatment, darn repair still seems to be quite effective way of treating inguinal hernias.

CONCLUSION

Darning with non-absorbable suture such as polypropylene is still equally effective in dealing with inguinal hernias. It is technically easier, less time consuming and more cost effective when compared with Lichtenstein's

hernioplasty. It is a method of choice in dealing with inguinal hernias in a majority of patients in our setup who don't have access to more sophisticated procedures. A prolong follow-up period is required to assess long-term recurrence rate.

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