A Prospective Randomized Controlled Study of Lichtenstein's Tension Free versus Modified Bassini Repair in the Management of Groin Hernias

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Abstract

Background : Bassini's repair and the Lichtenstein's tension free mesh hernioplasty are commonly used hernia repair techniques. A prospective randomized controlled study of Lichtenstein's tension free versus modified Bassini repair in the management of groin hernias was undertaken to compare the technique and postoperative course in the two procedures .

Methods: A prospective study was conducted on patients reporting to Command Hospital (SC) Pune with inguinal hernia. One hundred and ninety six patients were included in the study, operated upon by either of technique and followed up.

Results: Study involved 196 patients with 216 primary inguinal hernias, studied over a period of 24 months. A total of 118 Bassini repair and 98 Lichtenstein's repair were done. Of the 196 patients, four were females. Bassini Repair took more time than Lichtenstein's repair, though the difference was not statistically significant ($p > 0.05$). Direct hernias took lesser time to operate than the indirect hernias. Pain on the operative day, in the evening, was similar in both the groups. The commonest complication in both the groups was scar tenderness followed by erythema, scrotal swelling, neuralgia, superficial wound infection, funiculitis and seroma formation in the order of frequency. The average hospital stay was 5.74 days for Bassini's repair as compared to 4.97 days for Lichtenstein's repair. Patients undergoing Bassini's repair took longer (mean 28.4 days) to return to work as compared to those who underwent Lichtenstein's repair (mean 21.4 days) and the difference was statistically significant ($p < 0.05$). The recurrence rate was similar in Bassini's (6.78%) and Lichtenstein's repair (5.10%).

Conclusion : The Lichtenstein's tension free mesh hernioplasty was comparatively better than modified Bassini's repair due to its simplicity, less dissection and early ambulation in the postoperative period. Surgeons in training found the technique easier to master than the Bassini's repair.

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Key Words: Inguinal hernia; Lichtenstein's tension free mesh repair; Modified Bassini's repair

Introduction

Hernia repair is a commonly performed procedure in the world. Several methods have been developed over the years to improve on the traditional methods of hernia repair, the most important being the Lichtenstein mesh repair [1-3] and laparoscopic mesh repair [3,4]. The aim of this trial was to determine if, in the hands of an average surgeon and residents, there were any benefits to be gained from using the mesh repair as opposed to the commonly used modified Bassini repair. A controlled randomized prospective study was carried out to compare the recurrence rate, postoperative pain, infection rate, seroma formation, and funiculitis with associated morbidity and hospital stay in patients in whom Bassini and Lichtenstein method of repair was carried out.

Material and Methods

A prospective study was conducted on the patients

reporting to Command Hospital (Southern Command) Pune for inguinal hernia. A total of 196 patients were included in the study and operated upon over a period of 24 months. Children up to 18 years of age, patients staying outside Maharashtra, those operated in emergency or suffering from malignant disease, and patients not consenting to participate in the study were excluded. The study was randomized using envelopes containing pieces of paper on which 'Bassini' or 'Lichtenstein' was written. The envelopes were selected on the last visit of the patient to the OPD or immediately on admission to the ward by a person not involved in the study. The patient was explained the nature of surgery and consent for the same was taken. Patients refusing to consent were excluded and their envelopes destroyed. The surgeons and the persons carrying out postoperative assessment, being part of the same surgical team, were not blind to the procedure. All the Bassini repairs were done either under spinal or general anaesthesia while the Lichtenstein's repair was done under local/spinal/general anaesthesia, depending on the choice of the patient and surgeon.

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The inguinal canal was opened by an inguinal incision made 2.5 cm above and parallel to the medial three-fifth of the inguinal ligament in both the procedures and hernial sac identified. If it was an indirect sac a high dissection and herniotomy was done. The direct sac was simply inverted and repair carried out as per the randomisation. In modified Bassini's technique, the floor was repaired by approximating the conjoint tendon to the inguinal ligament by interrupted No. 1 prolene sutures, taking the first bite from the pubic tubercle. The fascia transversalis was not incised and the external oblique closed using 3-0 catgut in front of the cord after formally closing the coverings of the cord with interrupted 3-0 catgut.

In the Lichtenstein's repair, the hernial sacs were dealt with as above. The external oblique was then separated from underlying internal oblique muscle to accommodate a 6 to 8 cm wide mesh patch to overlap the internal oblique muscle and aponeurosis by at least 2 to 3 cm above the free edge of conjoint tendon. The medial end of the mesh is rounded to the shape of the medial end of the inguinal canal and with a 3-0 prolene suture the rounded end is sutured to the pubic tubercle overlapping the bone by 1.5 to 2 cm. Mesh was fixed to rectus sheath medially and inguinal ligament below by a continuous 3-0 prolene suture. The mesh was tagged to conjoint tendon by interrupted suture of 3-0 prolene (Fig 1). The cord was closed by suturing cord coverings with interrupted suture of 3-0 catgut and external oblique is closed in front of the cord with continuous suture of 3-0 catgut. Leaving a drain behind was left to the surgeon's discretion.

All cases were given a dose of injection ampicillin 1 gm and gentamicin 80 mg intramuscularly one hour prior to surgery. The dose was repeated intravenously at induction, followed by three doses post operatively if there was no infection or drain. In cases with drains left in the wound, antibiotics were continued till the removal of drain. No systemic antibiotics were used for superficial wound infection while tablet ciprofloxacin 500 mg twice daily was given prophylactically for patients with seroma formation. All patients were given injection voveran 75 mg intramuscularly 8 hourly on first postoperative day and tablet voveran 50 mg given on SOS basis thereafter.

Fig. 1 : Operative photograph showing prolene mesh in position in Lichtenstein's tension free mesh repair

Pain analysis was done by visual analogue scale (VAS) on the operative evening. Patients were handed over a piece of paper with a 10 cm straight line drawn on it with left hand corner representing no pain and the right hand side representing most severe pain the patient could imagine. Patient was requested to mark the severity of pain, he felt, on the line.

The continuous numerical data were subjected to analysis of variants (ANOVA), while the discrete data were analysed by the Chi square test.

Results

The difference between the two groups in terms of age and sex distribution, side or type of hernia was not statistically significant. The maximum numbers of cases were between 3rd to 7th decades (Fig. 2). Smoking was commoner in patients with direct inguinal hernia in statistically significant proportions ($p < 0.05$) (Fig 3). Modified Bassini repair required more time (59.34 ± 19.11 minutes) as compared to Lichtenstein's repair (55.34 ± 12.15 minutes) but the difference was not statistically significant ($p > 0.05$) (Table 1). The pain score in the evening on the operative day in the Bassini repair patients was (mean 6 ± 1.23) less than the patients who underwent Lichtenstein's repair (6.08 ± 1.57) on visual analogue scale. The difference in pain score was not statistically significant ($p > 0.05$). Patients who underwent Lichtenstein's repair under local anaesthesia, complained of lesser pain (mean 4.66 ± 1.3) as compared to the spinal anaesthesia (6.58 ± 1.35). The difference was statistically significant ($p < 0.05$) (Fig. 4).

The commonest complication in both groups was scar tenderness, followed by erythema, scrotal swelling, neuralgia, superficial infection and seroma formation (Table 2). The erythema and scar tenderness was more common in the

Fig. 2 : Age distribution

Fig. 3 : Smoking and hernia

Table 1**Operation time**

Surgeons	Bassini Repair (Minutes)		Lichtenstein's Repair (Minutes)	
	Direct	Indirect	Direct	Indirect
Residents	73.3 (Range 65-70)	75.75 (Range 50-105)	68.75 (Range 55-80)	68.75 (Range 65-86)
Consultants	43.87 (Range 25-56)	47.33 (Range 32-95)	46.28 (Range 35-55)	52.16 (Range 32-70)
Combined	59.33 $\pm$ 19.10		55.33 $\pm$ 12.15	

Table 2**Complications**

Type of repair	Total	Erythema	Scrotal swelling	Seroma	Superficial infection	Retention of urine	Haematoma	Recurrence	Scar tenderness	Funiculitis	Neuralgia
Bassini (percentage)	118	36 30.51	31 26.27	8 6.78	11 9.32	23 19.49	5 4.24	8 6.78	37 31.36	17 14.40	22 18.64
Lichtenstein's (percentage)	98	32 32.65	14 14.29	4 4.08	9 9.18	14 14.29	1 1.02	5 5.10	41 41.84	12 12.24	10 10.20

Fig. 4 : Pain on operative evening

Lichtenstein's repair. 37 patients developed urinary retention in the postoperative period requiring catheterisation. The incidence was maximum (14.15%) amongst the patients undergoing Bassini's repair under spinal anaesthesia and minimum (9.09%) amongst the patients operated by Lichtenstein's technique under local anaesthesia. The difference is statistically significant ($p < 0.05$). Most of the patients with urinary retention were more than 50 years of age (mean age 55.7 years). The cases of superficial wound infection (9.32% in Bassini and 9.18% in Lichtenstein's repair) were equally distributed amongst the cases, irrespective of the drain usage (Table 2). The average hospital stay in the post operative period for modified Bassini Repair was 5.74 days (range 2- 16 days), and 4.97 days (range 2 – 11 days) for patients undergoing Lichtenstein's repair. Patients who underwent modified Bassini's repair took longer (28.24 ± 6.81 days) to return to work as compared to their counterparts who were operated with Lichtenstein's technique (21.39 ± 4.95 days) and the difference was statistically significant ($p < 0.05$). During the follow up period ranging from 1 to 3 years, there were 8 (6.61%) cases of recurrence in Bassini repair as compared to 5 (5.10%) in Lichtenstein's repair. The difference in recurrence rate was not statistically significant ($p > 0.05$).

Discussion

A prospective randomized controlled study of Lichtenstein's tension free versus modified Bassini repair in the management of groin hernias was done to compare the technique, clinical outcome and postoperative course in both the procedures.

The recurrence rate has always been considered an important parameter to assess the effectiveness of any form of hernia repair. In non-specialised centres recurrence rates is 10-40% after Bassini's repair [5, 6]. The problem in the repair of inguinal hernia is the wide discrepancy between the monotonous excellence achieved in personal series and the uniformly depressing results obtained by impersonal statistical reviews. Yet impersonal reviews indicate that the recurrence rate remains excessively high and fairly constant, whatever methods and material are employed. Various modifications of the Bassini's technique were introduced with an expectation of reducing the recurrence rate. Shouldice and Cooper's ligament repair is the most popular modification of Bassini's repair [7]. The recurrence rate of Shouldice repair in specialist centres is less than 1% [8] but in non-specialised centres the rate varies from 1-7% [9,10]. For Cooper's ligament repair the reported recurrence rate is 4.17% [7]. In contrast, Lichtenstein reported a recurrence rate of 0.1% after a mean follow up period of 66 months [11], while the technique of plug and patch repair under local anaesthesia, gives a low recurrence rate of 0.25% [12]. The concept of judging the supremacy of a hernia repair technique over others using recurrence rate as a criterion is questionable [5,13].

Hernia surgery is one of the few intermediate operations available to junior trainees. Lichtenstein

hernia repair is probably easier for trainees to learn. In a recent prospective trial of primary inguinal hernia repair by surgical trainees, the recurrence rate was 8% for Lichtenstein and 5% for Shouldice repair at 6-9 years of follow-up and 38% of patients had chronic groin pain following Lichtenstein repair [14]. The recurrence rate at the end of our study (a follow up of 1 to 3 years) was 6.61% (8 out of 118 cases) as compared to 5.1% (5 out of 98) in Lichtenstein's repair which is similar to other contemporary reports [14]. The recurrence rate in our study may not represent true effectiveness of a repair technique because of two reasons. Firstly, the high early recurrence rate would be due to sizeable proportion of surgeries being done by the resident surgeons and the recurrence rate in cases operated by junior surgeons is known to be higher than that of the consultants [15, 16]. Secondly our follow-up period was limited, with the cases operated at the terminal part of the study being followed up for an year only. A higher recurrence rate may be found if the follow up is continued for a longer duration. This study has relevance to armed forces in that the patients operated by Lichtenstein's tension free mesh hernioplasty technique were not placed in low medical category after sick leaves and an early post operative rehabilitation was possible.

Haematoma as a complication of Bassini's repair between 0-20% in different studies has been reported [17]. In our study only five patients, who were operated for an indirect inguinal hernia with modified Bassini's technique by trainee surgeons developed haematoma of which three patients required re-exploration and the subsequent recovery was uneventful. Cigarette smoking is known to disturb the protease/antiprotease system leading to destruction of elastin and collagen of the rectus sheath and fascia transversalis [18]. Our study substantiates this notion, as smoking was commoner amongst the patients with direct hernia in statistically significant proportions ($p < 0.05$) as compared to the patients with indirect hernia, in whom weakening of the floor of the canal has a lesser role to play in the pathogenesis of hernia formation.

To conclude, the Lichtenstein's tension free mesh hernioplasty was found to be better than the Bassini's repair due to technical simplicity, smaller dissection and early ambulation with an acceptable post operative rehabilitation without any low medical categorisation in serving soldiers. Surgeons in training found the technique easier to master than the Bassini's repair.

Conflicts of Interest

None identified

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