



## Comparative Study of Stoppa's Repair by Pfannensteil Incision Versus Lichtenstein Technique for Management of Bilateral Inguinal Hernia

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### Abstract

**Background:** *Hernia repair is one of the most commonly performed general surgical procedures worldwide. Today, Stoppa's repair has been considered as an alternative to Lichtenstein's tension free mesh hernioplasty in the case of bilateral inguinal hernias. This new technique is theoretically closer to ideal hernia repair and based on the concept of providing a strong, mobile and physiologically dynamic posterior inguinal wall. The technique is simple, easy to learn and does not require complicated dissection or suturing.*

**Aims and Objectives:** *To establish the influence of Stoppa's repair on early clinical outcomes of bilateral inguinal hernia repair and limited study of long term outcomes, especially with regards to post-operative pain, operative time, wound complications, recurrence, time taken to ambulate etc.*

**Settings and Design:** *This is a comparative study carried out in 60 patients, out of which 30 underwent Lichtenstein's repair and 30 underwent Stoppa's repair, admitted in surgical ward in Sir Sayajirao Hospital, Baroda from October 2014 to November 2016.*

**Materials and Methods:** *Data was collected by meticulous history taking, careful clinical examination, appropriate radiological, haematological investigation, operative findings and follow-up of the cases.*

**Results:** *Post-operative pain relief was more in Stoppa's group compared to Lichtenstein group on day 1, 3 and 7. Also, early and late wound complications were lesser in Stoppa's group compared to Lichtenstein's group. Patients of Stoppa's group returned to routine work faster compared to Lichtenstein group. Chronic groin pain was found to be less incident in Stoppa's group, but that was not statistically significant due to the limited follow-up period. There was no recurrence seen in both groups during the 6 months follow-up period.*

**Conclusion:** *It can be reliably concluded that Stoppa's repair using pfannensteil incision is definitely a promising procedure for the management of patients with bilateral inguinal hernias.*

**Keywords:** *Stoppa's repair, Lichtenstein's meshplasty, Inguinal hernia, Postoperative Pain, Hernioplasty.*

### Introduction

It has been said that the history of groin hernias is the history of surgery itself.<sup>1</sup> Hernia

repair is one of the most commonly performed general surgical procedures worldwide.<sup>2</sup> Since the time Bassini described his technique the

search for an Ideal Inguinal Hernia repair is still on. An Ideal Hernia repair should be Tension free, Tissue based, with no potential damage to vital structures, no Long Term pain or complications and no recurrence.

Lichtenstein's prosthetic repair using prolene mesh has been popular lately & it is a tension free repair. The mesh works as a mechanical barrier, but it does not give mobility and physiologically dynamic posterior wall.<sup>3</sup> Moreover this technique is associated with risk of infections, recurrence, chronic pain testicular atrophy and infertility, foreign body sensations and chronic groin sepsis which sometimes may require mesh removal.<sup>4</sup>

Other tissue repairs like such as modified Bassini, Iliotibial tract repair, Shouldice, Nylon-Darn, Halsted-Tanner, McVay and many others either requires good surgical experience or are tension repairs fraught with recurrences. Recurrences vary from surgeon to surgeon and centre to centre owing to complexity of the procedures.<sup>5</sup>

The Stoppa's Repair first described in 1975 by Rene Stoppa, also known as giant prosthetic reinforcement of the visceral sac (GPRVS), is a tension free type of hernia repair, which is performed by wrapping the lower part of the parietal peritoneum with prosthetic mesh and placing it at a preperitoneal level through pfannensteil incision. This technique has met particular success in the repair of bilateral hernias, large scrotal hernias, and recurrent hernias in which conventional repair is difficult and carries a high morbidity and failure rate.<sup>7-9</sup>

This new technique is theoretically closer to ideal hernia repair and based on the concept of providing a strong, mobile and physiologically dynamic posterior inguinal wall. The technique is simple, easy to learn and does not require complicated dissection or suturing.

The purpose of this study is to attempt to establish the influence of this new technique on early clinical outcomes of bilateral inguinal hernia repair, and limited study of long term outcomes.

## Materials and Methods

This is a comparative study carried out in 60 patients admitted in surgical ward in Sir Sayajirao Hospital, Baroda from October 2014 to November 2016 with a follow up period of 6 months. All patients of bilateral inguinal hernia and age more than 18 years were included in this study. Patients with complicated inguinal hernia, obstructed or strangulated inguinal hernia, previous abdominal surgery, local skin infection and age less than 18 years were excluded. By simple randomization, patients were divided into two groups; thirty of them undergoing Lichtenstein tension free mesh hernioplasty in which two separate inguinal incisions were kept and thirty of them undergoing Stoppa's repair in which pfannensteil incision was kept. Purpose of the study and the methods of treatment were carefully explained to the patients individually and written informed consent taken. Detailed history was collected including age, chief complaints and duration, other associated conditions like chronic cough, chronic constipation, urinary complaints etc, history of previous abdominal surgeries, family history, occupation, marital status etc. Detailed physical examination was conducted by any experienced surgeon. Telephonic contact numbers and detailed addresses were collected for follow up.

## Method of Lichtenstein Tension Free Mesh Hernioplasty<sup>21,22</sup>

A 5–6 cm skin incision, which starts from the pubic tubercle and extends laterally within the Langer line, gives an excellent exposure of the pubic tubercle and the internal ring. After skin incision, the external oblique aponeurosis is opened.

Indirect hernial sacs are freed from the cord to a point beyond the neck of the sac and are inverted into the pre-peritoneal space without ligation. In the event of direct hernias, if large, the direct sacs are inverted with an absorbable suture. A sheet of 7.5×15cm of mesh is used preferably monofilament polypropylene meshes because their surface texture promotes fibroplasia and their monofila-

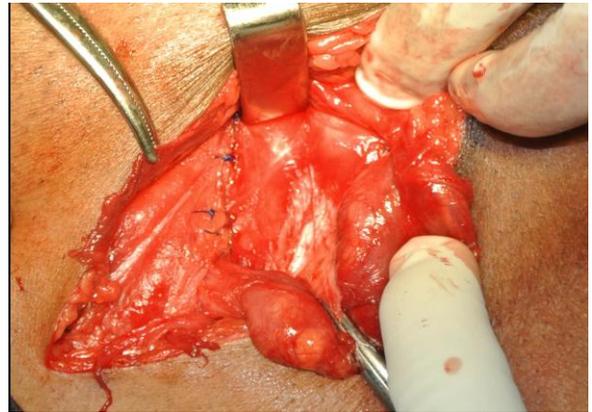
ment structure does not perpetuate or harbor infection. With the cord retracted upward, the sharper corner is sutured with a nonabsorbable monofilament suture material to the insertion of the rectus sheath to the pubic bone and overlapping the bone by 1 to 2 cm. This is a crucial step in the repair because failure to cover this bone with the mesh can result in recurrence of the hernia. A slit is made at the lateral end of the mesh, creating two tails, a wide one (two-thirds) above and a narrower one (one-third) below. The wider upper tail is grasped with forceps and passed toward the head of the patient from underneath the spermatic cord; this positions the cord between the two tails of the mesh. The wider upper tail is crossed and placed over the narrower one and held with a hemostat. With the cord retracted downward and the upper leaf of the external oblique aponeurosis retracted upward, the upper edge of the patch is sutured in place with two interrupted absorbable sutures, one to the rectus sheath and the other to the internal oblique aponeurosis, just lateral to the internal ring.



**Figure 1:** Separation of Sac and Cord structures



**Figure 2:** Reduction of sac contents and Ligation of sac



**Figure 3:** Preparation of posterior wall for Repair



**Figure 4:** Placement and fixation of mesh with stay sutures

Using a single nonabsorbable monofilament suture, the lower edges of each of the two tails are fixed to the inguinal ligament just lateral to the completion knot of the lower running suture. The excess patch on the lateral side is trimmed, leaving at least 5 cm of mesh beyond the internal ring. This is tucked underneath the external oblique aponeurosis, which is then closed over the cord with an absorbable suture.

#### **Method of Stoppa's Repair By Using Pfannensteil Incision<sup>1</sup>**

For all patients, a pfannensteil incision was used as a standard, followed by vertical separation of both recti to enter the preperitoneal space. Blunt dissection of the preperitoneal space was performed. Dissection involved the retropubic space of Retzius, and reached the rectus abdominis muscle and epigastric vessels laterally, extending to the retroinguinal space. The spermatic cord and gonadal vessels were visualized. The superior pubic ramus, the obturator foramen, and iliac vessels were exposed.

Direct hernias were identified and reduced. Large sacs were removed and ligated with a purse-string suture. Indirect sacs were divided, the proximal peritoneum was sutured, and the distal peritoneum was left in place attached to the cord. Separation of the spermatic cord and gonadal vessels was performed by dissection of their peritoneal attachment. Two prolene mesh of 15 by 15cm<sup>2</sup> were placed in the preperitoneal space in bilateral inguinal region. Fixation of the mesh was done by suturing mesh with pubic tubercle on both sides.



**Figure 5:** Vertical separation of both recti done to enter pre-peritoneal space



**Figure 6:** Spermatic cord and cord structures are identified and separated from hernia sac carefully



**Figure 7:** Prolene mesh is kept in preperitoneal region



**Figure 8:** Skin is closed with staples

Inj. Ceftriaxone 1gm intravenously was given for all patients half an hour prior to surgery. Post operatively analgesia in the form of Inj. Diclofenac single dose and then Tab. Diclofenac 50mg twice a day for next 2 days was given to all patients. Per urethral catheter was done in all patients of Stoppa's group.

Operating time was measured as the time of total procedure i.e. starting from the skin incision till the final suture taken for skin closure. The patients were followed up for postoperative pain which was evaluated using Visual Analogue Score Scale on day 1, day 3 and day7, wound hematoma, seroma, wound infection, scrotal swelling, chronic pain and foreign body sensation. Time for return to routine daily activities done by the patient pre-operatively, postoperative duration of hospital stay and recurrence rate was also documented.

### Observation and Results

This is a comparative study carried out in 60 patients, thirty of them undergoing Lichtenstein tension free meshplasty and thirty undergoing Stoppa's repair, admitted in surgical ward in Sir Sayajirao Hospital, Baroda from October 2014 to November 2016.

The mean age of presentation in Lichtenstein group was 48.57 + 15.8 years and in Stoppa's group was 40.82 + 14.51 years. There was no significant difference in the age in both the groups (p=0.06).

The mean duration of the total surgery in Lichtenstein group was 74.68±2.86 mins while that in Stoppa's group was 64.43±2.59 mins. There was a statistically significant difference of nearly 10 minutes with a 'p' value of <0.0001.

**Table 1:-** Post Operative Pain (VAS Scale)

Day	Lichtenstein	Stoppa	P value
1	5.93±1.12	4.39±1.03	<0.0001
3	4.46±1.10	2.96±0.84	<0.0001
7	2.07±1.30	0.61±0.88	<0.0001

**Table 2:-** Early Complications in two groups of patients

Complications	Lichtenstein (n=30)		Stoppa (n=30)		Total (n=60)		P value
	N	%	n	%	n	%	
Fever	2	7.1%	1	3.6%	3	5.4%	0.99
Seroma	2	7.1%	3	10.7%	5	8.9%	0.99
Scrotal swelling	4	14.2%	2	7.1%	6	10.7%	0.67
Hematoma	1	3.6%	0	0%	1	1.8%	0.99
Wound Infection	1	3.6%	1	3.6%	2	3.6%	1

**Table 3:-** Late Complication: Chronic Pain)

Methods	1 month	3 months	6 months
Lichtenstein (n=30)	2 (7.1%)	4 (14.3%)	4 (14.3%)
Stoppa (n=30)	0 (0%)	1 (3.6%)	1 (3.6%)
P value	0.49	0.35	0.35

The Mean duration of Postoperative Hospital stay in Lichtenstein group was 5.39±1.89 while that in Stoppa Group was 3.96±1.85, with a statistically significant difference of 1.43 days with a P value of 0.0061. Though some patients had to stay for prolonged duration due to complications it was not statistically significant as complications occurred in both groups.

The Mean duration (in days) to return to the routine light sedentary job work (occupation) was 7.43±1.73 in the Lichtenstein group and 5.25±1.17 in the Stoppa group. On statistical calculation the P Value is <0.0001, which is considered statistically significant.

No recurrence in inguinal hernia was seen in patients of both the Lichtenstein and Stoppa groups during the 6 months follow up period.

## Discussion

Inguinal hernia is the most common surgical abdominal entity in adults.<sup>30</sup> In the past decade Lichtenstein repair has become the gold standard for treatment of inguinal hernias mainly due to the reduction in recurrences noted and due to the reproducibility of the procedure.<sup>25</sup>

It is used as a gold standard surgery for all types and sizes of bilateral inguinal hernia with very few exceptions but with two separate inguinal incisions. Several other complications of mesh repair include hematoma, seroma, ischemic orchitis, testicular atrophy, mesh infection and sinus formation<sup>26</sup>. Young patients especially those undergoing mesh repair for Indirect Hernias are affected mostly with a risk of infertility in future<sup>28</sup>.

Hence a search for ideal hernia repair is still underway and Stoppa procedure through pfannensteil incision might be the procedure satisfying the criteria for an ideal bilateral hernia repair as it is tension free. Also it requires only single incision for the repair of bilateral inguinal hernia so patient satisfaction is achieved too.

**Table 4:-** Comparison of Age Distribution in various studies

STUDIES	LICHTENSTEIN (years)	STOPPA (years)	P Value
Youssef et al	43.89±10.27	45.97±10.69	0.37
Z Abbas et al	39.26±1.58	39.84±10.97	0.44
Present study	48.57±15.8	40.82±14.51	0.06

**Table 5:-** Comparison of Operative Times in various studies

STUDIES	LICHTENSTEIN (minutes)	STOPPA (minutes)	P Value
Youssef et al	72.3±12.2	59.4±6.3	<0.001
Z Abbas et al	65.67±6.97	65.64±7.89	0.82
Rodriguez et al	48	39	<0.01
Present study	74.68±2.86	64.43±2.59	<0.0001

**Table 6:-** Comparison of Post Operative Pain (VAS Scores) in various studies

STUDIES	LICHTENSTEIN	STOPPA	P Value
Youssef et al	2.8±1.6	2.4±1.9	0.09
Z Abbas et al	3.5±0.97	2.86±0.70	0.0004
Present study	5.93±1.12	4.39±1.03	<0.0001

Stoppa’s Repair using pfannensteil incision has less tissue dissection requirement. Lichtenstein technique requires more dissection, tissue

handling. This may contribute to significant less Post-Operative Pain after the Stoppa technique, compared to Lichtenstein technique.

**Table 7:-** Comparison of Duration Of Hospital Stay in various studies

STUDIES	LICHTENSTEIN (DAYS)	STOPPA (DAYS)	P Value
Manylirah et al	6.1	5.8	-
Present study	5.39±1.89	3.96±1.85	0.0061

**Table 8:-** Comparison of Return To Routine Daily Activities in various studies

STUDIES	LICHTENSTEIN (days)	STOPPA (days)	P Value
Youssef et al	4.4±1.1	3.9±0.9	<0.05
Z Abbas et al	3.90±0.86	2.58±0.70	<0.0001
Present study	7.3±1.73	5.25±1.17	<0.0001

It suggests that patients operated with Stoppa’s Repair by using Pfannensteil incision get ambulatory sooner and return to the routine

activities before the patients operated with Lichtenstein repair.

**Table 9:-** Comparison of Early Complications in various studies

Studies	Early Complications					
	Wound Infections		Cord/ Scrotal Oedema		Hematoma	
	L	S	L	S	L	S
Youssef et al	2.7%	1.4%	5.6%	7.1%	—	—
Rodriguez et al	1.3%	0.8%	—	—	3.9%	2%
Szopinski et al	1.9%	0.9%	—	—	7.7%	6.8%
Z Abbas et al	—	—	2%	2%	—	—
Present study	3.6%	3.6%	14.2%	7.1%	3.6%	0%

Patients with wound infection had minimal sero-purulent soakage and one or two sutures were

removed and wound culture was sent. Oral antibiotics were given according to the wound

culture. None of the patient required wound re-exploration or removal of the mesh.

The oedema is due to the dissection around the sac of hernia and handling of tissues while separating the spermatic cord from sac. On ultrasound, epididymo-orchitis was found in 1 patient from

each group and cord oedema was seen in 3 patients in Lichtenstein group and 1 patient in Stoppa group. Tab. Chymoral Forte was given to these patients and scrotal elevation was advised. None of the patients required re-exploration.

**Table 10:-** Comparison of Chronic Pain and Recurrence in various studies

STUDIES	Chronic Pain			Recurrence		
	L	S	P Value	L	S	P value
Youssef et al	1.4%	2.8%	0.55	---	---	---
Rodriguez et al	1%	1%	---	4%	1%	---
Present study	14.3%	3.6%	0.35	0%	0%	---

Strong foreign body fibrous reactions are seen at the mesh placement sites after inguinal hernia repair. This causes spermatic cord and nerve entrapment leading to chronic pain. It implies that the occurrence of chronic pain is similar in both the groups. The exact cause of post-hernioplasty pain is not known. The patients were managed with oral analgesics.

### Conclusions

Lesser operating time, post-operative pain, complications like fever, seroma, hematoma, scrotal swelling and wound infection have certainly been seen in Stopp's repair compared to Lichtenstein's tension free meshplasty. Also, duration of post-operative hospital stay and time taken to return to routine daily activities was significantly less in Stoppa's group compared to Lichtenstein group, making it a favourable procedure in patients with bilateral inguinal hernia. Stoppa's repair using pfannensteil incision is definitely a promising procedure but more number of Randomized control trials and multicenter trials need to be undertaken to study the pros and cons of this procedure in future.

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