

**ORIGINAL ARTICLE****PROLENE HERNIA SYSTEM (PHS) VERSUS LINCHENSTEIN REPAIR IN INGUINAL HERNIOPLASTY: A COMPARATIVE STUDY****Rushin B Thakor<sup>1</sup>, Darshan Patel<sup>2</sup>, Chirag Shah<sup>2</sup>, Gulab R Patel<sup>3</sup>****Author's Affiliations:** <sup>1</sup>Senior Resident; <sup>2</sup>Third year resident; <sup>3</sup>Professor and Head, Department of Surgery, Government Medical College, Surat.**Correspondence:** Dr. Rushin B Thakor, Email: dr.rushin95@gmail.com**ABSTRACT**

**Background:** Surgeons are more interested in the techniques available, in recurrence rates, and in short term complications of hernia surgery. The present study was conducted with an objective to compare inguinal hernioplasty with the prolene hernia system versus Linchenstein repair.

**Methodology:** The present comparative study was conducted on the patient admitted with the diagnosis of primary unilateral inguinal hernia. These patients were randomly placed in two groups, one group was subjected to open tension free Prolene hernia system mesh hernioplasty & other group Linchenstein repair. The patients were assessed for the severity of post operative pain using visual analogue scale, duration of surgery, technical difficulty and post-operative complications like wound infection, wound seroma.

**Results:** Duration of surgery in case of Linchenstein mesh repair ranged from 40 -50 minutes and in PHS ranged from 60 - 80 minutes with mean of 70.4 minutes. For Linchenstein repair at the end of 7<sup>th</sup> day 24% cases have no pain, 60% cases have minimal pain, while 16% cases have moderate pain. For PHS at the end of 7<sup>th</sup> day 44% cases have no pain, 48% cases have minimal pain, while 8% cases have moderate pain. No patient has severe pain at the end of 7<sup>th</sup> and 15<sup>th</sup> day.

**Conclusion:** There is no significant difference found in hospital stay, Complications, chronic pain and recurrence rate in either group. PHS is bit difficult for new surgeon, it requires expertise.

**Key words:** inguinal hernia, Linchenstein Repair, Prolene Hernia System, Hernioplasty

**INTRODUCTION**

Groin Hernias are one of the most common surgical conditions faced by surgeons over the years and it still continues, to excite the interest of surgeons and patients. Surgeons are more interested in the techniques available, in recurrence rates, and in short term complications of hernia surgery whereas patients are most interested in return to work and full social activity, pain-free convalescence, and a well-healed wound.<sup>1</sup>

In late 18<sup>th</sup> century, Edoardo Bassini revolutionized the treatment of inguinal hernia by the technique designed "to restore those conditions in the area of

the inguinal orifice which exists under normal circumstances".<sup>1</sup> Halstead, Shouldice, McVay, regardless of modification, have shared a common disadvantage, suture line tension, being the prime etiologic factor in hernia recurrence. Linchtenstein's tension-free mesh repair opened a new era in groin hernia repair with significant decrease in recurrence rates.<sup>2</sup>

This latest, tension free Prolene Hernia System mesh technique has been introduced by Dr.Arthur Gilbert in 1999, combining all the benefits of the mesh plug, Lichtenstein's and Kugel techniques. It is the only tension free device covering the entire hernia prone area called "the myopectineal orifice" and has aimed to further reduce the incidence of recurrence rates

and wound complications.<sup>3</sup> The present study was conducted with an objective to compare inguinal hernioplasty with the prolene hernia system verses linchenstein repair

**MATERIALS AND METHODS**

The present comparative study was conducted on the patient admitted with the diagnosis of primary unilateral inguinal hernia in New Civil hospital, Surat from June 2012 to 2014. The operative procedure which was utilized was inguinal hernioplasty with the Prolene Hernia System. The diagnosis of primary uncomplicated inguinal hernia after clinical examination of the abdomen was made on basis of history of a reducible groin swelling.

All essential investigations like random blood sugar, blood urea, serum creatinine, ECG, hemoglobin percentage and routine urine analysis for sugar, albumin and microscopy and chest X-ray were done to obtain fitness for surgery. These patients after investigations were randomly placed in two groups according to the surgeon’s choice after discussing with patient. One group was subjected to open tension free Prolene hernia system mesh hernioplasty & other group was subjected to Linchenstein repair.

Men above 18 years of age with unilateral primary uncomplicated inguinal hernia and who gave consent for the procedure are included in the study. The cases who are in pediatric age group, with complicated inguinal hernias (irreducible, incarcerated, strangulated), recurrent hernia, patient with systemic disease, inguinal hernias associated with intra-abdominal malignancy are excluded from the study.

For the technique using the prolene hernia system (R), the preperitoneal space is opened. This mesh consists of an “underlay patch” that is positioned in the pre-peritoneal space, a “connector” that is placed through the hernial defect, and an “onlay patch” that is placed on the inguinal floor with minimal fixation using polypropylene 2-0 suture. For the technique using the lichenstein repair , the prolene mesh is fixed with non absorbable sutures. A split for spermatic cord is made.

A note was made regarding the contents of the sac, duration of surgery and any technical difficulty encountered during the surgery. The patients were assessed for the severity of post operative pain using visual analogue scale at post operative day 1, post

operative day7, post operative day 15, post operative 1month, 6<sup>th</sup> month and at 1year of operation. These patients were also followed up for post-operative complications like wound infection, wound seroma, wound hematoma and wound dehiscence. Follow-up was done after 1 week, 4 week, 6 months and 1 year for complications like chronic groin pain (inguinodynia), time taken to return to normal activity, patient’s satisfaction and recurrence.

**RESULTS**

The present study included 50 cases of unilateral primary inguinal hernia who were subjected to open tension free Prolene hernia system mesh hernioplasty (Group 1) & Linchenstein repair (Group 2).

**Table 1: Age wise distribution of cases**

Age (years)	Lichenstein Repair	Prolene hernia system
21-30	3 (12)	6(24)
31-40	6(24)	4(16)
41-50	8(32)	6(24)
51-60	3(12)	4(16)
>70	5(20)	5(20)

**Table 2: Distribution of hernia on both the groups**

Variables	Lichenstein Repair	Prolene hernia system
<b>Type of Inguinal Hernia</b>		
Direct	10 (40)	4 (16)
Indirect	15 (60)	21 (84)
<b>Side of Inguinal Hernia</b>		
Right	17 (68)	19 (76)
Left	8 (32)	6 (24)

**Table 3: Comparison of duration of surgery between the two groups**

Duration of surgery (min)	Lichenstein Repair (%)	Prolene hernia system (%)
40	8 (32)	0
45	9 (36)	0
50	8 (32)	0
60	0	7 (28)
70	0	10 (40)
80	0	8 (32)

Table 1 shows the distribution of cases according to age in both the groups. In 25 cases of Linchenstein repair and 25 cases of prolene hernia system majority

of inguinal hernias were right sided (table 2). In 25 cases of Lichenstein repair and 25 cases of prolene hernia repair majority are of indirect type (table 2).

Duration of surgery in case of Lichenstein mesh repair ranged from 40 -50 minutes with mean of 45 minutes. Duration of surgery in case PHS ranged

from 60 - 80 minutes with mean of 70.4 minutes (Table 3). Table 4 shows the distribution of early pain and chronic groin pain measured by Visual analogue scale score (VAS). Table 5 shows the distribution of post-operative complications and duration of stay in hospital.

**Table 4: Early pain and chronic groin pain among both groups**

Early Pain (VAS Score)	24h		7 <sup>th</sup> day		15 <sup>th</sup> day	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
No (0)	0(0)	0(0)	6(24%)	11(44)	9(36%)	13(52)
Minimal (1-3)	16(64%)	16(64)	15(60%)	12(48)	13(52%)	11(44)
Moderate (4-6)	9(36%)	9(36)	4(16%)	2(8)	3(12%)	1(4)
Severe (7-10)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Chronic Groin Pain	1 month		6 month		1 year	
No (0)	14(56)	16(64)	21(84)	23(92)	23(92)	25(100)
Minimal (1-3)	11(44)	9(36)	4(16)	2(8)	2(8)	0(0)
Moderate (4-6)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Severe (7-10)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)

Group 1-Lichenstein repair, Group 2 – PHS

**Table 5: Immediate Post-Operative Complications**

Complications	Lichenstein	PHS
Seroma	1(4)	2(8)
<b>Duration of stay (days)</b>		
2	22 (88)	22 (88)
3	3 (12)	3 (12)

**DISCUSSION**

The unique feature of the P.H.S. mesh device is that it has three components of the most popular mesh devices in use today for open hernia repairs into a single, easily used device. Dr. A.I. Gilbert describes the use of this technique with use of a few sutures in the onlay patch assuring the stability of the entire three-part, one piece device. The purpose of his article was to simplify technique of dissection of the pre-peritoneal space, and the deployment of the underlay patch.<sup>4</sup> In the present study, technical difficulty in PHS was encountered only in 14 out of 25 operations while creating the posterior space. We concluded that this technique was difficult in initially learning phase.

Authors Harris Dean et al conducted studies on a small group of patients using the P.H.S Mesh and concluded that the mean operating time was comparatively less (36 min).<sup>5</sup> Doctors at department of surgery, P.D. Hinduja National Hospital and Medical

Research centre, Mumbai conducted studies to determine the feasibility of using P.H.S. mesh for open tension free hernioplasties and they reported an average operating time of 35 minutes.<sup>6</sup> J Vironen et al experienced that operating time with P.H.S. mesh was 27 min. A study conducted by A.N. Kingsnorth et al shows that there was a 10% reduction in operating time (34 min) using PHS mesh.<sup>7</sup> Among the 25 patients operated in our setup majority of the operations were completed within 70.4 minute which is contradictory to other studies. The explanation regarding this is we are trying to be accustomed with this technique.

In the present study, follow up of P.H.S. group patients revealed that 9 patients (36%) had minimal pain at 1 month follow up. For Lichenstein repair group, 11 patients (44%) had minimal pain at 1 month follow up. At end of 1 year 2(8%) of our 25 patients had mild degree of chronic groin pain/discomfort. Chronic groin pain following inguinal hernia repair is a recognized long-term complication, but the precise incidence is still unknown. Well conducted, large unselected epidemiological studies suggest that about 20% of patients are affected and that in about 12% the intensity of pain is sufficient to impair some aspects of daily activity. Patients are classified as having chronic pain if post-operative pain lasts for more than 1 month.<sup>8</sup> A recent

Canadian study reported 12% of patients suffered moderate to severe pain 2 years after operation.<sup>9</sup>

In the present study, post-operative complication was 8% with PHS repair and 4% with Lichtenstein repair. Infection is one of the most dreaded complications following hernia repair for surgeons and the patients. Clinically significant infections after hernia repair are those in which antibiotics are required, hospitalization is necessary, or debridement / drainage is needed. Post operative infection rates following inguinal hernia repair are reported to be from 0.5% to 9%, depending upon the clinical variables of the population, such as whether mesh was used and whether preventive antibiotics were employed.<sup>10</sup>

## CONCLUSION

There is no significant difference found in hospital stay, Complications, chronic pain and recurrence rate in either group. PHS underlying patch covers the all three myopectenial orifices which theoretically prevent occurrence of other hernias from that orifice, but our study revealed that no occurrence of other hernia in either group. PHS is bit difficult for new surgeon, it requires expertise.

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