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Original Research Article

Comparative Study between Lichtenstein Tension-Free Mesh Hernioplasty and Prolene Hernia System

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Abstract: Inguinal hernia repair is an ever-evolving surgical solution to an age old problem. Many studies have compared the Prolene Hernia System (PHS) repair with the gold standard Lichtenstein Mesh Repair (LMR). Despite theoretical advantages, results have been inconclusive about the superiority of either method. Hence, a prospective study was planned to compare the early & late outcomes in patients undergoing these surgical repairs. Patients were enrolled and followed up for a period of 1 year post-operatively. All the included patients were randomized into two groups, Group A underwent Lichtenstein tension free mesh hernioplasty and Group B underwent Prolene Hernia System mesh repair. Patients were inquired about post-operative pain and if present the pain intensity was assessed on visual analogue scale. If pain was present, analgesic requirement for pain relief was recorded. During the review, complications like surgical site infection, seroma / hematoma formation, chronic pain, implant infection etc. were noted. The data collected was analyzed statistically. PHS is an alternative approach in the management of inguinal hernias, but the Lichtenstein mesh repair still remains the gold standard. Both methods guarantee effective repair resulting in a relatively low rate of recurrence and complications and are comparable in terms of ease of surgery and time taken for surgery. The final choice of treatment technique depends on intra-operative evaluation and ability of the surgeon to perform a given method.

Keywords: Lichtenstein Mesh Repair, Prolene Hernia System, Tension-free

INTRODUCTION

Inguinal hernia repair holds the position of being one the most frequently performed operation in general surgery. It has been estimated that a life time risk of having a hernia is 27 % in males and 3 % in females (Primatesta, P., & Goldacre, M. J. 1996) and hence even modest improvements in clinical outcomes of this surgery have become important (Vironen, J., *et al.*, 2006).

Inguinal hernia repair is an ever-evolving surgical solution to an age old problem. Right from 1889 when Bassini described repairing of inguinal hernia by suturing the conjoint tendon to the inguinal ligament, the primary surgical objective was to adequately cover the anatomic hole, "myopectineal orifice of Fruchaud", through which defect, "the hernia", protruded; so as to prevent hernia recurrence. The Bassini repairs and other modifications were performed under tension. The direct approximation of tissues in these repairs led to high recurrence rates of 5% to 21% (Dirksen, C. D., *et al.*, 1998; Shouldice, E. B. 2003).

Tension associated with tissue approximation was eliminated by using prosthetic mesh in inguinal herniorrhaphy and Usher et al (Usher, F. C., 1959) were the first to use a mesh to repair the defect in 1958. This technique was refined by Lichtenstein and Shulman in the year 1986. Lichtenstein et al (Lichtenstein, I. L., & Shulman, A. G. 1986) coined the term "tension free" repair and it has revolutionized hernia surgery. This is the most commonly carried out herniorrhaphy technique now and is considered the gold standard (Reuben, B., & Neumayer, L. 2006) to which all newer techniques are compared.

The introduction of mesh in inguinal hernia repairs led to significant decrease in recurrence rates, even when the repair was performed by the residents. The learning curve decreased with mesh repair. In the era of low recurrence rate, attention has shifted towards maintaining quality of life. Factors such as incidence of

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post-operative pain and ease of handling of mesh have become equally important in addition to recurrence rate (Nienhuijs, S. W., 2005). The search for ideal mesh however is elusive and still continues (Bilsel, Y., & Abci, I. 2012).

The multiple tension-free techniques available currently include the open anterior repair {onlay patch, plug and patch}, open posterior repair {Stoppa-Rives technique; Kugel; CR Brad Inc, Murray Hill, NJ}, combined posterior and anterior approach {Prolene Hernia System (PHS); Ethicon, Inc, Somerville, NJ} and the closed posterior approach {laproscopic}. Of all the available repairs only laproscopic repair and PHS mesh provides complete coverage of the myopectineal orifice (Awad, S. S., 2007).

Laproscopic inguinal hernia repair gives the advantage of less pain and quicker return to activity with a recurrence rate of (3-10 %) (Liem, M. S., *et al.*, 1997; McCormack, K., *et al.*, 2003). However, the initial enthusiasm for this type of repair especially for primary inguinal hernias have subsided because of associated high cost, steep learning curve, serious complications and need for general anesthesia.

In the 1999, Gilbert's bilayer mesh apparatus was introduced which is commercially known as Prolene Hernia System. (Gilbert, A. I., *et al.*, 1999) argued that onlay mesh alone would enable a herniation between posterior wall and the mesh further makes it vulnerable regarding its positioning and tails. Thus, solely plug type of mesh would inadequately address weakness of the myopectineal orifice (Pierides, G., & Vironen, J. 2011). In PHS herniorrhaphy, the mesh consists of an onlay mesh and underlay (a preperitoneal) patch attached with a connector or plug (to fill the wall defect). In theory, PHS repair combines the benefits of a posterior and anterior repair from an open approach. PHS mesh provides the repair of direct, indirect and femoral hernia with extremely low recurrence rate along with complete coverage of myopectineal orifice (Gilbert, A.I. 1992; Kingsnorth, A. *et al.*, 2002).

Many studies have compared the PHS repair with the gold standard Lichtenstein Mesh Repair (LMR) (Vironen, J. *et al.*, 2006; Nienhuijs, S. W. *et al.*, 2005; Awad, S. S. *et al.*, 2007; Pierides, G., & Vironen, J. 2011; & Sanjay, P. *et al.*, 2006) But despite the theoretical advantages, the results have been non-conclusive about the superiority of the surgery among the two. Hence, a prospective study was planned to compare the early & late outcomes in patients undergoing Lichtenstein tension free mesh hernioplasty versus Prolene Hernia System mesh repair for inguinal hernia.

OBJECTIVES

- To compare & assess the average operative time taken by the surgeon, ease of performing surgery, postoperative pain, average analgesic requirement, rate of surgical site infection (SSI), seroma / hematoma formation in patients undergoing surgery for inguinal hernia by Lichtenstein tension free repair and Prolene Hernia System mesh repair.

- To assess late outcomes like chronic pain and implant infection rates following hernia repair by Lichtenstein tension free repair versus Prolene Hernia System mesh repair.

MATERIALS & METHODS

Ours was a prospective study conducted in a tertiary care referral hospital in the department of surgery. Ethical clearance for the study was obtained from the Institutional ethical committee prior to the commencement of the study.

Patients were enrolled for one year and later each patient was followed up for a period of 1 year post-operatively. Thus, the study period was for a total of 2 years.

The eligible patients who were about to undergo hernia repair were briefed about the study and the informed written consent was obtained from the patients who agreed to participate in the study.

Inclusion Criteria

- Patients diagnosed of having inguinal hernia admitted for undergoing elective hernia repair
- Age between 18-80 years
- Given consent for participation in the study

Exclusion Criteria

- Recurrent Hernia
- Age less than 18 years or more than 80 years
- Consent not given for participation

All the included patients were randomized into two groups, Group A and Group B, using random number table. All patients included in Group A were to undergo Lichtenstein tension free mesh hernioplasty and patients in Group B were to undergo Prolene Hernia System mesh repair.

All the cases were elective and were done under appropriate anesthesia. Adequate antibiotic coverage was given peri-operatively. Prolene Mesh of size 15 x 7 cm was used for Lichtenstein tension free mesh hernioplasty whereas in PHS technique was performed with the device of size appropriate to each patient.

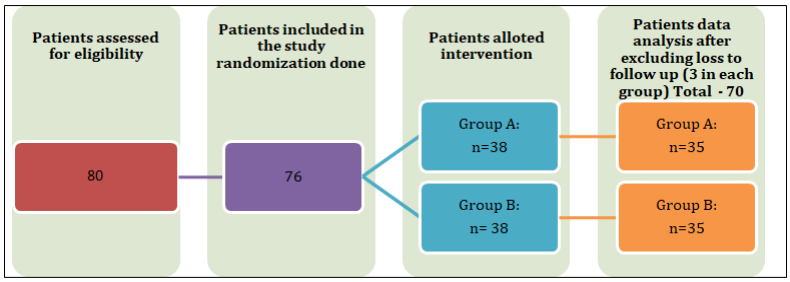
Peri-operatively, the details of the operating surgeon and the time required for the surgery, which was the time starting from the skin incision on the start of the surgery to the last suture of the skin closure at the end of the surgery were noted. The operating surgeon was inquired about the ease of performing the surgery and giving the score out of 10 in which the score 0 represented most difficult while 10 represented a very easy surgery.

Patients included in the study were reviewed post-operatively on day 1, day 2, day 3, day 7, day 15, day 30, 6 month after and 1 year after the surgery. The patients were reviewed during the hospital stay in the wards. Later, follow-up was done on OPD basis after discharge. Patients were contacted telephonically for acquiring further information on follow-up.

On review patients were inquired about post-operative pain and if present the pain intensity was assessed on visual analogue scale (VAS) (Palmqvist, E. *et al.*, 2013; Collins, S. L. *et al.*, 1997; Jensen, M. P. *et al.*, 2013).

If the pain was present, analgesic requirement was noted for the pain relief. During the review, complications like surgical site infection, seroma / hematoma formation, chronic pain, implant infection etc. were noted. All the details of the patient and information thus obtained were recorded in a predesigned and pretested proforma.

80 patients were assessed for eligibility but 4 patients refused to participate in the study hence were excluded. 76 patients thus, were included and randomization was done to have 38 in each arm i.e. Group A and Group B. Patients in Group A were to undergo Lichtenstein tension free mesh hernioplasty and patients in Group B were to undergo Prolene Hernia System mesh repair. During the follow up 3 patients were lost in each arm hence were excluded. Thus, finally data of 70 patients was included in the analysis, 35 in each arm.



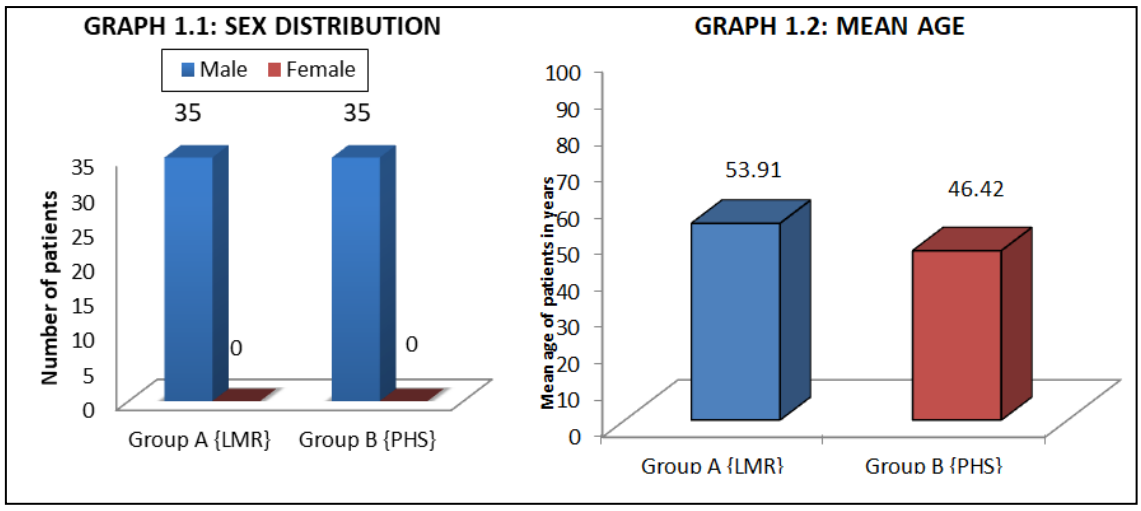
Statistical Analysis

Data analysis was done by using the statistical software SPSS (Statistical package for social sciences) version 17.0. Two independent sample t-test, Chi-square test, Fisher's exact test and Mann Whitney U tests were used to find the significance between Group A and Group B for various parameters. The level of significance was 5%.

RESULTS

Table 1.1: Comparison of the two groups A and B in terms of demographic data of the patients included in the study

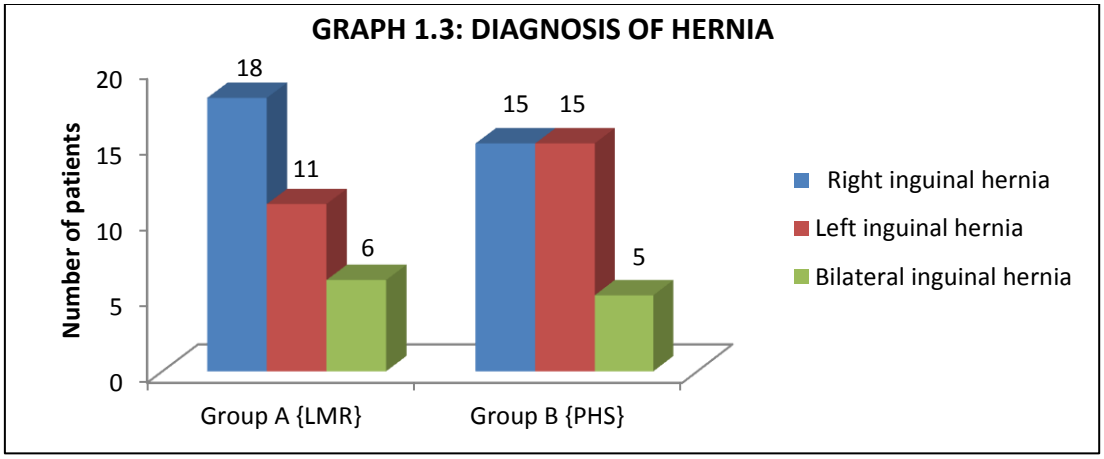
Gender	Group A {LMR}n=35 (%)	Group B {PHS}n=35 (%)
Male	35 (100 %)	35 (100 %)
Female	0 (0 %)	0 (0 %)
Mean age (Years)	53.91±17.52	46.42± 16.36
Right inguinal hernia	18 (51.43 %)	15 (42.86 %)
Left inguinal hernia	11 (31.43%)	15 (42.86%)
Bilateral inguinal hernia	6 (17.14%)	5 (14.29%)



All patients included in the study were male. (Table 1.1 & Graph 1.1)

Graph 1.2 shows the mean age of the patients in the group A was 53.91 ± 17.52 years with range 18-78 years and group B 46.42 ± 16.36 years with range 19-79 years.

There was no statistical difference between the two groups (p = 0.069). {Graph 1.2}



Graph 1.3 shows that amongst the 35 patients in group A, 18 (51.43 %), 11 (31.43%) and 6 (17.14%) had right, left and bilateral inguinal hernia whereas amongst the total 35 included in group B, 15 (42.86 %), 15 (42.86%) and 5 (14.29%) right, left and bilateral inguinal hernia respectively. No statistical difference was seen between the two groups {Graph1.3}.

Table 1.2: Comparison of the two groups A and B in terms of Gilbert's Classification

	Group A {LMR} n=35 (%)	Group B {PHS} n=35 (%)	Total
Type 1 = Small, indirect	1 (2.86 %)	12 (34.29 %)	13
Type 2 = Medium, Indirect	10 (28.57 %)	8 (22.86 %)	18
Type 3 = Large, Indirect	3 (8.57 %)	0 (0.00 %)	3
Type 4 = Entire floor, direct	20 (57.14 %)	13 (37.14 %)	33
Type 5 = Diverticular, direct	0 (0.00 %)	2 (5.71 %)	2
Type 6 = Combined (pantaloon)	1 (2.86 %)	0 (0.00 %)	1
Total	35	35	70

Fisher's exact test p value = 0.250

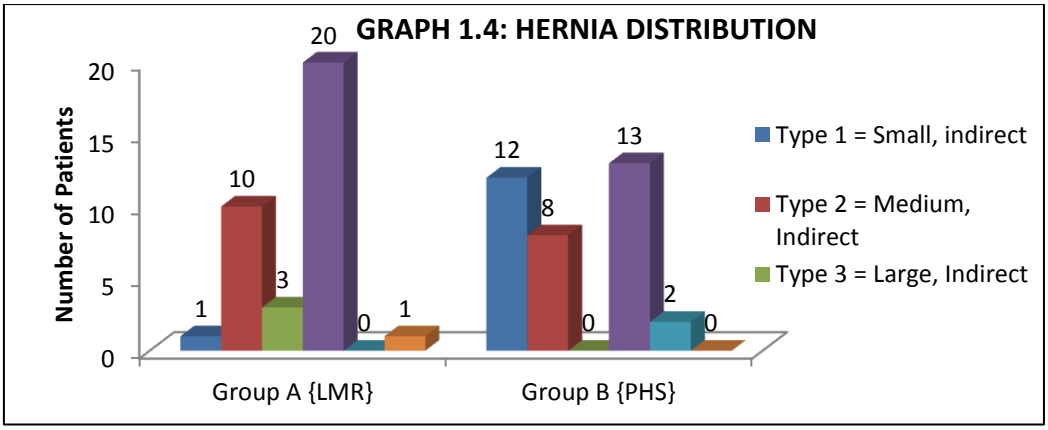


Table -1.2 shows that among the 35 patients belonging the group A, 1 (2.86 %), 10 (28.57 %), 3 (8.57 %), 20 (57.14 %)0 (0.00 %), 1 (2.86 %) and that in group B, 12 (34.29 %), 8 (22.86 %), 0 (0.00 %), 13 (37.14 %)2 (5.71 %), 0 (0.00 %) had type 1,type 2, type 3, type 4, type 5 and type 6 of Gilbert's classification, respectively. No significant difference was seen among the two groups {Graph 1.4}.

Table-1.3: Comparison of the two groups A and B in terms of diagnosis of hernia

	Group A {LMR} n=35 (%)	Group B {PHS} n=35 (%)	Total
Indirect	14 (2.86 %)	20 (34.29 %)	13
Direct	20 (28.57 %)	15 (22.86 %)	18
Pantaloon	1 (8.57 %)	0 (0.00 %)	3
Total	35	35	70

By using Fisher's exact test p-value = 0.232

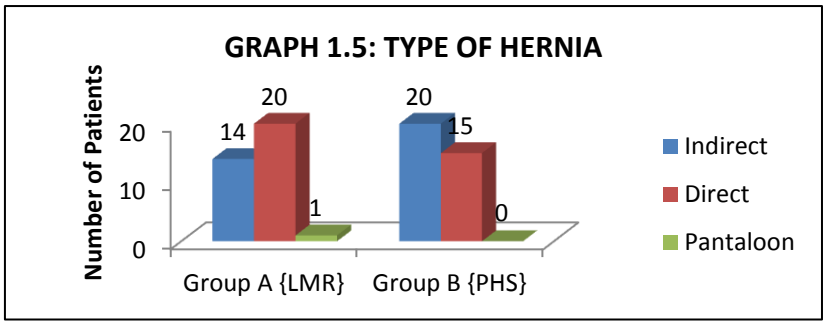
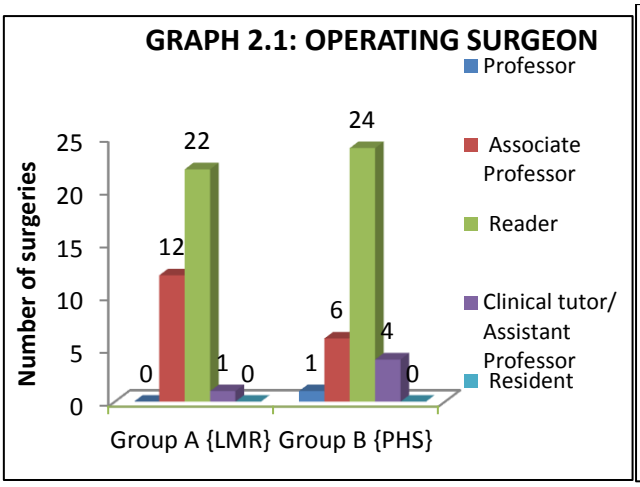


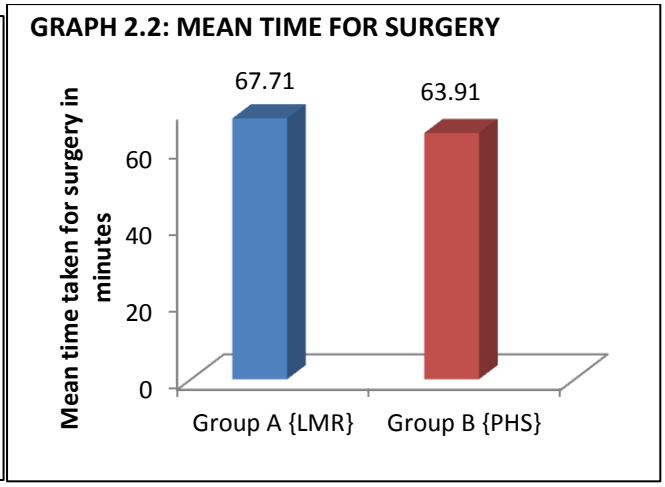
Table-1.3 shows that among the 35 patients belonging the group A, 14 (2.86 %) had indirect, 20 (28.57 %) had direct while 1 (8.57 %) had pantaloon type of inguinal hernia. Among the 35 patients belonging the group B, 20 (34.29 %) had indirect, 15 (22.86 %) had direct while 0 (0.00%) had pantaloon type of inguinal hernia. No significant difference was seen among the two groups (p= 0.232) {Graph 1.5}.

Comparison of the two groups A and B in terms of the outcomes of the two surgeries LMR and PHS, respectively

Table - 2.1:Comparison of the two groups A &B in terms of the operating surgeon

	Group A {LMR} n=35 (%)	**Group B {PHS} n=35 (%)**	**Total**	**p value**
Professor	0 (0.00%)	1 (2.85%)	1	0.152
Associate Professor	12 (34.28%)	6 (17.14%)	18	
Reader	22 (62.85%)	24 (68.57%)	46	
Clinical tutor/ Assistant Professor	1 (2.85%)	4 (11.42%)	5	
Resident	0 (0.00%)	0 (0.00%)	0	
Total	35	35	70	





Maximum surgeries, 22 (62.85%) and 24 (68.57%) were carried out by Reader in Group A and Group B, respectively. There was no significant difference between the operating surgeons experience in between the two groups (p = 0.152) {Graph 2.1}.

Table-2.2 Comparison of the two groups A and B in terms of the mean time taken for the surgery

	Group A {LMR} n=35	Group B {PHS} n=35
Mean time taken (minutes)	67.71 ± 22.33	63.91 ± 11.77

p value 0.377 By 2 independent sample t test

The mean operating time for Group A was 67.71 ± 22.33 and for Group B was 63.91 ± 11.77 minutes, respectively. There was no significant difference between the two groups (p value 0.377) {Graph 2.2}.

Table-2.3 Comparison of the two groups A and B in terms of ease of performing surgery assessed by the operating surgeon

Scores given for ease of surgery	Group A {LMR} n=35 (%)	Group B {PHS} n=35 (%)	Total
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	1	2	3
7	14	18	32
8	19	15	34
9	1	0	1
10	0	0	0
Total	35	35	70

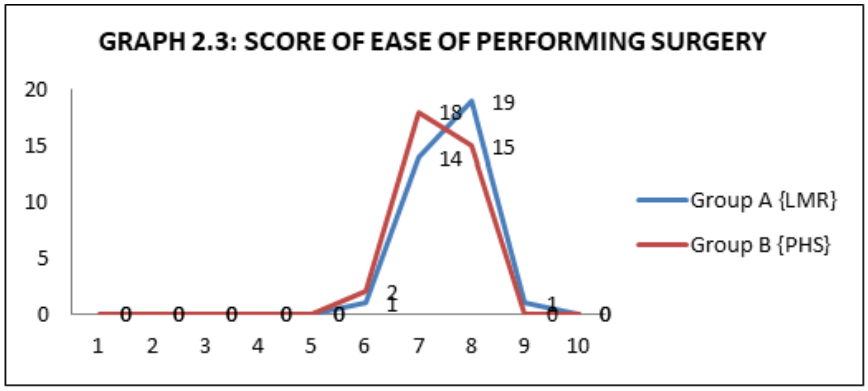


Table-2.3 shows that scores 6, 7, 8 and 9 were given for ease of performing surgery for Group A {LMR} by 1, 14, 19 and 1 number of operating surgeons, while 2, 18, 15 and 0 number of surgeons gave the scores as 6, 7, 8 and 9, respectively. No statistical difference was seen {Graph 2.3}.

Table-2.4 Comparison of the two groups A and B in terms of the median score given by the operating surgeon for ease of performing surgery

	Group A {LMR} n=35	Group B {PHS} n=35
Median score for ease of surgery	8	8

By Mann Whitney U test p value 0.186

The median score given by the surgeon for the ease of performing surgery was 8 in both groups. No significant difference was found.

Comparing the outcomes in the two groups

Graph -3.1 Comparison of the two groups A and B in terms of presence of post operative pain

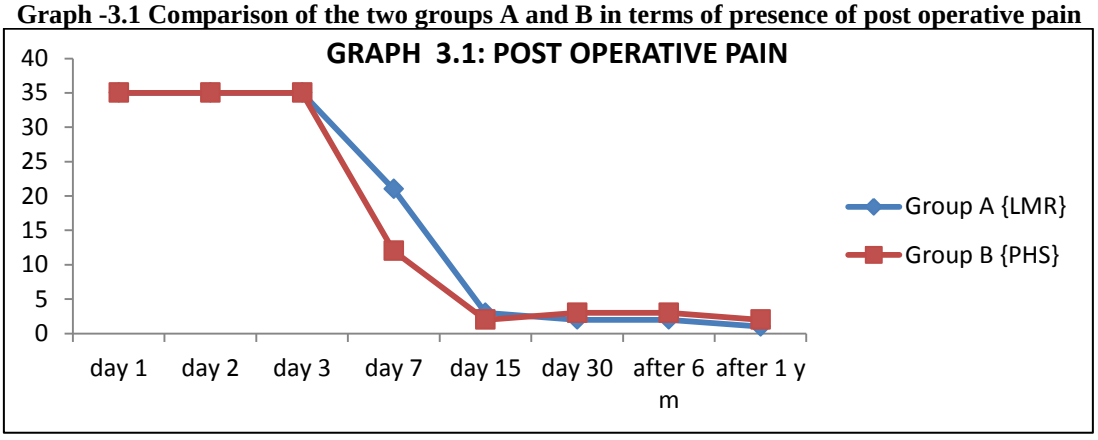
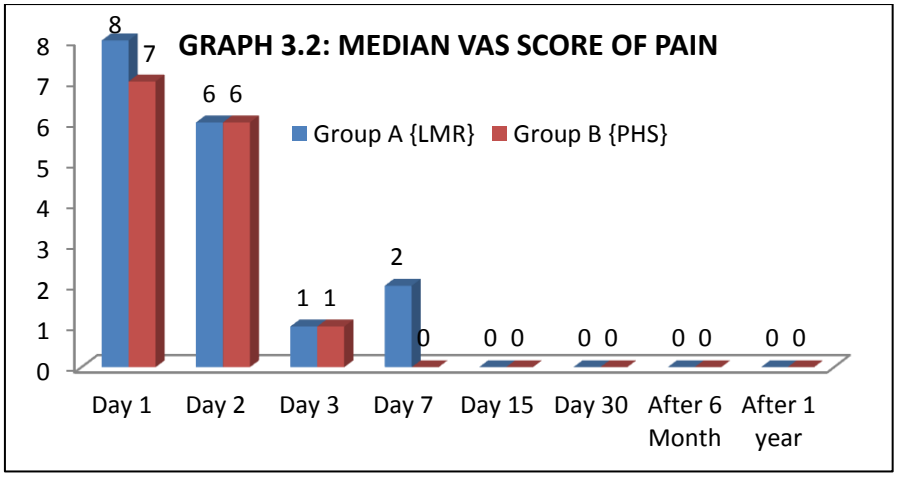


Table -3.1 Comparison of the two groups A and B in terms of Median VAS score for the pain

	Group A {LMR} n=35	**Group A {PHS} n=35**	**p value**
Day 1	8	7	0.526
Day 2	6	6	0.16
Day 3	1	1	0.083
Day 7	2	0	0.019*
Day 15	0	0	0.425
Day 30	0	0	0.971
After 6 Month	0	0	0.999
After 1 year	0	0	0.058

p value By Mann Whitney U test



The median VAS score for the pain in group A was 8, 6, 1 and 2 and that in Group B was 7, 6, 1 and 0 on 1st, 2nd, 3rd and 7thpost operative day, respectively. There was no significant difference between the two groups except on 7th post-operative day (p=0.019).

Table -3.2: Comparison of the two groups A and B in terms of type of analgesic requirement on Day 1, Day 2, Day 3 and Day 7 post-operatively.

		Analgesic requirement					Total
Type of analgesic given		0	1	2	3	5	
Day 1	Group A	0	0	12	11	12	35
	Group B	0	0	8	20	7	35
Day 2	Group A	0	0	32	2	1	35
	Group B	0	0	33	2	0	35
Day 3	Group A	0	3	32	0	0	35
	Group B	0	10	25	0	0	35
Day 7	Group A	32	2	1	0	0	35
	Group B	35	0	0	0	0	35

On day 1, 12 patients required 1 tab of PCM TDS, 11 patients required Tab PCM 2 TDS and 12 patients required tab diclofenac along with PCM in LMR group while 8 patients required 1 tab of PCM TDS, 20 patients required Tab PCM 2 TDS & 7 patients required tab diclofenac along with PCM in PHS group.

On day 7, 2 patients required tab PCM on SOS basis & 1 patient required tab PCM TDS in LMR group while there was no analgesic requirement in PHS group.

The analgesic requirement decreased from Day 1 to day 7 gradually in both the groups.

Table-3.3: Comparison of the two groups A and B in terms of type of analgesic requirement on Day 1, Day 2, Day 3 and Day 7 post-operatively.

	Group A {LMR} n=35	**Group B {PHS} n=35**	**P-value**
Day 1	3	3	0.885
Day 2	2	2	0.626
Day 3	2	2	0.033

There was no significant difference found in the analgesic requirement in both groups.

Comparison of the two groups A and B in terms of complications after surgery.

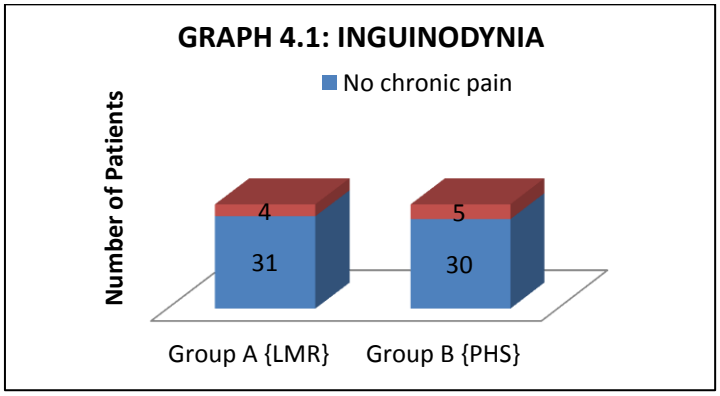
Table-4.1 Comparison of the two groups A and B in terms of surgical site infection

		Group A {LMR} n=35	Group B {PHS} n=35	Total
Day 1	Yes	0	0	0
	No	35	35	70
Day 2	Yes	0	0	0
	No	35	35	70
Day 3	Yes	0	1	1
	No	35	34	69
Day 7	Yes	1	0	1
	No	34	35	69
Day 15	Yes	0	0	0
	No	35	35	70
Day 30	Yes	0	0	0
	No	35	35	70

Among the 35 patients in group A, 1 patient was found to have SSI on 7th day post-operatively while in group B out of 35, 1 patient was found to have SSI on 3rd day post-operatively. Both SSI were mild and subcutaneous and got resolved with daily dressing without antibiotic. There was no patient found to have Seroma or hematoma in both the groups.

Table-4.2 Comparison of the two groups A and B in terms of Inguinodynia (Chronic pain)

	Group A {LMR} n=35	Group B{PHS} n=35	p value
Inguinodynia (Chronic pain)	4	5	0.721



4 patients of group A and 5 patients in Group in B were found to have chronic inguinal pain persisting after 3 month with maximum pain score of 3 on VAS in each group, which was mild in nature and didn't require any analgesic or intervention. There was no significant difference between numbers of patients in both groups having inguinodynia.

No patient was found to have implant infection requiring mesh explantation in both groups. No patient in both groups was found to have recurrence of hernia during follow up period of 1 year.

DISCUSSION

The only effective method of treating hernia is surgery. It is not only a medical but also a social and economic problem. The constant research for more and more perfect method is going on. The introduction of tensionless repair using synthetic material was a breakthrough in this field.

Tension free mesh repairs for adult inguinal hernias was originally popularized by (Lichtenstein, I. L., & Shulman, A. G. 1986) in 1989, although Lichtenstein himself credits Newman with the original description of this repair. It is widely accepted worldwide and is the most commonly performed tension free repair today. Owing to the ease of operation, low rates of local recurrence and high levels of patients safety and comfort the Lichtenstein repair has became the most commonly used method of inguinal hernia repair.

In an attempt to improve on the LMR, (Gilbert, A. I. *et al.,* 1999) developed an approach to the pre-peritoneal space through the internal ring and led to the development of the PHS mesh.

It provides 3 components of the most popular mesh devices in use today for open hernia repair, in a single, easily used device. The 3 components include

1. An underlay mesh – similar to that used in Gilbert's suture less repair.
2. An onlay mesh – similar to that used in Lichtenstein repair
3. A connecting cylinder between the two not as bulky as the plug described by Rutkow and not as hard as rolled plug described by Lichtenstein.

PHS has many theoretical advantages over the conventional forms of repair. It provides a larger allowable surface for effective tissue in growth and fibrosis. The underlay patch lies in the pre-peritoneal space and provides a double layered reconstruction of the trasversalis fascia. The PHS protects both the femoral and inguinal regions from recurrence. The underlay component secures the myopectineal orifice and the onlay component secures the posterior wall of the inguinal canal. Placement of the underlay component in the pre-peritoneal plane has theoretical advantages. It employs the Pascal's principle of hydrostatic pressure to allow the intra-abdominal pressure to keep the mesh secured in place. It has all the advantages of a secure posterior repair from a simple anterior approach (Chandiramani, V. A. *et al.*, 2003).

In theory inguinal hernia repair with PHS mesh should require more operation time because of the greater amount of dissection needed when compared to the LMR technique. However, in concordance with prior reports the average time of the mesh repair was not statistically different between the PHS and the LMR group. Mean repair times have ranged from 27- 65 minutes (Awad, S. S. *et al.,* 2007). Preliminary reports of the PHS mesh repair have shown ease of placement, less post-operative pain and equivalent operative time to the LMR.

Our study showed that the mean time taken for the surgery was 67.71 ± 22.33 minutes in Group A while that in Group B was 63.91 ± 11.77 minutes (p= 0.377). Though the mean operative time required doing PHS mesh repair was lesser but it was not statistically significant. Our results are in accordance to Farajetal[27]who found a 10 % decrease in operating time when PHS was used but still couldn't find significant statistical difference. The mean operative time in our study was higher than in other reports and may be related to the hernia repairs being performed in a teaching institute.

The ease of performing surgery and skill can play an important role in the outcome of a surgery. Hence, we tried to evaluate the ease of performing surgery by asking the operating surgeon the level of ease of surgery on the scale of 0 to 10 with 0 being most difficult while 10 being very easy. The median score given by the surgeon for the ease of performing surgery was 8 in both groups. No significant difference was found between the two groups (p = 0.186).

The median Visual Analogue Scale (VAS) score for the pain in group A was 8, 6, 1 and 2 and that in Group B was 7, 6, 1 and 0 on 1st, 2nd, 3rd and 7thpost operative day, respectively. There was no significant difference between the two groups except on 7thpost-operative day (p=0.019) where in the PHS group had lesser pain. Our results were in concordance with the other studies conducted by (Vironen *et al.,* 2006; Faraj *et al.,* 2009; and Matyja *et al.,* 2010) who also couldn't find any significant differences in intensity or duration of post-operative pain.

On assessing the analgesic requirements, we found that the median score for pain relief was 3 on day 1, 2 on day 2 and 3 in both the groups. There was no significant difference in analgesics requirement in both the groups. Our results are similar as found by (Nienhuijs, S. *et al.*, 2005) where 95.8 % of patients had Paracetamol as the analgesic used. Mean amount of PCM consumed per day was 1.9g in PHS and 1.8 g in LMR group. There was no statistical difference between the two groups.

The incidence of surgical site infection in our study was one in each group (n=35) i.e. 2.85 %. This was similar to the studies by (Sanjay, P., *et al.*, 2006) (PHS group= 2/31, LMR= 1/33, p=0.53) and (Matyja, A. *et al.*, 2010) (PHS – 3.5 % LMR 2.6 %) who also didn't find any significant difference between the two groups.

We found no seroma or hematoma formation in both the groups. This was similar to an Indian study conducted by Vinod, A. *et al.*, 2003) who also found no hematoma/ seroma (0/47 in PHS) formation in his study. While (Matyja, A. *et al.*, 2010) found the incidence of 0.6 % in both groups (PHS=167, LMR=301). The lower incidence in our study may be because of lesser sample size of the study groups (n=35 each).

4 out of 35 patients (11.42 %) of group A {LMR} and 5 out of 35 patients (14.28%) in Group B {PHS} were found to have chronic inguinal pain persisting after 3 month with maximum pain score of 3 on VAS in each group. There was no significant difference between numbers of patients in both groups having inguinodynia. This was similar to the findings by (Sanjay, P. *et al.*, 2006) who found inguinodynia in

12.9 % in PHS group while 15.1 % in LMR group with no significant difference.

We found no implant infection and none required mesh explantation in our study in both groups. This finding was similar to (Sanjay, P. *et al.,* 2006) where no mesh removal was required because of infection.

No patient in both groups was found to have recurrence of hernia during the 12 months of follow up period. This was similar to (Vinod, A. *et al.*, 2003) who also got no case of recurrence when followed up for 1-15 months. However, (Zhao, G. *et al.*, 2009) in the meta-analysis found the recurrence rate as 0.34 % in patients undergoing PHS repair while 1 % in patients undergoing LMR for inguinal hernia and concluded that it has no statistically significant difference in the two groups.

Hernia recurrence is known to be a function of time.About 6 years of long term follow up is considered adequate, as most hernia recurrences appeared with 5 years of surgery (Frey, D. M. *et al.*, 2007). Hence, because of the limitation of our study was study period and small sample size, recurrence rate cannot be commented upon.

CONCLUSION

Prolene Hernia System (PHS) is an alternative approach in the management of inguinal hernias, but the Lichtenstein mesh repair still remains the gold standard. Both methods guarantee effective repair of inguinal hernia resulting in a relatively low rate of recurrence and complications.

Both methods are comparable in terms of ease of surgery and time taken for surgery. The final choice of treatment technique depends on intra-operative evaluation and ability of the surgeon to perform a given method. In PHS technique, the cost factor should be considered especially in developing countries.

Long term studies are required to test the efficacy of the mesh in terms of recurrence rates, chronic groin pain etc. In the medium terms, PHS has a similar outcome to Lichtenstein patch and because of additional protective patch in the pre-peritoneal space may provide additional safe guard against recurrence.

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