

Light Weight Mesh Versus Heavy Weight Mesh In Open Liechtenstein Hernioplasty: A Prospective Randomized Study.

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Abstract

Background: inguinal hernia surgery is most commonly performed surgery worldwide. Over the year many techniques have been involved and now a day tension free repair by using prosthetic mesh is standard of care.

Methods: Prospective randomized study was conducted in Dr Ram Manohar Lohia hospital, New Delhi between 5th January 2013 to 23 march 2014 to compare the difference between light weight versus heavy weight mesh uses in Liechtenstein hernioplasty. 33 patients were taken in heavy weight mesh group(HWM) and 33 patients in light weight mesh group(LWM).

Results: The pain in groin by visual analogue score at post-operative day 1, 2, 3 and 1 week and 1 month was not statically significant (P value > 0.05) in both the groups, but at 3 months follow up mean of pain score was 0.09 vs 0.00 ($p < 0.05$) in HWM vs LWM group which was significant statically. The mean of average duration of stay in post-operative period was 3.73 vs 3.52 days ($p > 0.05$) HWM and LWM group which reflects there is no significant differences in hospital stay with the type of mesh used in hernia surgery. At 3 months follow up foreign body sensation was experienced in HWM group ($p < 0.05$) compared to LWM.

Conclusion: Uses of light weight mesh compared to heavy weight mesh has no major impact on early recurrence and postoperative complications following inguinal hernia repair. However light weight mesh has some advantage over heavy weight mesh in terms of early ambulation, late post-operative groin pain and foreign body sensation.

Key words – Inguinal hernia, Liechtenstein hernioplasty, light weight mesh group, heavy weight mesh group, postoperative complications.

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I. Introduction

Inguinal hernia is most commonly seen complaint in outpatient department of surgery. Probably it is the most commonly performed surgery worldwide because of its high incidence globally.¹ Inguinal hernia accounts for 75% of abdominal wall hernia.² It is more common in male, sports person, heavy weight lifter, and may be associated with other risk factors like smoking and connective tissue disorder. History of hernia repair can be traced back to Egypt and Greece civilization.³ However Bassini's and Shouldice repair made a revolution in the field of hernia surgery but the disadvantage of using these technique can result in repair under tension that culminates into high rates of recurrence.⁴ In 1989 Lichtenstein and his colleagues introduced the concept of tension free repair of inguinal hernia with the use of a prosthetic mesh to reinforce the posterior wall of inguinal canal and they found the excellent result from the both highly specialized as well as general surgical unit. Tension free mesh repair now has become the gold standard technique in inguinal hernia surgery.⁵ The primary consideration in hernia repair is, minimizing the risk of post-operative recurrence, early return to normal activities, and minimizing postsurgical complications. The knowledge of surgical anatomy, technique and materials are the keys of success of hernia repair. Use of mesh in hernia repair reduced the hernia recurrence⁶ however the presence of foreign material can induce strong chronic inflammation reaction, which

can result in chronic pain and foreign body sensation in post-operative period.⁷ The various developments in mesh have been made for tension free repair with the advantage of lesser recurrence and postoperative pain. Use of polypropylene mesh in surgery was first time introduced by FC Usher⁸ and it is now the most commonly used mesh in hernia surgery. Concepts behind the use of mesh are to reinforce the abdominal wall with the formation of scar tissue. Therefore, it was believed that the stronger the mesh resulted in more fibrosis and, the more effective wall strengthening. A variety of prosthetic meshes are available now a day for meshplasty and search of ideal prosthetic materials for mesh is on-going research. The properties of ideal mesh are inertness, resistance to infection, molecular permeability, pliability, mechanical integrity, and biocompatibility.⁹ Various type of absorbable and non-absorbable, heavy weight and light weight mesh available now a day with its own advantage and disadvantage.

Heavy weight mesh (HWM) is designed with thick polymer fibres (>50gm/m²), small pores (< 1 mm) gives high tensile strength but causes more inflammation and decreased elasticity.¹⁰ The light weight mesh (LWM) has larger pore size (3-5mm), low weight per unit area(<50gm/m²), stimulates less inflammatory reaction and provides greater elasticity and more flexibility.¹¹ The aim of this study was designed to assess the feasibility of using light weight mesh for hernia repair and its advantages and disadvantages in comparison to high molecular weight mesh.

II. Materials And Methods

This prospective randomized study was conducted in the Department of Surgery, PGIMER & Dr. Ram Manohar Lohia Hospital from 5th January 2013 – 23rd March 2014.

66 cases of unilateral inguinal hernia were taken up to the study for a period of one year. The cases were divided into two groups A(heavy weight mesh) & B(light weight mesh) by simple randomisation using closed envelope method. The patients were followed up at the time of hospital discharge, at 1 week, 1 month & 3 months after surgery and the factors assessed in this study were:

1. Hospital stay
2. Early ambulation
3. Post-operative pain at local site (by VAS)
4. Local complications

Seroma

Wound infection

5. Chronic pain: Defined as any inguinal, scrotal or mid-thigh pain that persists three months after surgery
6. Early Recurrence (within 3 months post-operative period)

The percentage loss to follow up in OPD was 17 %, which was dealt with by telephonic interviews with the subjects in the follow up period

Inclusion Criteria:

1. All adult patients (>18 years) with primary unilateral inguinal hernia coming to general surgery OPD of Dr.Ram Manohar Lohia Hospital, New Delhi.

Exclusion Criteria:

1. Irreducible inguinal hernia
2. Obstructed inguinal hernia
3. Strangulated inguinal hernia
4. Bilateral inguinal hernia
4. Patients who are unlikely to cooperate in the follow-up.

III. Results

DEMOGRAPHICS:

Table 1. Demography showed that maximum number of patients fall in the range of 25-35 years and 45-55 year's group.

Age group	Number of patients	%
25-35	20	30.3
35-45	15	22.7
45-55	20	30.3
55-65	11	16.7
Total	66	100.0

Table 2; Duration of post op. stay (mean)

	Group	N	Mean	Std. Deviation	P value
Duration of post op stay	A	33	3.73	1.180	0.416
	B	33	3.52	0.906	

The Table 2 shows the mean duration of hospital stay was higher in case of group A(HWM) compared to group B(LWM). The average duration of stay in post-operative period was 3.73 days in case of HWM, and 3.52 days in LWM group. But P value >.05 suggested that this difference is not statistically significant.

Table 3 Ambulation in days, postoperatively

	Group	N	Mean	Std. Deviation	P value
Ambulation	A	33	2.39	0.496	0.0
	B	33	2.03	0.174	

Both groups A and B became ambulatory following postoperative day 2. The mean time taken for ambulation in days was higher in group A (2.39 days) compared to group B (2.03 days). The result suggestive of the patient underwent Lichtenstien’s meshplasty with LWM became ambulatory earlier than with HWM. The p value <.05 suggested that this difference is statistically significant.

PAIN SCORE (VAS)					
	Group	N	Mean	Std. Deviation	P value
Pain score day1	A	33	7.33	0.736	0.182
	B	33	7.09	0.723	
Pain score day2	A	33	4.45	1.252	0.362
	B	33	4.21	0.857	
Pain score day 3	A	33	2.18	0.95	0.427
	B	33	2.03	0.529	
Pain at 1 week	A	33	0.67	0.692	0.227
	B	33	0.45	0.869	
Pain at 1 month	A	33	0.55	0.666	0.199
	B	33	0.73	0.452	
Pain at 3 month	A	33	0.09	0.292	0.078
	B	33	0	0	

Table 4 result showed that pain at post-operative day 1, 2, 3 and 1 week and 1 month was not statically significant (P value > 0 .05) in both the groups. At 3 month follow up, the mean of pain score was 0.09 and 0.00 in group A(HWM) & group B(LWM) respectively which was statistically significant (P value < 0.05). Our observation suggested that, there is no significant effect of mesh type on pain intensity in the early postoperative period but at 3 month follow up light weight mesh group experienced less pain compared to heavy weight mesh group.

		Group			
		A	B	Total	P value
Seroma formation	No	26	30	56	0.170
	Yes	7	3	10	
	Total	33	33	66	

Table 5 Incidence of Seroma formation

Out of 66 patients 7 from group A (HWM) & 3 from group B (LWM) complaints of seroma formation. P value > 0.05 suggested that this value is insignificant

		Group			
		A	B	Total	P value
Follow up at 1 month complications if any	Nil	29	33	62	.039
	Stiffness	4	0	4	
	Total	33	33	66	

Table 6 Complications at 1 month

At 1 month follow up 4 patients from group A complained of stiffness at hernia repair site. There was no such complaint in group B. The remaining patients did not complain of any stiffness. Statistical analysis suggested this value to be significant (P value<0.05)

		Group			
		A	B	Total	P value
Follow up at 3 months complications if any	Nil	29	33	62	.039
	Stiffness	4	0	4	
	Total	33	33	66	

Table 9 Incidence of complications at 3 month follow up

At 3 months follow up 4 patients from group A (HWM) complained of stiffness at hernia repair site. There was no such complaint group B (LWM). The remaining patients also did not complain of any stiffness. Statistical analysis suggested this value to be significant (P value<0.05).

IV. Discussion

Most studies report that the use of the light meshes results in, less intense pain in both the immediate and long-term postoperative period¹². Our observations however are consistent with many previous study and do not confirm the significant effect of mesh type on pain intensity in the early postoperative period day 1, 2, 3 and at 1 week follow up.^{13,14} In our study there was no significant difference in pain intensity in both, HWM & LWM groups in early postoperative period and 1 month but at 3 months follow up light weight mesh has advantage over heavy weight mesh repair. Randomized study of Post S et al reports that there were no differences between the treatment groups (HWM & LWM) with respect to early and late surgical complications for Lichtenstein inguinal hernia repair.¹³ In our study at 1 week of follow up, 10 patients presented with complaint of seroma (HWM and LWM groups, 7 and 3 patients respectively). The difference in complication rate was statistically not significant when comparing both groups at 1 week (P > 0.05). Our study does not confirm the significant effect of mesh type on early postoperative complications. The result in present study can be attributed to a small sample size and may give significant results when a larger sample size is used. The reports of randomized trials of Koch A et al and PaaJanen H, reports that there is no significant influence of mesh type on the length of postoperative hospital stay.^{14,15} In our study the average duration of stay in post-operative period was 3.73 days and 3.52 days in HWM, and LWM groups respectively. The difference of hospital stay in our study in HWM and LWM group is not significant statistically (P value > 0.05). The duration of hospital stay post-operatively does not depend upon the type of mesh used in inguinal hernia surgery.

In our study the mean time taken for ambulation in days was higher in HWM group (2.39 days)

compared to LWM groups (2.03 days). Patient underwent hernia repairs with LWM became ambulatory earlier than with HWM (The p value <.05).

The randomized study of O'Dwyer P.J et al¹⁶ states that the use of LWM is associated with an increase in hernia recurrence after inguinal hernia repair at 12 month follow up. The randomized study of K. Bury et al. showed that, the using partially absorbable lightweight mesh as opposed to standard heavyweight polypropylene mesh did not result in different recurrence rate at the time of 60-month follow-up.¹² In our study there was no recurrence observed at 3 month follow up, in both HWM and LWM groups. The result in present study can be attributed to a short follow up period and may give significant results when a longer follow up is used.

Study of Lee SD et al¹⁷ reports that LWM led to less sensation of a foreign body in groin region, compared to HWM following hernia repair. In our study at 1 and 3 month follow up, 4 patients from HWM group complained of stiffness at hernia repair site. There was no such complaint in LWM group. The remaining 62 patients also did not complain of any stiffness. In our study we found that, the use of HWM in hernia repairs is associated with the feeling of stiffness at operative site in long term as compared to LWM (P value < 0.05).

V. Conclusion

The use of the lightweight composite mesh for inguinal hernia repair has similar outcomes to polypropylene in terms of early and chronic postoperative pain. Seroma formation and infection is not associated with the type of mesh used. However repair of hernia with light weight mesh have advantage over heavy weight in terms of early ambulation, less feelings of foreign body. Both types of mesh don't exhibit significant difference in early recurrence following hernia repair, but the final results require multicentre trials in a larger series of patients.

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