INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

TO COMPARE THE OUTCOME AFTER USING LIGHTWEIGHT OR HEAVYWEIGHT MESH FOR THE REPAIR OF INGUINAL HERNIA

***Dr. Manoranjan R Kushwaha, Dr. Jigar Jariwala, Dr. Raj sharma**

Department of surgery, NHL medical college, Elisbridge Ahmedabad pin 380006

Abstract

Background: *Hernia repair is one of the most commonly performed procedures by general surgeons. With the introduction of tissue tension as an important factor, lichtenstein tension free mesh repair has become the standard procedure to be accepted worldwide.* ***Objective:*** *Comparative study of Lightweight or Heavyweight Mesh for The Repair of Inguinal Hernia with Reference to Postoperative Pain, Short Term Recurrences, Seroma Formation and Foreign Body Sensation.* ***Method:*** *This study was conducted on 50 patients of inguinal hernia attending the surgical out-patient clinic of Smt. N.H.L. Municipal Medical College and associated Vadilal Sarabhai General Hospital, Ahmedabad from October 2017 to July 2019.Patients for the study were selected from amongst those attending the surgical OPD of the Vadilal Sarabhai Hospital with clinical diagnosis of inguinal hernia.All male patients 18 years and above diagnosed with inguinal hernia.* ***Results:*** *This study recorded a significant reduction of postoperative pain following Lichtenstein inguinal hernia repair with a lightweight mesh. This study recorded more incidence of foreign body sensation in heavyweight mesh group, which is statistically significant. This study noted more incidence of seroma formation in heavyweight mesh group, but this is not statistically significant. No recurrence was reported in either group during the follow-up period of six months. Although follow-up period was short, there is a trend towards both meshes being equally effective.* ***Conclusion:*** *Finally, it can be recommended from this study that use of Lightweight mesh in Lichtenstein hernia repair is a valid alternative to the Heavyweight mesh with reduced postoperative pain, foreign body sensation and seroma formation. The risk of hernia recurrence warrants longer follow-up period.*

Keyword: *Lightweight or Heavyweight Mesh, Repair of Inguinal Hernia, Inguinal Hernia*

INTRODUCTION

With Lichtenstein repair becoming the standard procedure for tension free repair of hernia, two types of mesh have been commonly used for this procedure having different properties which are shown in the table below

Mesh type	Lightweight	Heavyweight
Core material type	PROLENE soft mesh	PROLENE polypropylene mesh
Manufacturer	Ethicon(johnson & johnsons)	Ethicon(johnson & johnsons)
Elasticity	20-35%	4-16%
Tensile strength	16N/cm	12N/cm
Tissue separating barrier	None	none
Pore size	2.38+/-0.03mm	<1mm (square)
Average filament size	3.7+/-0.1 mils polypropylene	
Weight	44g/m (square)	>95gm (square)
Customizable	Yes	yes
Fixation requirement	When fixating with sutures or other mechanical fixation devices, a safe distance from the edge of mesh not less than 6.5 mm must be maintained. 6.5 mm and 12.5 mm distance should be left between fixation points.	It is recommended that suture be placed at distance of 8.5mm to 12.5 mm apart distance approximately 6.5 mm from the edge of mesh

Shelf life	5 years	5 years

MATERIALS AND METHODS

MATERIALS STUDY DESIGN: - Randomized control trial.

SELECTION OF PATIENTS: - Patients for the study were selected from amongst those attending the surgical OPD of the Vadilal Sarabhai Hospital with clinical diagnosis of inguinal hernia.

The patients were included in the study based on the following criteria:

INCLUSION CRITERIAS
All male patients 18 years and above diagnosed with inguinal hernia.

EXCLUSION CRITERIAS
- Recurrent inguinal hernia
- Bilateral inguinal hernia
- Previous history of surgery for hydrocele or varicocele
- Patient with a concomitant hydrocoele, varicocele or tubercular pathology
- Those receiving chronic immunosuppressant or corticosteroid therapy

METHODS OF STUDY

The workup of patients was divided into preoperative evaluation, operative procedure, postoperative monitoring and follow up.

A. PREOPERATIVE EVALUATION
CONSENT- informed consent was taken from all subjects eligible for study before enrolment. RANDOMIZATION- patients were randomized into two groups by using computer generated numbers.
Group A- Lightweight polypropylene mesh (Prolene SoftTm, pore size>lmm, weight-44 g/m2) used for Lichtenstein hernia repair.
Group B- Heavyweight polypropylene mesh(ProleneTm, pore size<lmm weight- 100 g/m2) used for Lichtenstein hernia repair.

B. POST OPERATIVE MONITORING-
Patients were allowed orally in the evening of surgery.
Prophylactic antibiotics were given for two doses at 8 pm and 8 am the following day. All patients were administered injection Diclofenac Na 75 mg intramuscularly at 8 pm. Dressing was removed on the next day of surgery and findings noted. Patient discharged and was advised to take tablet voveran 50 mg orally when he feels significant pain causing discomfort and to record the same in the chart (visual analogue scale) provided. Patients were advised to do day to day activities immediately after recovering from the effects of anaesthesia.
VAS chart was filled by each patient at 24 hr and 1 month after surgery. Patients were advised to attend Surgery OPD on 7th postoperative day for review and removal of stitches. A thorough examination was done during this visit. VAS chart noted, and other complications (seroma formation, foreign body sensation, short-term recurrences) noted. All patients were advised to come for follow up after 1 month or earlier if symptomatic.

C. STATISTICAL ANALYSIS-
All the relevant data compiled on Microsoft Excel Computer Program and was subjected to statistical analysis. Qualitative data was expressed by percentages and difference between independent groups was observed by Chi square test. Quantitative data will be expressed by mean and standard deviation and difference between mean will be observed by t-test and $P<0.05$ will be considered as significant.

OBSERVATION AND RESULTS
The study was conducted in the Department of Surgery, Smt. N.H.L. Municipal Medical College and associated Vadilal Sarabhai Hospital, Ahmedabad from October 2017 to July 2019.

TABLE 1. patient in two groups.

GROUP	NUMBER OF PATIENTS

Heavyweight mesh	25
Lightweight mesh	25
Total	50

A total of 50 male patients 18 years and above with clinical diagnosis of primary inguinal hernia were included in the study. Patients were randomized into two groups, 25 patients in each group using computer generated numbers. (table 1)

Table 2-Types of hernia

Mesh	**Type of hernia**						**Total**
	LDIH	**LIIH**	**LPIH**	**RDIH**	**RIIH**	**RPIH**	
Heavyweight mesh	5	7	0	1	9	3	25
% of total	10%	14%	0%	2%	18%	6%	50%
Lightweight mesh	0	6	2	3	10	4	25
% of total	0%	12%	4%	65	20%	8%	50%
Total	5	13	2	4	19	7	520
% of total	10%	26%	4%	8%	38%	140%	100%

Table 2 shows mesh used in different types of inguinal hernias. Most of the patients had right sided inguinal hernia (30patients) and right sided indirect inguinal hernia was the most common variant (38%). In this variant 9 patients considered for heavyweight mesh and 10 patients for lightweight mesh. p-value=0.473
The age group distribution of these patients shows that, out of 50 patients, most patients were between 18 and 37 years of age (52%), 34% patients between 38 and 57 years, and 14% of patients above the age of 57 years. Patients were randomized in two groups, heavyweight mesh group (n=25) and lightweight mesh group (n=25).

1).post-operative pain-
Post-operative pain was recorded at 24 hour and 1 month after surgery by using visual analogue scale (VAS) pain scoring system. At 24 hour most patients scaled pain at 2 while at 1 month most common score was 1.

Table 3.Pain at 24 hour

Pain (vas)	**Number of patients**	**percentage**
1	9	18
2	15	30
3	7	14
5	4	8
6	2	4
total	50	100

Table 4. Pain at 1month

pain(vas)	**Number of patients**	**Percentage %**
0	4	8
1	37	74
3	2	4
total	50	100

2). Post-operative pain at 24 hour
The postoperative pain was recorded at 24 hour by using visual analogue scale was more in heavyweight mesh group in comparison with lightweight mesh group, which is statistically significant. (p-value=0.017)
The mean pain at 24 hour was 2.76 with S.D. of 1.35.

Table no.5 Post-operative pain

mesh	**Pain at 24 hour**						**total**
	1	2	3	4	5	6	
(HW) mesh	0	6	8	6	3	2	25
% of total	0%	12%	16%	12%	6%	4%	50%

INDIAN JOURNAL OF
APPLIED BASIC
MEDICAL SCIENCES

IJABMS
Peer Reviewed Journal
E-ISSN: 2249-7935
ISSN: 0975-8917

(LW) mesh	9	9	5	1	1	0	25
% of total	18%	18%	10%	2%	2%	0%	50%
Total	9	15	13	7	4	2	50%
% of total	18%	30%	26%	14%	8%	4%	100%

P-value=0.017

Table no.6 chi-square test for testing significance of postoperative pain at 24 hour

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.297a	30	.980
No. of valid cases	50		

a) 40 cells (95.2%) have expected count less than 5. The minimum expected count is .04.
b) Post-operative pain at 1 month-

The postoperative pain was recorded at 1 month by using visual analogue scale was more in heavyweight mesh group in comparison with lightweight mesh group,which is statistically significant. (p-value=0.037)
The mean pain at 1 month was 1.14 with S.D. of 0.606.

Table no 7. post-operative pain at 1 month

mesh	Pain at 1 month				Total
	0	1	2	3	
HW mesh	0	17	6	2	25
% of total	0%	34%	12%	4%	50%
Lw mesh	4	20	1	0	25
% of total	8%	40%	2%	3%	50%
Total	4	37	7	2	50
% of total	8%	74%	14%	4%	100%

P VALUE =0.037

Table no 8.chi-square test for testing significance of postoperative pain at 1 month

	Value	Df	asymp sig. (2 -sided)
1'pearson chi-square	6.134"	12	0.909
No. of valid cases	50		

2.Seroma formation- Seven patients developed seroma in both groups, five in heavyweight mesh group and two in lightweight mesh group. The p-value was 0.221 which was statistically not significant. All the patients managed conservatively and there was no need of aspiration or opening the stitch line.

Table no 9. Seroma formation in comparison with mesh

mesh	Seroma formation YES	NO	total
HW mesh	5	20	25
% of total	10%	40%	50%
Lw mesh	2	23	35
% of total	4%	46%	50%
Total	7	43	50
% of total	14%	86%	100%

p-value=0.221

Table no 10.chi-square test for testing significance of seroma formation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.495	1	.221
No. of valid cases	50		

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.50.

3.Foreign body sensation-

Table no 11.

MESH	FOREIGN BODY SENSATION		TOTAL
	YES	NO	
HW mesh **% of total**	10 20%	15 30%	25 50%
LW mesh **% of total**	2 4%	23 46%	25 50%
Total **% of total**	12 24%	38 765	50 100%

p-value=0.008
Total twelve patients complained of foreign body sensation, ten in heavyweight mesh group and two in lightweight mesh group. However, it does not limit their daily activities. The pvalue was <0.05 which was statistically significant.

Table 12. chi-square test for testing significance of Foreign body sensation

	Value	Df	Asymp.sig.(2 –sided)
Pearson chi-square	7.018	1	0.00
No.of valid cases	50		

4.Recurrence-There were no recurrences in both heavyweight and lightweight mesh groups with a follow up period of 6 months. However, a longer period of follow-up is required for assessment of recurrence.

DISCUSSION

Group A- Lightweight polypropylene mesh used for Lichtenstein hernia repair.
Group B- Heavyweight polypropylene mesh used for Lichtenstein hernia repair.

Comparative evaluation after using lightweight mesh or heavyweight mesh for the repair of inguinal hernia was made in terms of postoperative pain, short term recurrences, seroma formation and foreign body sensation.

1. Post-operative pain-
This study recorded a significant reduction in post-operative pain of any severity following Lichtenstein repair of inguinal hernia with a lightweight mesh.
The p-value at 24 hours, 1 month were 0.017, 0.037 respectively, which were statistically significant.

2. Seroma formation-
The results of this study favoured above findings but results are not statistically significant. This study recorded 7 cases seroma formation, 5 in heavyweight mesh group and 2 in lightweight mesh group. The p-value was 0.221 which was statistically not significant. All the patients were managed conservatively. There was no wound infection in either group.

3. Foreign body sensation-
The results of this study are consistent with the above findings. 12 patients (24%) in this study complained about foreign body sensation, 10 (20% of total patients) of them were from heavyweight mesh group and 2 (4% of total patients) was from lightweight mesh group. P-value was 0.008 which was statistically significant.

4. Recurrence-
In our study with a follow up period of six months' recurrence rate was zero. These results are consistent with C. Nikkolo et a145 and Bringman S et al:13

CONCLUSIONS & RECOMMENDATIONS

- This study recorded a significant reduction of postoperative pain following Lichtenstein inguinal hernia repair with a lightweight mesh.
- This study recorded more incidence of foreign body sensation in heavyweight mesh group, which is statistically significant.

- This study noted more incidence of seroma formation in heavyweight mesh group, but this is not statistically significant.
- No recurrence was reported in either group during the follow-up period of six months.

Although follow-up period was short, there is a trend towards both meshes being equally effective.
Finally, it can be recommended from this study that use of Lightweight mesh in Lichtenstein hernia repair is a valid alternative to the Heavyweight mesh with reduced postoperative pain, foreign body sensation and seroma formation. The risk of hernia recurrence warrants longer follow-up period.

REFERENCES

Lichtenstein IL, Shulman AG, Amid PK, Montllor MM. The tension-free hernioplasty. Am J Surg 1989 Feb,157:188-93.

EU hernia trialists collaboration. Mesh compared with non- mesh methods of open groin hernia repair: systematic review of randomized controlled trials. Br J Surg2000 Jul;87(7):854-9.

Van Veen RN, Wijsmuller AR, Vrijland WW, Hop WC, Lange JF, Jeekel J. longterm follow-up of a randomized clinical trial of non-mesh versus mesh repair of primary inguinal hernia. BrJ Surg 2007 Apr;94(4):506-10.

Klosterhalfen B, Junge K, Klinge U. The lightweight and large porous mesh concept for hernia repair. Expert Rev Med Devices. 2005 Jan;2(1):103-17.

Primatesta P, Goldacre M.J. Inguinal hernia repair; incidence of elective and emergency surgery, readmission and mortality. Int J Epidemiol 1996(Aug);25(4):835- 9.

Bassini E. Nuovo Metodo per la cura radicale dell'ernia inguinale. Arch F KlinChir 1890; 40:429-76.

Nyhus LM. Evolution of hernia repair: a salute-to ProfessOr Pedro Pietri. Hernia 2001 Dec;5(4):196-9. 8 Shouldice EE. The treatment of Hernia. Ontario Med Rev 1953; 20:670-84.

Porrero JL, Hidalgo M, Sanjuanbenito A, Sanchez- Cabezudo C. The Shouldice herniorrhaphy in the treatment of inguinal hernias: a prospective study on 775 patients. Hernia 2004 Feb,8(1):60- 3.

Fleming WR, Elliott TB, Jones RM, Hardy KJ. Randomized clinical trial

Annandale T. A case in which a reducible oblique and direct inguinal and femoral hernia existed on the same side and were successfully treated by operation. Edinburgh Med J 1876; 21:1087-91.

Cheatle GL. An operation for the radical cure of inguinal and femoral hernia. Br Med J 1920 Jul;2(3107):68-9.

Henry AK. Operation for femoral hernia by midline extraperitoneal approach: With a preliminary note of the use of this, route for reducible inguinal hernia. Lancet 1936; 1:531-3.

Nyhus LM, Condon RE, Harkins HN. Clinical experiences with preperitoneal hernia repair for all types of hernia of the groin. Am J Surg 1960 Aug,100:234-44.

Vrijland WW, van den Tol MP, Luijendijk RW, Hop WCJ, Busschbach JJV, de Lange DCD et al. Randomized clinical trial of non-mesh versus mesh repair of primary inguinal hernia. Br J Surg 2002 Mar;89(3):293-7.

Usher FC, Fries JG, Ochsner JL, Tuttle LL Jr. Marlex mesh: a new plastic mesh for replacing tissue defects: II Experimental studies. AMA Arch Surg 1959 Jan;78(1):138-45.