

## Original Research Article

# Comparative study of patient reported rates of chronic pain with the use of heavy weight and light weight mesh in open hernia repair in a tertiary care hospital

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### ABSTRACT

**Background:** Hernia repair one of the most common operations performed by general surgeons. Mesh repair is the gold standard for these repairs, the rates of postoperative chronic pain associated with these meshes are still unclear. The aim of the study is to compare the post-operative persisting pain after 3 months in open hernia repair with light weight and heavyweight mesh.

**Methods:** A randomized control study was conducted in a tertiary care hospital with sample size of 80. lightweight and heavyweight mesh were used after randomization with equal participants in each group. Postoperative pain was analysed 1 week, 2 week and 3 months after surgery using visual analogue scale.

**Results:** The study was conducted on a total of 80 participants. The mean age was 53(±16) and 46(±19) in those who received heavyweight mesh and lightweight mesh respectively. Majority of them 73(91.2%) were males and only 7 (8.8%) of them were females. Out of 80 participants, number of participants operated with lightweight mesh and heavyweight mesh was equal (1:1). At three months follow up, only mild and moderate pain was reported with both the groups. Among patients treated with heavy weight meshes 14 patients (35%) reported moderate pain with 26 patients (65%) reported mild pain. Among patients treated with lightweight mesh reported only 4 patients (10%) reported moderate pain with 36 patients (90%) reported only mild pain. There was significant difference in the mean of VAS score between the groups and there was significant difference between the type of mesh used and pain after 3 months ( $P<0.01$ ).

**Conclusions:** Partially absorbable lightweight mesh can be used for open inguinal hernia repair with significantly less chronic postoperative pain with improved quality of life and functional outcome.

**Keywords:** Chronic pain, Light weight mesh, Heavy weight mesh, VAS

### INTRODUCTION

Hernia repair one of the most common operations performed by general surgeons. Men are 25 times more likely to have a groin hernia than women. An indirect inguinal hernia is the most common hernia, regardless of gender. Tension-free repairs are now standard and there

are a variety of different types. The reported incidence of long-lasting pain, however, varies between 2 and 35 per cent, depending on surgical technique, method of pain evaluation and definition, and time after surgery.<sup>1-3</sup> European guidelines concluded that the overall rate of moderate to severe persistent pain after hernia surgery is around 10-12 per cent and that recurrence rates are

similar when a large mesh is used, regardless of surgical technique.<sup>4</sup> The aim of the study is to compare the post-operative persisting pain after 3 months in open hernia repair with light weight and heavyweight mesh.

## METHODS

**Study design and setting:** a randomised controlled study was conducted in a tertiary care centre of south india in the department of surgery.

**Study population:** All the patients admitted for elective inguinal hernia repair. Inclusion criteria were age at least 15 years, and elective surgery comprising unilateral primary groin hernia repair. Exclusion criteria were recurrent inguinal hernias and bilateral inguinal hernias.

**Sampling:** Sample size was 80 among which we assigned 40 participants to each arm, randomly.

**Operational definition:** Chronic pain was defined as pain persisting for more than 3months, affecting everyday activities.<sup>5,6</sup> Pain was classified using VAS score into following categories:

- Mild pain: VAS score  $\leq 3$
- Moderate pain: VAS score between 4 and 6
- Severe pain: VAS score  $\geq 7$

## Data collection

All patients who had groin hernia repair between 1st November 2017 and 30th March 2015. The procedure during the study interval was considered to randomize heavyweight and lightweight mesh among the patients. Participants were followed up every week and pain were

assessed using visual analogue scale. A reminder was sent through the phone call the day before the follow up.

Postoperatively, patients of both the groups were given the same analgesics-injection diclofenac 50 mg intramuscularly (1-0-1) for 2 days and then converted to oral. Pain was assessed based on visual analogue score (VAS) ranging from 0 to 10, considering 0 as no pain and 10 as maximum pain.

**Surgical methods:** Lichtenstein tension free hernia repair.

## Outcome measure

The endpoint was the rate of pain (according to the definition) present in the operated groin 3 months after the repair in relation to the surgical mesh (heavyweight or lightweight) used.

## Statistical methods

Data was entered using MS Excel and analysed. Continuous variables were expressed using mean and standard deviation and categorical variables were expressed in percentages. Hypothesis tested using t test – Whitney test in case of continuous variables and chi square / fissure exact test in case of categorical variable. Effect size was expressed as relative risk and mean difference.

## RESULTS

The study was conducted on a total of 80 participants. The mean age was 53 ( $\pm 16$ ) and 46 ( $\pm 19$ ) in those who received heavyweight mesh and lightweight mesh respectively.

**Table 1: Characteristics of participants undergone hernioplasty for indirect inguinal hernia (n=80).**

		Mesh used		Total N (%)
		heavyweight	lightweight	
Age in years (mean+SD)		53 (16)	46 (19)	80
Gender	Female	5	2	7
		12.5%	5.0%	8.8
	Male	35	38	73
		87.5%	95.0%	91.2
Diagnosis	Left inguinal hernia	10	14	24
		25.0%	35.0%	30.0
	Right inguinal hernia	30	26	56
		75.0%	65.0%	70.0

Majority of them 73 (91.2%) were males and only 7 (8.8%) of them were females.

Out of 80 participants, number of participants operated with lightweight mesh and heavyweight mesh was equal (1:1). Amongst those who received heavyweight mesh 35

(87.5%) were males and 38 (95%) in participants operated with lightweight mesh were males. A total of 56 people was diagnosed with right sided inguinal hernia and 24 with left sided inguinal hernia. The proportion of patients getting operated with heavyweight and lightweight mesh in both the groups almost equal. (25%,35% and 75%,65%) (Table 1).

At one week follow up, among patients treated with heavyweight meshes 40 patients (95%) reported moderate (20, 50%) to severe (18, 45%) pain and only 2 patients (5%) reported mild pain, whereas among patients treated

with lightweight mesh 28 patients(60%) reported moderate (22, 52.5%) to severe (6, 15%) pain with 12 patients(30%) reported mild pain.

**Table 2: Comparison of post-operative Pain among patients undergone hernioplasty using heavyweight and lightweight mesh (N=80).**

Follow up time	Pain grade	Mesh used		Total	RR	P value
		heavyweight	lightweight			
One week	Mild	2	12	14	6	0.07
		5.0%	30.0%	17.5%		
	Moderate	20	22	42	1.1	
		50.0%	55.0%	52.5%		
	Severe	18	6	24	0.33	
		45.0%	15.0%	30.0%		
VAS score	mean + SD	4.5+1.6	6.2+1.6			<0.001
Two weeks	Mild	8	24	32	3	0.01
		20.0%	60.0%	40.0%		
	Moderate	29	15	44	0.51	
		72.5%	37.5%	55.0%		
	Severe	3	1	4	0.33	
		7.5%	2.5%	5.0%		
VAS score	mean + SD	4.45+1.51	3.18+1.53			<0.001
Three months	Mild	26	36	62	1.38	0.01
		65.0%	90.0%	77.5%		
	Moderate	14	4	18	0.28	
		35.0%	10.0%	22.5%		
VAS score	mean + SD	2.65+1.51	1.4+1.3			<0.001

There was significant difference in the mean of VAS score between the groups but no significant difference between the type of mesh used and pain after 1 week (P=0.07).At two week follow up, among patients treated with heavyweight meshes 32 patients( 80%) reported moderate (29, 72.5%) to severe (3, 7.5%) pain and 8 patients (20%) reported mild pain, whereas among patients treated with lightweight mesh 16 patients(40%) reported moderate (15, 37.5%) to severe (1, 2.5%) pain with 24 patients(60%) reported mild pain. There was significant difference in the mean of VAS score between the groups and there was significant difference between the type of mesh used and pain after 2 weeks (P<0.01).

At three months follow up, only mild and moderate pain was reported with both the groups. Among patients treated with heavy weight meshes 14 patients (35%) reported moderate pain with 26 patients (65%) reported mild pain.

Among patients treated with lightweight mesh reported only 4 patients (10%) reported moderate pain with 36 patients (90%) reported only mild pain. There was significant difference in the mean of VAS score between the groups and there was significant difference between

the type of mesh used and pain after 3 months (P<0.01) (Table 2).

## DISCUSSION

Hernias are viscous protrusions from the cavity, which is usually present in the membrane-formed sac-like structure<sup>7</sup>.Studies have shown that among the groin hernias, 96% are inguinal and only 4% are femoral hernias, which occur in both men and women in the ratio 9:18. Evidence-based inguinal hernia guidelines recommend Lichtenstein hernia repair in case of a primary unilateral inguinal hernia. In this repair, the inguinal floor is reinforced by means of mesh. Meshes are classified in various ways, one of which is on the basis of weight into heavy weight and lightweight mesh. Though mesh weight alone as a quality parameter is questionable, current guidelines have recommended the use of lightweight and large-pore meshes, as it seems to reduce the incidence of chronic pain and long-term discomfort.<sup>9</sup>

Several studies compared heavyweight with lightweight meshes in open tension free hernia repair and showed significant reduction in postoperative pain and foreign

body sensation.<sup>10,11</sup> However, there are several studies with conflicting results. Some studies reported that there was no difference in pain score, and other studies reported poor results with the use of lightweight meshes.<sup>12,13</sup>

A study hypothesized that the increased fibrotic reaction from the use of heavy weight meshes would be accompanied by a higher frequency of chronic pain and postoperative fibrotic change, which may result in pain later because the inflammatory response continues for 3 months postoperatively.<sup>14</sup> Another recent study reported that lightweight meshes were associated with a higher incidence of chronic pain, an equal rate of mesh awareness and discomfort, and a higher risk of recurrence.<sup>15</sup> The present study was aimed to compare the heavy-weight composite polypropylene mesh versus the light-weight proline mesh in view of postoperative pain in patients undergoing Lichtenstein mesh repair for inguinal hernia, because among all other complications, chronic pain is the one which interferes with day to day activities.

In present study, patients were followed up after one week, two week and 3 months after the hernia repair using visual analogue scale. During every follow up the rates of pain reported by the patients treated with lightweight mesh was lower than the patients treated with heavyweight mesh and after 3 months which is defined as chronic pain was also less with light weight group and is statistically significant.

## CONCLUSION

Partially absorbable lightweight mesh can be used for open inguinal hernia repair with significantly less chronic postoperative pain with improved quality of life and functional outcome.

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