

A RANDOMIZED CLINICAL TRIAL COMPARING OUTCOMES OF LICHTENSTEIN HERNIA REPAIR WITH LIGHTWEIGHT VS. HEAVYWEIGHT MESH

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Abstract

Background: The Lichtenstein repair, in particular, is regarded as the gold standard for treating inguinal hernias, a surgical problem that is very common. Even though a variety of techniques have been documented, Lichtenstein Inguinal Hernia Repair is currently among the most frequently done surgical procedures worldwide. However, issues like feeling of a foreign body, stiffness over the abdominal wall, chronic pain, and recurrence are of significant concern. To compare the outcome of heavy weight vs. light weight mesh in Lichtenstein repair of inguinal hernia, we compared the postoperative complications and post-operative recovery time in patients undergoing inguinal hernia repair using heavy weight mesh vs. light weight mesh. **Materials and Methods:** This was a prospective, single-blinded randomized trial on outcomes between heavy (Polypropylene) and light (monofilament Polypropylene) weight mesh in Lichtenstein repair of inguinal hernia patients admitted to the Department of General Surgery, Government Medical College, Haldwani, from January 2021–September 2022, comprising a total of 56 patients. **Result:** In my study, foreign body sensation in the heavy weight mesh group was significantly higher than in the light weight mesh group. Chronic pain was also more common in the heavy weight mesh group. Similarly, patients in the heavy weight mesh group complained of stiffness around the incisional site, whereas no patients had this complaint in the light weight mesh group. **Conclusion:** Based on the findings of the present study, we concluded that light weight mesh has a lesser incidence of postoperative pain, chronic pain, abdominal wall stiffness, and there was early mobility, and an early return to work, in light weight mesh group of patients. Light weight mesh has been shown in my research to be superior to heavy weight mesh when used as an inguinal hernia prosthesis.

INTRODUCTION

A hernia is a protrusion of a viscus or a part of a viscus through an abnormal opening in the walls of its containing cavity.^[1] Approximately 75% of abdominal wall hernias occur in the groin. Inguinal hernias are classified as direct or indirect. Elective surgery for inguinal hernias is a common and simple operation. Globally, inguinal hernia repair has become one of the most important procedures for improving quality of life and preventing disability. Nowadays, among the open surgeries, the Lichtenstein operation is the preferred surgery. In the 1980s, Lichtenstein described a tension-free, simple, flat polypropylene mesh repair for inguinal hernias. The Lichtenstein repair claimed two major advantages: lowered hernia recurrence rates and

accelerated postoperative recovery. Meshes weighing less than 40 g/m² are generally referred to as light, and those weighing more than 80 g/m² are referred to as heavy.^[2] Denser or heavy weight meshes provoke a greater reaction, leading to collagen contraction and stiffening. Mesh with thinner strands and larger spaces between them, ‘lightweight, large-pore meshes’, are preferred because they have better tissue integration, less shrinkage, more flexibility, and improved comfort. The purpose of the study was to compare the clinical outcome of Lichtenstein repair for inguinal hernias using light-weighted and heavy-weighted mesh. We used polypropylene surgical mesh (HWM) and monofilament polypropylene (LWM).

MATERIALS AND METHODS

The present study was a prospective, single blinded randomized control trial conducted at Dr. Susheela Tiwari Government Hospital, Haldwani from January 2021 to September 2022. Patients with age more than 18 years and less than 80 years giving consent for surgery and fit for surgery were included. Patients with complicated hernia (incarceration, obstruction and strangulation), recurrent hernia, active infection in the inguinal region and not giving consent for surgery were excluded from this study. A total of 56 patients were subjected to mesh inguinal hernioplasty. Included patients were screened for complete blood count, routine biochemistry, bleeding time, clotting time, urine examination, Chest X-ray and ECG. All patients were randomized alternatively into two groups:

Group I: those who undergone hernia repair by LWM (study group)

Group II: those who undergone hernia repair by HWM (control group)

Conventional open tension-free mesh technique as described by Lichtenstein was used as the operative technique. Mesh repair was done using the polypropylene mesh (HWM) and monofilament polypropylene (LWM). Patients were followed up post operatively at the end of 2 weeks, 1 Month and 3 Months and were assessed for

- Pain
- Foreign body sensation over inguinal area

- Stiffness over abdominal wall

Pain assessment was based on Visual Analogue Scale/Graphic Rating Scale.

All data was tabulated and subjected to appropriate statistical analysis using SPSS version 21.0. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all patients after explaining in detail the entire research protocol.

RESULTS

Descriptive

In our study, a total of 56 patients were involved, with a mean age of 45.26 years in group I and 45.55 years in group II, and there were only male patients. In groups I and II, the mean total weight was 65.11 kg and 63.28 kg, respectively. Group I had a mean height of 162.78 cm, while group II had a mean height of 161 cm. The side of the inguinal hernia was bilaterally seen in 2 in group I, 4 in group II, left in 11 in group I and 7 in group II, and right in 14 in group I and 18 in group II. Direct hernia was seen in 17 in group I and 15 in group II, and indirect hernia was seen in 10 in group I and 14 in group II. The duration of surgery in group I was 63.33 minutes, and in group II it was 62.24 minutes. The length of hospital stay in group I was 3.33 days, and in group II it was 3.69 days. Seroma was present in 1 (3.7%) in group I and in 1 (3.4%) in group II. The mean VAS score in group I was 2.85 and in group II was 3.90.

Table 1: Patient and disease characteristics at time of operation

Groups	Group I (LWM)	Group II (HWM)
Mean Age (Years)	45.26 (±14.4)	45.55 (±17.7)
Gender N (%)		
Male	27 (48.2%)	29 (51.2%)
Mean Body weight (kg)	65.11 (±8.8)	63.28 (±8.9)
Mean Height (cm)	162.78 (±5.3)	161.0 (±6.3)
Side of inguinal hernia N (%)		
Bilateral	2 (7.4%)	4 (13.8%)
Left	11 (40.7%)	7 (24.1%)
Right	14 (51.9%)	18 (62.1%)
Type of inguinal hernia N (%)		
Direct	17 (63.0%)	15 (51.7%)
Indirect	10 (37.0%)	14 (48.3%)
Mean duration of surgery (mins)	63.33 (±6.8)	62.24 (±9.1)
Mean length of hospital stay (days)	3.33(±1.0)	3.69(±1.1)
Presence of seroma after surgery N (%)	1 (3.7%)	1 (3.4%)
Mean Vas score	2.85(±0.8)	3.90(±0.5)

Comparison of outcomes

Table 2 shows that in 2 weeks, foreign body sensation in the inguinal area was seen in 15 in group 2. Stiffness over the abdominal wall was seen in 21 in group 2. The mean VAS score in group 1 was 1.19 and in group 2 was 3.83.

Table 2: Comparison of outcomes in 2 weeks

Groups	Group I (LWM)	Group II (HWM)	Significance
Foreign body sensation	0	15	<0.001
Stiffness over abdominal wall	0	21	<0.001
Mean VAS score	1.19 (±0.39)	3.83 (±0.76)	<0.001

P<0.005 was considered significant.

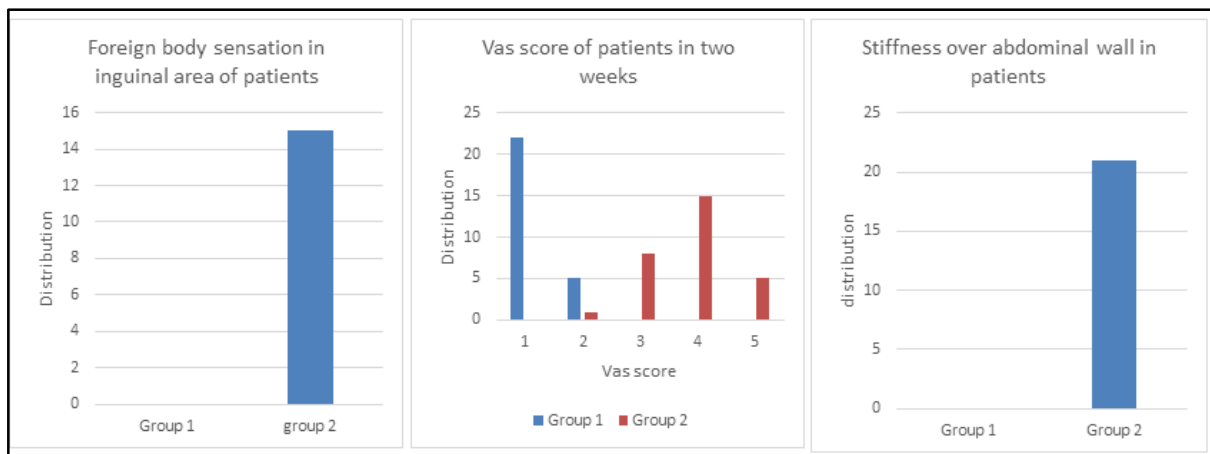


Figure 1: shows graphical presentation of foreign body sensation in inguinal area, VAS score and stiffness over abdominal wall in 2 weeks

In 1-month, foreign body sensation in the inguinal area was seen in 17 in group II. Stiffness over the abdominal wall was seen in 21 in group II. The mean VAS score in group I was 1.0, and in group II it was 1.45 [Table 3].

Table 3: Comparison of outcomes in 1 month

Groups	Group I (LWM)	Group II (HWM)	Significance
Foreign body sensation	0	17	<0.001
Stiffness over abdominal wall	0	21	<0.001
Mean VAS score	1.0	1.45 (± 0.95)	0.024

P<0.005 was considered significant.

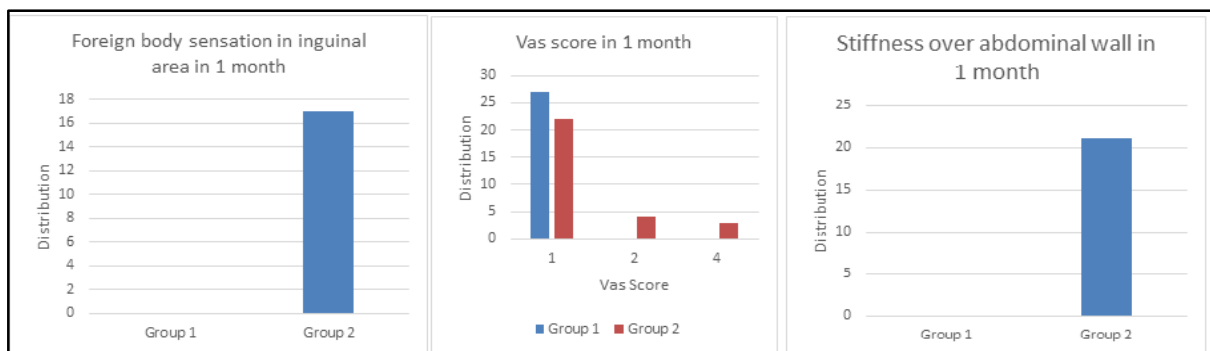


Figure 2: shows graphical presentation of foreign body sensation in inguinal area, VAS score and stiffness over abdominal wall in 1 month

In 3 months, foreign body sensation in the inguinal area was seen in 11 in group II. Stiffness over the abdominal wall was seen in 11 in group II. The mean VAS score in group I was 1.0, and in group II it was 1.31 [Table 4].

Table 4: Comparison of outcomes in 3 month

Groups	Group I (LWM)	Group II (HWM)	Significance
Foreign body sensation	0	11	<0.001
Stiffness over abdominal wall	0	11	<0.001
Mean VAS score	1.0	1.31 (± 0.93)	0.086

P<0.005 was considered significant.

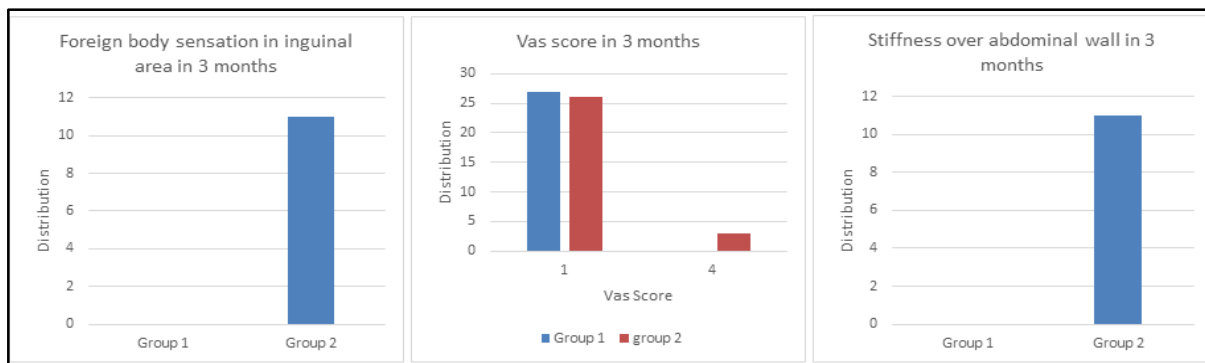


Figure 3: shows graphical presentation of foreign body sensation in inguinal area, VAS score and stiffness over abdominal wall in 3 months

Post-operative recovery time

[Figure 4] shows that the length of hospital stay was 2 days in 7 in group I and 6 in group II, 3 days in 8 in group I and 4 in group II, 4 days in 9 in group I and 13 in group II, 5 days in 2 in group I and 5 in group II, and 6 days in 1 in each group. However, the difference was not significant ($P > 0.05$).

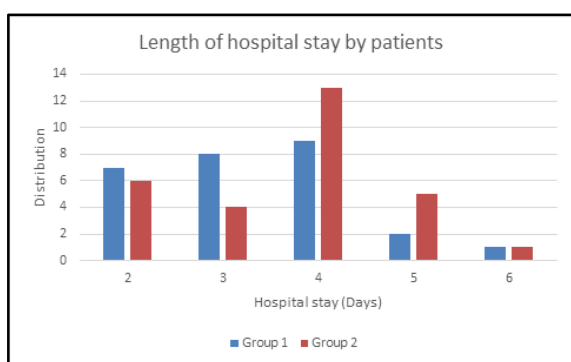


Figure 4: graphical presentation of length of hospital stay after surgery

DISCUSSION

In both groups, the majority of the patients in this study were in the age range of 25–65 years. In a study conducted by Louis and Wendell et al., the age at presentation of inguinal hernia was highest in people aged 30–60. In a study done by Ira M. Rutkow,^[3] 18% of cases were <15 years of age, 20% were 24–44 years, 23% were 45–65 years, and 30% were > 65 years of age. The maximum number of cases was between 25–65 years of age.

In our study, 100% were males, and there was no female. This may be due to fewer incidences of hernia and less awareness among women about hernias. The socioeconomic and educational level of female patients contributed to a lower number of female patients presenting to the hospital with inguinal hernia early in our study.

In our study, only the postoperative period was calculated. The average duration of hospital stay in the HWM group was 3.69 days, and in the LWM group it was 3.33 days.

In our study, the recurrence rate was nil, even though it can't be compared because of the small study group and the shorter follow-up period. Sajid et al.^[4] in their systematic review concluded that the use of a LWM was not associated with a higher recurrence rate.

There was no significant difference in recurrence rates between the LWM and HWM groups in studies by Chui et al, Agarwal et al and Bittner et al.^[5-7]

At the end of the 2-week follow-up, patients in only the HWM group experienced foreign body sensations after hernia repair surgery, while none of the patients in the LWM group experienced any foreign body sensations. Similarly, Chui et al,^[7] reported significantly less foreign body sensation at 3, 6, and 12 months with LW mesh. The incidence after 3 months was 8% in the LW mesh group as compared to 24% in the HW mesh group, while Bittner et al. reported that there was no significant difference in this parameter between the LW and HW mesh groups.

Bittner et al,^[5] reported more pain in the midweight mesh group at 6 months compared to the other three groups. However, at 12 months follow-up, they did not find any significant difference in chronic pain among all mesh groups. Agarwal et al,^[6] showed that LW polypropylene mesh was associated with significantly better pain score, patient comfort, and sexual function. Patients in the LWM group had lower pain scores (VAS means 1.19, 1.0, and 1.0 in 2 weeks, 1 month, and 3 months of follow-up, respectively) and higher overall satisfaction in our study.

Only patients in the heavy mesh group had stiffness over the abdominal wall in our study, whereas there were no patients with stiffness in the light weight mesh group throughout the follow-up period, and the difference was statistically significant.

Limitations

The patients were managed by different surgical teams, although the operating surgeon was the same. Due to COVID-19, the flow of patients was limited, hence the sample size was small, and the short duration of follow-up made it difficult to find out long-term complications. A definitive outcome after surgery with a shorter follow-up could not be achieved.

CONCLUSION

This study had evidence supporting the hypothesis that reducing the amount of polypropylene in the mesh for inguinal hernia repair reduces the complication rates but comes with the disadvantage of being expensive and not affordable by all, especially in the Indian government hospital setting, where meshes (heavy weight mesh) are supplied in bulk and free of cost. Lightweight meshes can be a better option in Lichtenstein hernia repairs, provided they are made more affordable and their efficacy is proven in larger studies with a longer follow-up period.

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