Original Article

Use Of Different Types Of Mesh In Inguinal Hernia- Comparative Analysis Of Outcome On Quality Of Life

VINOD KUMAR SINGHAL[1] , FARIS DAWOOD ALASWAD[2] , UMM HEBA ASIF[3] , VARSHA OJHA[4] , VIDHER V V[5]

[1](General Surgeon, Prime Hospital, Dubai)
[2](General Surgeon, NMC Specialty Hospital, Dubai)
[3](Registrar General Surgery, Prime Hospital, Dubai)
[4](Gynecologist and Obstetrician, Prime Hospital)
[5](Student, University College London, London)
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Abstract

Background and Aim- There is a paucity of high-quality evidence concerning mesh choice in open inguinal hernia repair. Using an expertise-based quality of life scale, we aimed to evaluate the postoperative impact of two different mesh types on pain and discomfort, quality of life.

Methods- This observational cohort study's with retrospective analysis. Based on the inguinal hernia laparoscopic each patient underwent between January 2021 and December 2022, (2 years) two patient cohorts were created conducted at tertiary care hospital. One group of surgeons used a heavyweight polypropylene mesh (90 g/m2, Bard™ Flatmesh, Davol) while the second group employed a lightweight mesh (28 g/m2, ULTRAPRO™, Ethicon). A total of 360 hernia patients were admitted during the study period and among them random allocation was done for 180 patients was used with Heavyweight mesh (HWM) and 180 for lightweight mesh (LWM).

Results- Mean age group was 58 years in Heavy weight mesh and 59.4 years in low weight mesh. Mean BMI was 25. Most of the patients had indirect hernia followed by direct hernia. Comparing the study groups, there were significant differences ($p<0.05$) concerning awareness of a groin lump and groin discomfort, while close to significance regarding perception of foreign material, favouring the lightweight group 1 year after surgery. No statistically significant difference in quality of life as measured by EQ-5D between the different mesh groups could be detected. In total, expressed by minimally important differences, 152/180 in heavyweight mesh group patients (48.2%; 95% CI 42.8–53.6) improved their quality of life. The outcomes for quality of life based on Caroline comfort scale, no significant differences could be observed between the 2 groups.

Conclusion- Two year following Laparascopic surgery, there were noticeable changes in the awareness of a groin lump and discomfort, favouring the lighter group, but no difference in quality of life could be demonstrated between the groups in the trial's heavyweight and lightweight mesh groups.

Keywords- Mesh, hernia repair, laparoscopic surgery, Preperitoneal technique, groin pain.

Introduction-

A common surgical treatment is the correction of inguinal hernias. Each year, more than 20 million surgeries are carried out worldwide. Mesh mending has dominated the landscape in recent years as mesh-based methods are strongly advised in the most recent hernia Surgery recommendations.[1] According to the research presented by these recommendations, due to the physiologic mesh location and the mesh's placement away from the groin nerves, preperitoneal mesh placement is favoured over anterior mesh placement. [2] The literature demonstrates that laparoscopic transabdominal preperitoneal repair (TAPP) and total abdominal laparotomy (TALP) are superior to the well-established open Lichtenstein repair. TEP over extraperitoneal repair (Lichenstein). TAPP is related with less early or late postoperative discomfort, less chronic pain, a quicker recovery period, and a higher

quality of life as compared to Lichtenstein. [3,4] TAPP patients are reported to have a similar complication rate and greater hospital expenses. [4,5] Literature implies that TEP is superior to Lichtenstein, just like TAPP is. TEP patients are reported to have a lower complication rate and a similar recurrence rate [6] Recent recommendations state that when taking into account postoperative discomfort. Despite a well-documented differential in learning curve and upfront expenses favouring Lichtenstein, laparoscopic procedures are superior in terms of healing time and chronic pain. There has been less research comparing the transinguinal preperitoneal (TIPP) method to the Lichtenstein method. The open preperitoneal mesh procedures appear to be more common, particularly in Asian nations, and multiple studies have found positive results.[6] Preperitoneal mesh installations are currently advised, although there isn't much information comparing open to laparoscopic preperitoneal approaches. The purpose of this study is to compare the patient Quality of life outcomes for males who have inguinal hernias between heavyweight and Lightweight mesh repair through laparoscopic surgery.

Materials and Methods-

This observational cohort study's with retrospective analysis. Based on the inguinal hernia procedure each patient underwent between January 2021 and December 2022, two patient cohorts were created conducted at tertiary care hospital. One group of surgeons used a heavyweight polypropylene mesh (90 g/m2, Bard™ Flatmesh, Davol) while the second group employed a lightweight mesh (28 g/m2, ULTRAPRO™, Ethicon). A total of 360 hernia patients were admitted during the study period and among them random allocation was done for 180 patients was used with Heavyweight mesh (HWM) and 180 for lightweight mesh (LWM). At their preoperative visit, patients met with a senior surgeon, who performed each surgeon's primary technique using Laparoscopic surgery operation using heavy and light weight mesh. Therefore, all patients received care in accordance with the favoured method of the surgeon they saw. Written informed consent was obtained and study was approved by Institutional Ethics committee.

Inclusion criteria were as follows: adult male patients, age >18 years with a primary, inguinal hernia who underwent laparoscopic repair and signed the informed consent form.

Exclusion criteria were as follows: recurrent or bilateral hernias, patients choosing not to participate by signing the opting-out form or communicating telephonically.

Methodology-

The patients received a letter with an opt-out form, an opt-in form, and standardized questionnaires. Patients were requested to return the filled-out consent form and the finished questionnaires if they wanted to participate in the study. They were requested to send back the completed opt-out form if they decided against taking part. Patients who did not reply within six weeks of the letters' delivery received one phone call-back. After the reminder, it was deemed that they "did not answer" if they still had not returned the opt-in form and the questionnaires.

The patients received two quality of life tools. Quality of life was evaluated with the validated Euro Qol five dimensions (EQ-5D) instrument [7]. The Caroline Comfort Scale (CCS) is a hernia specific questionnaire. It consists of 23 questions divided in 3 domains: sensation of mesh, pain and movement limitations. Each question is scored on a 6-point scale from 0 to 5. A 0 represents ‘no symptoms’ and a 5 represents ‘disabling symptoms’.

Statistical Analysis-

The statistical analysis was performed using SPSS for windows version 22.0 software (Mac, and Linux). The findings were present in number and percentage analyzed by frequency, percent, and Chi-squared test. Chi-squared test was used to find the association among variables. The critical value of P indicating the probability of significant difference was taken as <0.05 for comparison.

Results-

Table 1- Demographic details of participants on the basis of type of mesh used

Characteristic		HWM (N = 180)	LWM (N =180)
		Mean (SD)	Mean (SD)
Age (years)		58.4 (13.0)	59.1 (12.7)
BMI (kg/m^2)		25.3 (2.8)	25.2 (2.9)
		N (%)	N (%)
Hernia type			
Indirect	99 (56.6)		102 (55.1)
Direct	61 (33.7)		52 (30.8)
Combined	19 (10.9)		22 (11.9)
Not classified		1(0.6)	4 (2.1)
ASA class			
I		107 (60.1)	116 (62.7)
II	64 (35.9)		56 (32.9)
III		9(3.9)	8 (4.3)

As per table 1 study groups were comparable on the basis of age, BMI, ASA and type of hernia. Mean age group was 58 years in Heavy weight mesh and 59.4 years in low weight mesh. Mean BMI was 25. Most of the patients had indirect hernia followed by direct hernia. ASA class I was most common. All parameters are comparable as they are not significant (p>0.05).

Table 2- Subjective symptom assessment in both groups at 4 and 12 months

Time period	HW (N = 180)	LW (N = 180)	P value*
4 months	43/126 (34.1)	32/133 (24.1)	0.07
Awareness of groin lump			
Perception of foreign material in groin	25/127 (19.7)	29/133 (21.8)	0.70
Loss of skin sensation in groin	53/130 (40.8)	62/136 (45.6)	0.49
Discomfort in groin	36/127 (28.4)	32/133 (24.1)	0.41
12 months			
Awareness of groin lump	26/144 (18.1)	9/149 (6.0)	0.02*
Perception of foreign material in groin	34/144 (23.6)	21/149 (14.1)	0.01*
Loss of skin sensation in groin	30/144 (20.8)	25/149 (16.8)	0.45
Discomfort in groin	41/143 (28.7)	27/149 (18.1)	0.03*

As per table 2 Comparing the study groups, there were significant differences (p<0.05) concerning awareness of a groin lump and groin discomfort, while close to significance regarding perception of foreign material, favoring the lightweight group 1 year after surgery. However, no statistically significant differences were found 4 months after surgery.

Table 3- Quality of Life by EQ-5D scale 4 and 12 months after Surgery

Time period	HW (N = 180)		LW (N = 180)	
	N (%)	95% CI	N (%)	95% CI
4 months				
Worse	7/157 (4.5)	2.1–9.1	5/168 (3.0)	1.2–7.0
No change	78/157 (49.7)	41.9–57.5	83/168 (49.4)	41.9–57.0
Better	72/157 (45.9)	38.2–53.7	80/168 (47.6)	40.1–55.2
P value*	0.78			
12 months				
Worse	3/161 (1.9)	0.6–5.7	2/171 (1.2)	0.3–4.3
No change	79/161 (49.1)	41.4–56.8	88/171 (51.5)	43.9–58.9
Better	79/161 (49.1)	41.4–56.8	81/171 (47.4)	40.0–54.9
P value*	0.75			

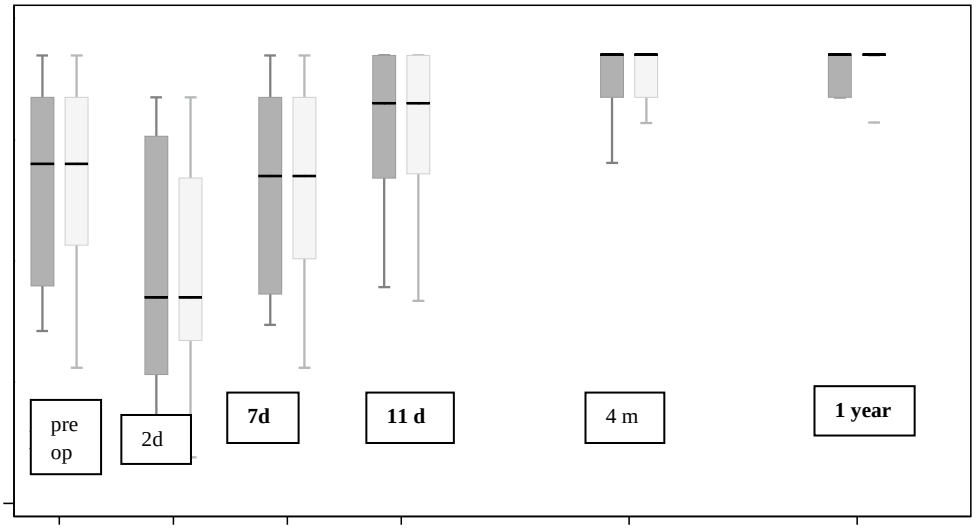
As per table 3 the quality of life data of 360 patients was available and analysed, of which 180 were in the heavyweight mesh group and 180 in the lightweight mesh group. No statistically significant difference in quality of life as measured by EQ-5D between the different mesh groups could be detected. In total, expressed by minimally important differences, 152/180 in heavyweight mesh group patients (48.2%; 95% CI 42.8–53.6) improved their quality of life, 160/180 patients (50.3%; 95% CI 44.9–55.7) had better quality of life in lightweight mesh while only 5/180 patients (1.5%; 95% CI 0.6–3.6) had a worse quality of life at 12 months after surgery.

Table 4- Comparison of quality of Life outcomes using Caroline Comfort scale

Outcomes	HWM	LWM	p-value
Non-Dichotomous			
Pain	1.4	1.6	0.11
Movement	2.8	2.9	0.13
Mesh Sensation	2.7	2.8	0.09
Dichotomous			
No pain	1.6	1.4	0.07
No movement	1.8	1.8	0.11
Mesh sensation	2.1	2.2	0.15

As per table 4 considering the outcomes for quality of life based on Caroline comfort scale, no significant differences could be observed between the 2 groups.

Figure 1- EQ-5D index values preoperatively and at five postoperative time points for heavyweight and lightweight mesh groups.



As per figure 1 Preop, preoperative time point immediately before surgery. Boxes and whiskers indicate 25th–75th percentiles and 10th–90th percentiles, respectively. Dark-grey figures represent the heavyweight mesh group and the corresponding light-grey boxes and whiskers represent values for the lightweight mesh. Median values are indicated by a black horizontal line for each group.

Discussion-

We were able to identify a difference regarding recognition of a hernia in this expertise-based randomized research of heavyweight and lightweight mesh in inguinal hernia surgery.1 year after surgery, the lightweight mesh group showed less groin lump and discomfort. However, both groups' quality of life and overall assessments of their groin symptoms significantly improved following surgery as compared to before. There is a decrease in chronic pain with the lightweight mesh, according to a comprehensive evaluation of nine trials comparing it to heavyweight mesh [8,9], whereas according to mesh type, two recent trials failed to demonstrate any differences [10, 11]. Despite having a sufficiently powered trial, we were unable to identify any benefit of the lightweight mesh for chronic pain in the current investigation. In contrast to other trials, we adopted an expertise-based design, potentially reducing bias brought about by specific surgeons who preferred a particular type of mesh while being assigned to operate with a different type. However, our findings that the heavyweight mesh was associated with a higher prevalence of local groin complaints are in line with the aforementioned studies [9–11].

Additionally, we showed that most patients experienced an improvement in quality of life following inguinal hernia surgery, which is also consistent with other studies [12]. Lightweight meshes may offer benefits such as enhanced biocompatibility may result in decreased chronic inflammation [12], discomfort, and pain, all of which may improve life quality [9]. Another hypothesis is that the spermatic cord's structures may be damaged by the inflammation caused by the mesh, which could have a negative effect on sex life. Nevertheless, the current investigation was unable to demonstrate these theoretical discrepancies. We employed a standardized technique, thus it stands to reason that focusing on the type of mesh may not be as important as improving and standardizing the surgical procedure.

According to our study's findings on quality of life based on CCS, 72.2%, 83.3%, and 80% of the patients respectively reported no symptoms or limits in terms of pain, movement restrictions, or mesh sensation. The CCS was used to assess postoperative quality of life in a prospective research by Gitelis et al. examining 293 patients (mean age 56 years, 93% male, 27% bilateral hernias, 20.5% asymptomatic, 15% recurrent hernias) after TEP repair. At one year after surgery, 89% of the patients reported no pain complaints, 95% reported no restrictions on their mobility, and 90% reported no sensation from the mesh. These percentages were 88%, 92%, and 91%,

respectively, at 2 years after surgery. [13] After a year, quality of life did not dramatically change, according to Muysoms et al. [14]

Even so, more recent studies and meta-analyses that compared the recurrence of lightweight and heavyweight meshes could find no differences [9,15,16].

Conclusion-

One year following surgery, there were noticeable changes in the awareness of a groin lump and discomfort, favouring the lighter group, but no difference in quality of life could be demonstrated between the groups in the trial's heavyweight and lightweight mesh groups. But up to a year following inguinal hernia surgery, both groups' quality of life was significantly better than it was before surgery.

Conflict of Interest- None declared

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