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ORIGINAL ARTICLE

Comparison of mean Postoperative Inguinodynia in patients undergoing open Inguinal Hernia Surgery with use of standard Polypropylene Heavy Weight Mesh v/s Ultra Pro light Weight Mesh

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ABSTRACT

Background: Various types of meshes for inguinal hernias have been discovered to combat with chronic groin pain related problems. The data regarding these findings was variable due to difference in the cut off values used in the past in different studies to label inguinodynia and local data was scarce where HWM is still highly practiced.

Aim: To compare the mean postoperative inguinodynia in patients undergoing open inguinal hernia surgery with use of standard polypropylene heavy weight mesh (HWM) v/s Ultra Pro lightweight mesh (LWM).

Methodology: This is a prospective randomized controlled trail conducted at department of surgery, Services Institute of Medical Sciences, from July 2019 to June 2020. Cases were divided in two groups by using radio opaque sealed envelopes labeled as A and B. Group-A underwent Lichtenstein mesh repair by Ultra Pro LWM and group B had polypropylene heavy weight mesh (HWM). Lichtenstein mesh repair was done under spinal or general anesthesia by the experienced surgeon. Duration of surgery was also calculated (from incision to closure). Patient was followed in outpatient department at 3 months where the outcome was seen and inguinodynia was assessed.

Results: The mean age was in group A was 40.66±10.52 years and 40.53 ±12.56 years in group B. The mean pain Score in group A was 2.024±0.88 and in Group-B it was 2.97 ±0.85.

Conclusion: Ultra Pro LWM is more effective in terms of less postoperative pain as compared to standard polypropylene heavy weight mesh in patients undergoing open inguinal hernia surgery

Keywords: Postoperative, Inguinodynia, Inguinal hernia, Standard, Polypropylene heavy weight mesh, Ultra Pro light

INTRODUCTION

In general surgery, operation for inguinal hernias either laparoscopic or open is a commonest procedure. Among all the procedures up to date, tension free Lichtenstein repair is the gold standard with low recurrence rates and less postoperative pain. Currently, meshes have replaced suture repair, and around 1 million meshes per year are used worldwide[1,2,3].

In current inguinal hernia repair literature debate, the foremost debatable issue is chronic pain after inguinal mesh hernioplasty. The international association for the study of pain described chronic groin pain as "groin pain reported by the patient at or beyond 3 months following inguinal hernia repair"[3].

Various types of meshes have been discovered to combat with chronic groin pain related problems. Use of polypropylene mesh (heavy weight) leads to formation of rigid scar plate, and stiffness of abdominal wall leading to physical discomfort limiting the daily activities of the individuals. To overcome this problem light weight meshes with large pore size were introduced with less foreign body reaction and pain[4].

With three-dimensional shaped mesh, 1,424 laparoscopic inguinal hernia repairs were performed. Patients received lightweight mesh in 804 cases and heavyweight mesh in 620 cases. Patients who received lightweight mesh were1slightly younger (52.5 years v/s 56.2 years, P.001) and had slightly lower body mass indices (26.3 v/s 27.2, P.00001). [5] Various randomized control trials have results with significant decrease experience of chronic pain with LWM than HWM[6].

Another randomized control trial also revealed that chronic pain was higher with HWM (6.2%) than LWM (3.8%)[2]. (Kim M). In a local study, there were no significant difference were found regarding chronic pain experienced beyond 6 months with LWM 6.25% while with HWM 15.62% which was statically significant.[7] According to a study done by Lee et al the mean pain score on LWM v/s HMW was 0.46±0.78 v/s 0.96±0.82 respectively with p= 0.027 at 3 months[8].

The data regarding these findings was variable due to difference in the cut off values used in the past in different studies to label inguinodynia and local data was also scarce where HWM is still highly practiced.

That's why this study was planned to compare these two types of mesh as well as to see the mean pain score between these two groups as compared to use of non-specific values which were used in the past to look for better modality to decrease morbidity in such cases.

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METHODOLOGY

This randomized Controlled Trial was conducted from July 2019 to June 2020 in the surgical department of Services Hospital, Lahore. It was after obtaining permission from the Institutional Ethical Committee of the hospital. Written consent was obtained from patients. The sample size was calculated as 82 (41 in each group) by keeping the confidence interval equal to 95%, power equal to 80% and mean pain with LWM as 0.46±0.78 v/s 0.96±0.82 with HWM in previous studies. Patients present with age of 15-60 years and cases of unilateral inguinal hernia as per operational definition were included from the study.

The demographic information was taken i.e. age, duration of hernia and anatomical side of hernia (left/right). These cases were divided in two groups by using radio opaque sealed envelopes labelled as A and B. Group A underwent Lichtenstein mesh repair by Ultra Pro Light weight mesh (LWM) and group B had polypropylene HWM. Lichtenstein mesh repair was done under spinal or general anesthesia by the experienced surgeon. Incision was placed 1cm above and parallel to the inguinal ligament.

Mesh (LWM or HWM) depend on the group chosen was placed behind the cord. Cord replaced back and closure of the external oblique aponeurosis was done followed by closure of the skin closure. Duration of surgery was also calculated (from incision to closure). All the patients were discharge after 24 to 48 hours of

the procedure unless any complication necessitating further hospital stay.

Patient were followed in outpatient department at 3 months where the final outcome was seen and inguinodynia was assessed as per operational definition. All these results were collected and recorded on a proforma.

Data was entered in SPSS-26. Quantitative variables like age, duration of hernia and degree of pain on VAS were presented as mean ± SD. Qualitative variables like anatomical side of hernia were presented as frequency & percentage. Data was 63 stratified for age, hernia duration, anatomical side of hernia and duration of surgery to see the effect on outcome variable i.e. inguinodynia. Post stratification independent sample t-test was applied taking p value was less than 0.05 as significant.

RESULTS

In this study, total 82 patients were included in Group A (LWM) and Group B (HWM). In Group A, average age was 40.66±10.52 years & in Group B, the average age was 40.53±12.56 years. In Group-A there were 17(41.5%) males and 24(58.5%) females while in Group-B there were 20(48.8%) males & 21(51.2%) females (Table 1).

In Group-A there were 20(48.8%) patients with Right side involved and 21(51.2%) with left side involved on the other side in Group-B there were 19(46.3%) patients with right side involved and 22(53.7%) with left side involved (Table 2).

The mean duration of the Hernia in Group-A was 39.32±13.22, while in the Group-B 70.07±11.00. The mean duration of the surgery in Group-A was 73.83±11.16 (minutes) and in Group-B 72.95 ±9.78 minute. The mean pain Score in Group-A was 2.024±0.88, and on the other side in Group-B the mean pain score was 2.97 ±0.85 (Table 3).

Table 1: Distribution of Age and Gender

Age	Group A (LWM)	Group B (HWM)
Mean±SD	40.66±10.52	4053±12.56
Male	17(41.5%)	20(48.8%)
Female	24(58.5%)	21(51.2%)

Table: 2 Anatomical side of hernia

Side of Hernia	Group A (LWM)	Group B (HWM)
Right	20(48.8%)	22(53.7%)
Left	21(51.2%)	22(53.7%)

Table: 3 Duration of Hernia, Surgery, inguinodynia (pain on visual analogue scale)

Age		Group A	Group B
Duration of Hernia	Mean ±SD	39.32±13.22	70.07±11.0
Duration of Surgery	Mean ±SD	73.83±11.16	72.95±9.78
inguinodynia	Mean ±SD	2.02±0.88	2.97±0.85

Table: 4 Inguinodynia stratified for Age groups, Anatomical Side of hernia and Duration of Surgery

		Group A	Group B	P value
Age groups	20-30 years	2.0±1.06	3.30±0.82	0.010
	31-40 years	2.0±0.85	3.22±0.83	0.004
	>40 years	2.04±0.86	2.72±0.82	0.012
Anatomical side of hernia	Right	1.95±0.88	3.158±0.95	0.000
	Left	2.095±0.88	2.81±0.73	0.006
Duration of surgery (minutes)	50-60	1.75±0.95	2.83±0.98	0.12
	61-70	1.82±0.882	3.12±0.83	0.002
	>70	2.25±0.85	2.96±0.85	0.007

The significant difference in the mean values of pain scores VAS in Group A and Group B in all the age groups i.e. 20-30, 31-40 and above 40 years as the p-values were significant (p-values=0.010,0.004 and 0.012). The significant difference in the mean values of VAS pain score in G roup A and Group B on both the anatomical sides of Hernia as the p-values were significant (p-value:0.000 and 0.006). There was no difference in the mean values of VAS pain score in Group A and Group B in the duration of 50-60 minutes (p- value:0.12) while there was significant1difference in the mean values of VAS pain score in group A and Group B in the duration of 61-70 minutes and above 70 minutes as the p-values were significant (p-values: 0.002 and 0.007) and on both the anatomical sides of Hernia as the p-values were significant (p-value:0.000 and 0.006).

DISCUSSION

The uses of lightweight mesh for repairing of inguinal hernia has been suggested to be compared with heavyweight mesh. However, Lightweight mesh is not commonly used by surgeons, possibly as a result of the high price & lack of confidence in previous evidence evaluation[2].

Since Lichtenstein introduced tension-free hernia repair, the rate of recurrence has dropped significantly to almost 0%. Marlex has become the normal prosthetic mesh for inguinal hernia repair, however it has a low biocompatibility and a density of 95 g / m^2 of artificial material 106;[9] As a result, it may result in a foreign body reaction or chronic uneasiness following surgery.

In our study, VAS was used to measure the degree of pain after surgery. Another 2017 study found that partially absorbable, lightweight prosthetic mesh is protected for repairing of inguinal hernia & improved functional overall quality of life after surgery[8].

According to Lee at al, the VAS was lower significantly in the LW 76 group. These findings are consistent with our findings, as VAS was lower in the LWM group compared to the HWM group in our study. When compared to polypropylene meshes, the biosynthetic meshes show good tissue integration, deposition of new collagen & continued neo-vascularization. As a result of less fibrosis, a lightweight mesh may be improved pain[10].

Most of the studies have compared heavy-weight and light-weight meshes in open tension-free hernia repair & found that heavyweight meshes reduced postoperative pain or foreign body sensation significantly[11]. Several studies have reported contradictory results. Some studies found no difference in pain scores, while others found poor results when lightweight meshes were used[12]. A hypothesized study that now the increased fibrotic response caused by the use of heavy weight meshes would be followed by a larger number of chronic pain & post-operative fibrotic modification, that can cause pain later so continues inflammatory response for 3.0 months after surgery[13].

According to Bangash et al In Group A versus Group B, mean score of visual analogue for postoperative pain at day 7.0 was 1.073 versus 1.31 (P = 0.0007) these results are similar to the findings of our study as in our study there was significant difference in the VAS pain score in both the groups. Another study found that slippage of the implanted mesh & also the pull of surrounding tissues could be causes of chronic pain or an increased risk of recurrence[7].

In our study, their difference was significant in the mean values if VAS pain score in both the groups when stratified for age groups, anatomical sites of Hernia and duration of surgery as their p-values were significant. In LWM group, the pain was lowest. Few more Studies reveal the frequency of mean pain scores following the preperitoneal placement of heavy weight meshes to be significantly greater on the visual analogue score. A study by Bitner et al [14] revealed visual analogue scores well decreasing after the TAPP procedure for 78 inguinal hernia. But this study was not comparing the postoperative pain scores by comparing different biomaterials and their construct.

According to a latest systematic review and meta-analysis of the use of light - weight vs heavy weight mesh in open inguinal hernia repair, using lightweight mesh decreased the incidence of chronic groin pain and the risk of developing other groin symptoms, including stiffness and the sensation of a foreign body[15].

Light weight meshes were first introduced in 1998 & their superiority over the heavy weight meshes is now usually accepted.[16] These meshes have enlarged pores (usually 3–5 mm

in diameter) or a small surface. They induce a less inflammatory response and, as a result, have greater flexibility & elasticity. The addition of the absorbable segment does in its part decrease the strength of the construct but the technical factors are truly believed to play a part. Furthermore the safety of the mesh in an infected environment is truly the benefit and actually cost-effective considering the expense of these meshes[17].

CONCLUSION

Ultra Pro LWM is more effective in terms of less post-operative pain as compared to standard polypropylene heavy weight mesh in patients undergoing open inguinal hernia surgery

Conflict of interest: Nil

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