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ORIGINAL ARTICLE

Comparison of prolene with parietex composite® mesh in laparoscopic intraperitoneal mesh hernioplasty for paraumbilical hernia.

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ABSTRACT… Objective: To compare the outcomes of prolene macroporous mesh with Parietex Composite® mesh in patients undergoing Laparoscopic hernioplasty for management of Paraumbilical hernia. **Study Design:** Prospective Comparative study. **Setting:** Jinnah Hospital Lahore. **Period:** 1st January 2016 to 1st January 2018. **Material & Methods:** A total of 100 patients with diagnosis of Paraumbilical hernia, aged >18 years were included. There were two groups. In group A (n=50) prolene macroporous mesh (Covidien) was placed. In group B (n=50) Parietex Composite® mesh (Covidien) was placed. After hernioplasty all patients were followed for a period of 2 years for evaluation of primary procedure and any complications like seroma, hematoma and intestinal obstruction. **Results:** The mean length of stay was 2.74±2.13 days in group A, versus 2.23±1.25 in group B (p-value 0.15). Seroma formation was seen in 4 (8.0%) patients in group A versus in 02 (4.0%) patients in group B (p-value 0.40). Hematoma formation was seen in 01 (2.0%) patients in group A versus 0.0% patients in group B (p-value 0.10). There was no recurrence and intestinal obstruction in any group in two years follow up. **Conclusion:** There was no difference in surgical outcome and the complication between two groups of patients undergoing laparoscopic Paraumbilical hernia repair with prolene macroporous and Parietex Composite mesh. Moreover, parietex composite mesh are difficult to insert and much expensive. Therefore, prolene mesh can be safely used in patients undergoing Laparoscopic Paraumbilical hernioplasty.

Key words: Complications, Paraumbilical Hernia, Prolene Mesh, Parietex Composite Mesh.

INTRODUCTION

Paraumbilical hernia is the one located near or at umbilicus. It is defined as hernia located up-to 3 cm below or up-to 3 cm above the umbilicus.[1] After inguinal hernia, it is the commonest hernia form in adult population. Incidence rate is 6% to 14% of all abdominal hernias in general adult population.[2,3] Up-to 90% of all Paraumbilical hernias are acquired and only 10% of these adult patients report to have hernias in their childhood.[3] Incidence is higher in female patients and in those with evidence of higher intra-abdominal pressure such as pregnant females, those with ascites, obese patients and having chronic abdominal distention.[4]

Use of mesh in the surgical management of paraumbilical hernia is well established treatment modality either performed using open or laparoscopic approach.[5] Frequently used mesh are either prosthetic or biological. Prosthetic mesh are principally made up of polypropylene, polyester, poly-vinylidene fluoride (PVDF) or polytetrafluoroethylene (PTFE).[6] It significantly lowers the risk of failure or recurrence of hernia.[7]

An ideal mesh should compose of materials that are chemically inert, and should produce inflammation and fibro-plastic response to incorporate it into the abdominal wall and should not produce foreign body reaction. Moreover, it should also be resistant to infections, sterilizable and non-carcinogenic.[8,9] Prolene based mesh materials are in wide clinical practice and are preferred materials for repair of inguinal hernia. Literature pertaining to its safety in laparoscopic

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paraumbilical hernia repair is limited. Till now most of the surgeons recommend dual layer (composite) mesh to be placed intraperitoneally as mesh will be in direct contact with abdominal visceras. Composite mesh is skirted polyester mesh with absorbable collagen film. Former allows the abdominal wall tissue in-growth whereas later prevent the occurrence of intestinal adhesion. Although composite mesh are considered to be more safe but these are 15-20 times expecive then PPM.

Now there is some growing evidence regarding the use of PPM in laparoscopic ventral hernia repair so we compared the outcomes of prolene mesh with Parietex Composite® mesh in patients undergoing laparoscopic hernioplasty for management of Paraumbilical hernia.

MATERIAL & METHODS

This prospective comparative study was conducted in Jinnah Hospital Lahore, within a duration of two years from first January 2016 to first January 2018.It was approved from ethical review board. The sample size was calculated using WHO calculator for two groups as 100 (50 each) cases using 95% level of significance and 80% power. It was nonprobability consecutive sampling. Cases were randomized according to computer generated software. 100 patients with diagnosis of Paraumbilical hernia, aged >18 years were included. Patients with complex hernias or those who were unfit for general anesthesia were excluded. Patients were divided into two groups; In Group A (n=50); prolene mesh and Group B (n=50); Parietex Composite® mesh was placed.

The procedure was performed under general anesthesia. All patients received prophylactic antibiotics. Patient was positioned supine. Pneumoperitoneum was created by veress method at palmer's point. Pneumoperitoneum was established to 15mmHg. After placement of first 10mm trocar, two additional 5mm trocars were inserted. Hernia contents were reduced and adhenolysis was done if any. Defect was sized and mesh was tailored to overlap fascial defect by 5cm. After introducing mesh through 10mm port it was tacked to posterior fascia using tacker. Omentum was spread over abdominal viscera mainly small intestine to prevent postoperative adhesion in patient in which prolene macroporous mesh was used. Sterile gauze ball was placed over hernia skin with sticking.

After hernioplasty all patients were followed till 2 years after primary procedure .Patients were called on 7th postoperative day in OPD to evaluate complication like seroma, hematoma. They were further followed every 06 months till 2years for, intestinal obstruction or recurrence.

All the data was entered in SPSS v25 software. Study outcomes were compared using chi-square/Fisher's exact test. P-value ≤0.05 was considered significant.

RESULTS

Demographic data was similar in group A and group B. Mean age of patients was 47.3±12.5 years in group A and 48.6±11.8 years in group B. 37 (74.0%) female patients in group A and 35(70.0%) in group B (Table-I).

Post-operative outcomes were also similar in group A and group B. Mean length of stay was 2.74±2.13 days in group A versus 2.23±1.25 in group B (p-value 0.15). Seroma formation was seen in 4 (8.0%) patients in group A versus in 02 (4.0%) patients in group B (p-value 0.40). Hematoma formation was seen in 01 (2.0%) patients in group A versus in 0.0% patients in group B (p-value 0.10). There was no incidence of recurrence and intestinal obstruction in two years follow up. (Table-II).

	Group A (Prolene Mesh)	Group B (Parietex Mesh)
Age (in years)	47.3±12.5	48.6±11.8
Male/Female Gender	13 (26.0%) /37 (74.0%)	15 (30.0%) / 35 (70.0%)
ASA I-II / III	46 (92.0%)/4 (8.0%)	47 (94.0%)/3 (6.0%)

Table-I. Demographic Data

	Group A (Prolene Mesh)	Group B (Parietex Mesh)	P-Value
Length of Stay	2.74±2.13	2.23±1.25	0.15
Seroma	04 (8.0%)	02 (4.0%)	0.40
Hematoma	01 (2.0%)	00 (0.0%)	0.1
Recurrence	00 (0.0%)	0 (0.0%)	--------
Intestinal Obstruction	00 (0.0%)	0 (0.0%)	--------

Table-II. Comparison of study outcomes.

DISCUSSION

Paraumbilical hernia is a common problem in adult population, with the female population having higher incidence in comparison to males.[10,11] Literature has reported multi-parity, obesity, ascites and carcinoma as risk of factors of paraumbilical hernia. Many techniques for repair are developed and described in literature.[11,12] Formerly open hernioraphy/hernioplasty has remained the gold standard for the management of hernia.[13] With the advent of laparoscope, the trend of open surgery has shifted to laparoscopic technique.[13,14] which utilizes Intraperitoneal placement of mesh. It carries advantage of uniform distribution of increased intra-abdominal pressures, along the whole mesh, which is contrary to pressure distribution along a tenuous suture line, as happens in traditional open suture repairs and helps to keep the mesh in place rather than displace it, as is the case in conventional overlay repairs. In laparoscopic approach, surgeon can clearly and definitively define the margins of the hernia defect and can identify other undiagnosed defects that may not be clinically apparent preoperatively. One of the commonest cause of high recurrence rate following traditional repairs is the phenomenon of occult hernias. These are the hernias liable to be missed during an open repair.

Laparoscopic repair has the advantage of better overlap beyond the defect with mesh and helps to prevent displacing the mesh into the defect. In the open approach, overlap of 3 to 5 cm requires extensive soft tissue dissection, with resultant increase in wound complications. This benefit is more prominent in overweight patients and those with bigger defects.[15]

The use of mesh in hernia repair has created revolution in the management of hernia, as these are effective in decreasing the rate of recurrences.[16,17] However, there is still an ongoing debate regarding the search of ideal mesh materials especially in laparoscopic umbilical hernia repair that is associated with minimum number of complications. Previously most of the surgeons only recommend the dual layer (Composite) mesh with one side consisting of an absorbable hydrogel barrier facing the bowel which reduces the risk of bowel adhesions. The side facing the abdominal wall is non-absorbable prolene and is responsible for fibrosis.[18]

Recent studies recommend now the use of prolene mesh to be used safely in laparoscopic umbilical hernia repair.[19, 20,21]

In current study, we evaluated the outcomes of two different mesh materials for laparoscopic mesh hernioplasty of paraumbilical hernia.

We did not find any significant difference in the outcomes i.e. length of stay, seroma formation, hematoma formation and recurrence with prolene macroporous mesh and parietex composite mesh by (Covidien) for hernioplasty. We had follow up for two years but not even a single case reported with intestinal obstruction in which prolene mesh was used. The rate of complications was slight high (Seroma 8.0%, Hematoma 2.0%) in prolene mesh but it did not achieve statistical significance. ($p>0.05$).

A study by Biondo-Simões compared the properties of four mesh materials regarding the formation of adhesions after intra-peritoneal placement. The authors reported that the rate of adhesion formation and length of adhesions is same as that of prolene and parietex composite mesh. They reported that vicryl mesh are associated with least number of adhesions formation.[22] The results were in accordance with our study.

The results of our study were in agreement with various reports from plastic and reconstructive surgeons, who have used PPM in open surgical

reconstruction of complex abdominal wall defects without compromising the safety of patients. According to Mathes et al.[23], for hernias with stable skin coverage, intraperitoneal placement of the Prolene (PPM) mesh is recommended, and has not been related with intraabdominal complications or failure of hernia repair. Many other plastic surgeons are using PPM intraperitoneally successfully.[24]

Alkhoury et al.[25] reported results of laparoscopic ventral hernia repair are comparable in the PPM and newer mesh, but PPM at a significantly lesser cost. Their study included 141 patients who had undergone laparoscopic VHR with PPM, of which123 patients were available for follow-up. The median follow-up period was 40 months. Partial transient small bowel obstruction occurred in 2.4 % of patients, which settled with conservative management and did not require surgery. Wound infection occurred in 3.2 % patients, port site hernia in 1.6 %, seroma in 0.7 % and recurrence in4.8 % of patients.

The disadvantage of prolene mesh is that these are hydrophobic and association with some degree of scar formation and contraction in long term sequellae.[26,27] Other concern is if the mesh is in direct contact with intestines, then the question of safety arises. Concerns regarding intraperitoneal polypropylene mesh are adhesions (with consequent intestinal obstruction), intestinal fistulization, sinus formation and infection. These complications may require surgery to relieve obstruction, removal of the mesh to treat infection or fistula and sometimes even intestinal resection. Mesh removal may be followed by recurrence of hernia.[28] In present study we did not face any incidence of adhesions using prolene mesh. The reason for this may be that we spread omentum over the viscera so that the viscera don't adherent to mesh.

It is reported that, adhesion of intestine with hernia meshes usually occurs within a week of the initial surgery. Thereafter, a layer of peritoneal cells coat the mesh and prevent the further risk of adhesion formation.[29] Early protection of abdominal viscera from mesh is by omentum and later on mesh gets peritonealised. We however, did not encounter intestinal obstruction in any of the patients in two years followup.

In a study by Lamber there was no significant difference between polypropylene and collagen coated polyester mesh when adhesion, degree of adhesion and strength needed to cause rupture were evaluated. However, the polypropylene mesh had significantly higher surface involved with adhesions when compared to collagen coated polyester mesh mesh. Based on these data, they recommend the use of polyester with collagen coating mesh for incisional hernia repair.[30]

Cost remains the major concern, as newer meshes are 15-20 times costlier then PPM.[28]

LIMITATIONS

Results of the study needs to be seen in context of its imitations. We relied on a small sample size and objective evaluation of two treatment modalities in a single center. However, similarity of our results with previous work done across the globe suggest generalizability of our results. We recommend large, multicentric randomized control trial to evaluate long-term results.

CONCLUSION

There were no differences in the complications rate of prolene and Parietex Composite mesh in patients undergoing laparoscopic Paraumbilical hernia repair. Therefore, prolene macroporous mesh can be safely used in patients undergoing Paraumbilical Laparoscopic hernioplasty.

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