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Original Research Article

Mesh repair versus mayo repair for paraumbilical hernia: a comparative study

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ABSTRACT

Background: Para umbilical hernia is a multifactorial and complex process they are most commonly found along the midline linea Alba. This study aims to assess the efficacy of mesh repair in comparison to Mayo Repair and to analyse the morbidity associated with the management.
Methods: The study was conducted in Victoria Hospital and Bowring and Lady Curzon Hospital attached to Bangalore Medical College and Research Institute, with clinical features suggestive of Paraumbilical Hernia (Minimum 30 cases each) from October 2010 to September 2012. Pediatric age group and those patients requiring emergency surgery have been excluded. 30 patients underwent Mayo's repair and 30 patients underwent Mesh repair. Follow up period ranged from 2 months to 24 months.
Results: paraumbilical hernia was found more commonly between 4rd and 6th decade of life with female: male 2.3:1. Most common presenting symptom was swelling with cough impulse (36.5%) and reducibility present. Commonest predisposing factors were multiparty and obesity. Percentage of early postoperative complications in Mayo's repair was 13.6% and in Mesh repairs 6.6%. No statistical difference was noted. Percentage of recurrence following Mayo's repair was 10% and following mesh repair was 0%. Postoperative complications like seroma, infections were similar in both procedures (Mayo's repair and Mesh repair).
Conclusions: Prosthetic mesh repair is a technique with good post-operative outcome, low recurrent rate and excellent patient satisfaction. It could become the gold standard in adult umbilical and paraumbilical hernia repair, in the future.

Keywords: Multiparty, Mayo's repair, Mesh repair, Paraumbilical hernia, Smoking

INTRODUCTION

Midline hernia occurring through linea Alba abutting superiorly or inferiorly on the umbilicus is called as paraumblical hernia.[1] Paraumbilical hernias constitute one of the common hernias of adulthood. Formation of Paraumbilical hernia is a multifactorial and complex process they are most commonly found along the midline linea Alba. Though they are typically supraumbilical in location.

Paraumbilical hernias are relatively common in adult population, more common in female with ratio of 3:1.[2] In 90% of the patient it is an acquired defect that is a direct result of increase abdominal pressure include multiparous status, obesity, older age, emphysema, asthma and other

chronic lung conditions, prostatisum, abdominal distention, steroid use, coughing and lifting weight. Paraumbilical Hernia is often asymptomatic or produces intermittent complaints. Discomfort or a ventral bulge is the most common initial symptom, most common content is omentum, but bowel obstruction can also be the first symptom that forces a patient to seek medical attention. Incarceration and strangulation are more common if the hernia neck defect is small.

Repair of paraumbilical hernia was earlier performed by Mayo's repair, but it has high recurrence rate upto 28% to30%.[1] Thus it has been replaced with Mesh repair as standard procedure for paraumbilical hernia repair, it has low recurrence rate compare to Mayo's repair. Umbilical hernias are amongst the commonly occurring abdominal wall defects, not much work has been done to record the incidence. Western studies quote an incidence 4.65% among all types of hernias.[3] the management of paraumbilical hernias remains one of the common surgical problems.[4] a number of operations are presently employed in the management of paraumbilical hernia. Hence, this study taken upto assess the efficacy of mesh repair in comparison to Mayo Repair and to analyze the morbidity associated with the management.

METHODS

This is a Prospective study done at Victoria and Bowring and Lady Curzon Hospital attached to Bangalore Medical College and research institute for the treatment of paraumbilical hernia from November 2010 to September 2012. All the materials for this study have been taken from 60 patients who got admitted to Victoria and Bowring and Lady Curzon Hospital. Informed written consent was obtained after explaining the surgical procedure and its results.

The study criteria include, randomly selected 60 paraumbilical hernia patients and excludes Patient with severe co-morbid conditions (severe cardiopulmonary disease, uncontrolled ascites), recurrent hernia, pediatric patients and patients undergoing emergency surgery are excluded.

Clinical history regarding duration of hernia, progression, associated complaints like pain in the swelling or abdomen, vomiting, reducibility, chronic cough, constipation, difficulty in micturition, abdominal distension-history suggestive of ascites and other causes of abdominal distension, number of pregnancies, previous surgery for same problem is collected. In local examination special attention was given to the position, size, shape, composition, cough impulse, reducibility, skin over the swelling and size of defect in linea alba.

Pre-surgical technique

Cases were prepared for surgery after preoperative correction of anemia, hypertension, diabetes and local skin conditions. All patients underwent surgical procedure after preoperative preparation. All patients received one dose of preoperative antibiotic 1gm of 3rd generation cephalosporin during or immediately after induction of anaesthesia. The anaesthesia of choice was sub arachnoid block or epidural anaesthesia with mild intravenous sedation. On operative table betadine scrub given to anterior abdominal wall. Surgical procedures done were Mayo's repair and Prosthetic mesh repair. Thirty patients were selected for particular procedure randomly. Patients who underwent Mayo's repair and 30 patients who underwent polypropylene mesh repair.

Surgical technique

Mayo's repair

After anaesthesia patient is laid on supine position, parts painted, and drapes are applied to allow access to the umbilical area. A transverse elliptical incision is made enclosing the umbilicus and the skin covering the hernia. It should extend laterally on each side for at least 5cm beyond the protuberance. It is deepened through subcutaneous fat until the glistening surface of the aponeurosis is exposed. The neck of the sac is generally free from adhesions and is opened first. Before doing so, the aponeurosis is cleared centrally from all directions, until the neck of the hernia is exposed of the level where it emerges through linea Alba. A small incision is made in the fibrous coverings of the neck of any convenient point on its circumference and is carefully deepened until the sac itself has been opened. A finger is introduced and is passed round the inside of the sac to determine the presence of any adhesions. The remaining circumference of the neck of the sac is then divided with scissors, the finger being used to protect the contents from injury. The central island comprising the sac together with attached ellipse of skin and fat is now joined to the abdomen only by contents is carefully examined. If they consist of omentum, which is ischaemic, it can be ligated and excised, if it is healthy, it can be reduced into peritoneal cavity. If bowel is the content, sac is opened up as far as possible. The sac is now gradually turned inside out, and contents gently peeled off its interior. Adherent omentum removed along with the sac. Adhesions between adjacent coils of intestine are released as far as possible and the hernial contents are returned to the abdominal cavity.

Mesh repair

Steps for surgery are similar to Mayo's repair till the hernial sac and its contents are managed. Polypropylene mesh is used for repair. Most commonly used size of mesh is 6" x 3". If defect is larger, larger sized mesh is used. After exposing the defect and excising excess part of hernial sac, peritoneum is closed using vicry 2-0, mesh is placed beneath the peritoneum. It is fixed to rectus sheath using prolene suture. Incision closed after keeping suction drain. In all patient suction drain was kept (No. 16) and skin closed with skin staplers or ethilon.

RESULTS

Paraumbilical hernia is more common between 4rd and 6th decade of life, more common in females (65%) than in males (35%).There is no difference in age distribution of cases between males and females. Age distribution in Mesh is 44.70±12.55 years; age distribution in mayo's is 46.27±13.98 years. Most common symptom was swelling around the umbilicus, may or may not be associated with pain. Swelling was reducible and cough impulse was present in 93.33% of patients. Skin changes were present in 8.3% of cases.

Table 1: Size of defect.

Size of defect (cm)	Mesh	Mayo's
4	13	18
4-6	13	11
>6	04	01

Most common precipitating factor in females is multiparty 87.1%, next common precipitating factor is obesity is 33.3%. Most common precipitating factor in males is smoking -61.9% followed by COPD. As stated in international literature paraumbilical is more common in obese and corpulent women. This has been substantiated by our results. Size of the defect was <4cm in 51.66% of patients, between 4-6cm in 40% of patients >6cm in 8.33% of patients.

Table: 2: Complication of the procedure.

Complications	Mayo's Repair (n=30)	Mesh Repair (n=30)	Significance
Seroma	4	2	P>0.05 (NS)
Wound infection	2	1	P>0.05 (NS)

Diabetes mellitus (20%) the most common associated disease followed by Hypertension (16.6%) and Hyphothyroidism - 3.33%. Most common postoperative complication were Seroma - 13.3% in Mayo's repair, 6.6% in Mesh repair, Wound infection - 6.6 % in Mayo's repair, 3.3% in Mesh repair**.** There is no statistical difference between mean size of the defect for which Mayo's repair and Mesh repair was applied.

Table 3: Recurrence of the procedure.

Procedure (n= 30)	Recurrance	Percentage
Mayo's	01	3.33%
Mesh	00	00

Size of defect for which Mesh repair was done is mean 4.88±1.77cm and size of defect for which Mayo's repair was done is 4.08±1.32cm. There was one recurrence (3.33%) following 30 cases of Mayo's repair. There were no recurrences following Mesh repair. There is no significance difference in recurrence following Mayo's repair and mesh repair, p value = 0.207, but there is statistical trend towards the difference between two procedures regarding recurrence, this trend may be converted to significance difference, if sample size and follow up period is increased.

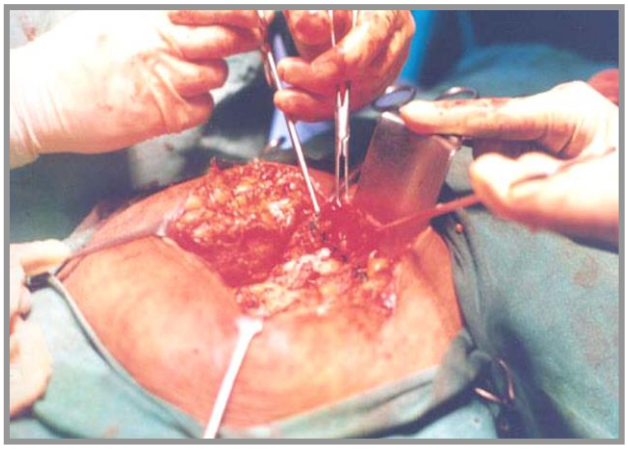

Figure 1: Mayo repair- 1st layer- double breasting.

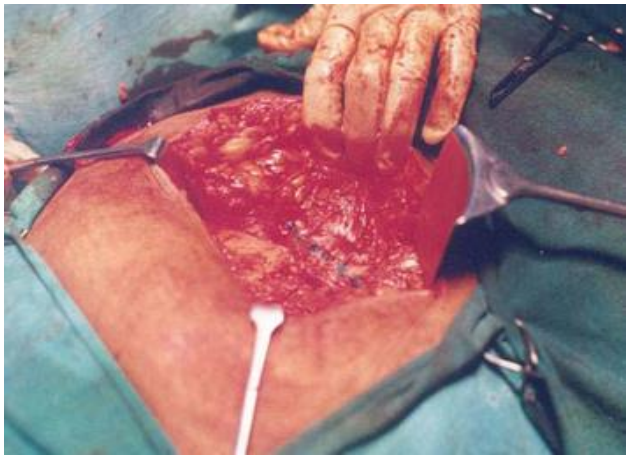

Figure 2: Mayo repair completed.

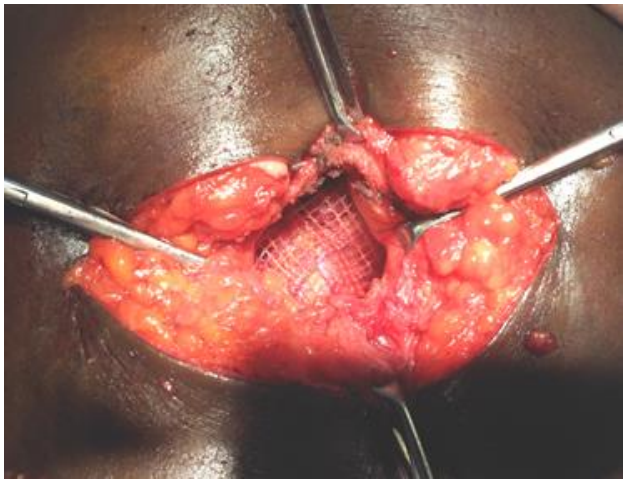

Figure 3: Mesh placement over peritoneum (Inlay).

Figure 4: completed mesh repair with drain insitu.

DISCUSSION

Paraumbilical hernia is more common in patients aged between 40-60 years in this study. Youngest patient was who presented with paraumbilical hernia in this study was 20 years old. It found that paraumbilical hernia is rare after 70 years as only one patient was >70 years old in both mayo's and mesh group. Paraumbilical hernia is more common in females. In mayo's group (n=30), 18 female 60% and 12 were male 40% and in mesh group (n=30), 21 were female 70% and 09 were male 30%. The sex ratio in the ratio quoted in international literature. 1:2.3, Maingo Abdominal operations - 1:3.[5-7] In this study is 2.3:1. There is no significance difference in age distribution in males and females, as disease is more common between 4rd and 6th decade in both sex. All 60 (100%) patients were presented with chief complaint of swelling around umbilicus, 22 (36.5%) patients had pain in the swelling or dragging type of pain abdomen and 5 (8.3%) patients had skin excoriation along with pain and swelling.

Most of the patients had swelling for 6 months before they presented to hospital. Maximum duration of symptoms was 2.5 years and minimum duration was 1 month. Even though it was stated in literature that most of the paraumbilical hernias are irreducible or partially reducible, in this study cough impulse was present and swelling was reducible in 93.33% of patients. Only 4 patients had absent cough impulse and irreducible swelling. Overlying skin changes were presented in longstanding cases 5 (8.3%). In females, most common precipitating factor was multiparty. Out of 39 patients 34 (87.1%) were multipara. This can be attributed to stretching and weakening of anterior abdominal wall musculoaponeurotic layer. Next common precipitating factor was obesity-13 patients (33.3%). Pathogenesis can be attributed to theory explained by Mayo-obesity causes downward traction on the abdominal wall bearing on a fixed point on umbilicus associated with an increase of vertical dimension of abdominal wall.[1,2] Fat penetrates muscle bundles and layers, weakens aponeurosis and favours appearance of hernia. Other less common precipitating factors were diabetes, hypertension, chronic cough and constipation.

In males most, common precipitating factor was Smoking -13 patients (61.9%) followed by COPD patients. Smoking is an important predisposing factor in development of inguinal hernia as it causes degeneration of collagen fibers same theory applied to paraumbilical hernia. Other precipitating factors are obesity and heavy manual work. Some patients had more than one precipitating factor and some patient did not have any precipitating factor. Twelve patients were diabetic, 10 patients were hypertensive, and 2 patients were hypothyroidism. These associated diseases were treated adequately before surgery; hence there was no much effect on the outcome following surgery.

In this series, 30 patients underwent polypropylene mesh repair and 30 patients underwent Mayo's repair. Out of 30 patients who underwent Mesh repair, all were Inlay (preperitoneal) procedure. Although cases were randomly selected for particular surgical procedure, size of defect and age of patients has been considered. Among 30 patients who underwent mesh repair 13 patients had defect size of <4cm, 13 patients had defect size of 4-6cm and 4 patients had defect size of >6cm. Mean size of defect was 4.88 cm with SD 1.77cm. Among 30 patients who underwent Mayo's repair 18 patients had defect size of < 4 cms,11 patients had defect size of 4-6 cms and one patient had defect size of >6cm. Mean size of defect was 4.08cm with SD 1.32cm. There is no statistical difference in defect size for which Mayo's and Mesh repair has been done. In this series, most common postoperative complications were Seroma - 13.3% in Mayo's repair, 6.6% in Mesh repair, Wound infection - 6.6% in Mayo's repair, 3.3% in Mesh repair. No patient required removal of mesh because of infection, as infection was superficial and responded well to antibiotics. There is no significant difference in percentage of postoperative complications between Mayo's repair and Mesh repair. Incidence of immediate postoperative complication is high compared to study conducted by Arryo A, Garcia P et al during 2001.[8-10] But there is no difference in postoperative complication between Mayo's repair and Mesh repair similar to that study.

In this series, out of 30 patients who underwent Mayo's repair one patient had recurrence of paraumbilical hernia (3.33%), there were no recurrence following Mesh repair. In study recurrence rate following suture repair (Mayo's repair) was 11% and 1% following Mesh repair. Although there is no significance difference in recurrence following Mayo's repair and Mesh repair (p=0.207), there is statistical trend towards difference in recurrence following Mayo's repair and Mesh repair i.e. high recurrence rate following Mayo's repair. Despite the high frequency of umbilical hernia repair procedure, disappointing high recurrence rates, upto 54% for simple suture repair. In total, consecutive patients underwent operative repair of an umbilical hernia. 28% of the

patients were female (n=37). In 12 patients (11%) umbilical hernia repair was achieved with mesh implantation. Fourteen umbilical hernia recurrences were noted (13%); none had been repaired using mesh. Similar result was observed in this hospital series where a recurrence of 3.33% occurred with suture repair.

Limitation of study was sample size and follow up period is small to show significance difference between two procedures.

CONCLUSION

Prosthetic mesh repair is a technique with good post-operative outcome, low recurrent rate and excellent patient satisfaction. It could become the gold standard in adult umbilical and paraumbilical hernia repair, in the future.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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