

## A Comparative study of Mayo's Repair and Mesh Repair with respect to Postoperative Complications

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### ABSTRACT

This prospective study included 60 patients with umbilical and para-umbilical herniae who had operation with two different techniques. The purpose was to compare the merits and demerits of Mayo's repair and tension free mesh repair. Inclusion criteria was, patients above 12 years of age, of both sex groups. Patients having diabetes mellitus, hypertension, huge hernias (i.e. diameter more than 7cm) recurrent hernias, cirrhosis of liver and chronic illness and below 12 years were excluded. The casual relationship of age and sex was studied which showed the maximum age incidence in 31-45 years of age, the male to female ratio remained 1:3.6 and majority of cases 78.33% were of para-umbilical hernia. The need for post operative analgesia was higher in Mayo's repair ranged between 3-16 doses(mean 6.64) as compared to mesh repair which ranged between 0-4 doses(mean 2.5). There was fixed protocol for analgesic requirement. The period of post operative hospital stay was observed to be higher in Mayo's repair (mean 1.8 days) as compared to mesh repair (mean 0.33 day). The complication rate in Mayo's repair was 70% as compared to mesh repair which was observed 30%. In this study there was single recurrence in Mayo's repair which was observed at ninth month of follow up, while no recurrence was seen in mesh repair.

**Key words:** Mayo's repair, mesh repair, recurrence, complications

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The word hernia originates from the Greek word hernios which means branch or off shoot (S. Manzar, 1993). When umbilical scar fails and stretches, the abdominal contents protrude through the opening and constitute an umbilical hernia. Midline hernias abutting on the umbilicus superiorly or inferiorly are also included in this group and are known as para umbilical hernias (Abrahamson, 1990).

The umbilical hernia is a common problem in childhood and the incidence of umbilical hernia in children varies with weight, age and race (Vohra, 1977). Umbilical hernia is most common during the first year of life with decreasing incidence there after. It may have familial predilection, tend to occur in twin births, breech presentations and infants born with an unusually long umbilical cord.

The umbilical hernia in adults occurs long after closure of the umbilical ring and is due to a gradual yielding of cicatrical tissue closing the ring.

The hernia is the para-umbilical which occurs through a defect adjacent to the umbilicus. The usual site is just above or below the umbilicus between the two recti. The predisposing factors include female gender, obesity, ascites, large intraabdominal tumours. The higher incidence of para-umbilical herniae in women was attributed (Mair, 1954) to pregnancy and obesity. In obesity an increased bulk of abdominal contents increases the intra-abdominal tension. Moreover, the fat weakens the umbilical and paraumbilical tissues. The midline aponeurotic area

is thus overstretched in both its longitudinal and transverse axis and may easily give way.

The vertical repair for umbilical and paraumbilical hernia in vogue commonly failed for two reasons.

- i. Since the sutures are placed parallel to the direction of aponeurotic fibers, tension causes tissue splitting, thus decreasing suture holding power.
- ii. Increased intra-abdominal pressure on vertical repair tends to distract the hernial margins since the lines of force are transverse and the fibers have been divided rather than separated (Lichten, 1976).

In Mayo's repair, attempts at widening the hernial defect in transverse direction cuts more aponeurotic fibers and favours recurrence at lateral extremities of the repair. Recurrence often occurs much earlier than expected, and has been reported to occur in the first few post operative months (Mair, 1945 cited Askar, 1978). It was believed that the wide area of contact between upper and lower fascial sheets would promote strong adhesion between them and ensure a good repair. Another objection in transverse repair (such as Mayo's) is increased separation of recti muscle which predispose to recurrence of hernia (Mayo 1901, Narayn Singh, 1993). Therefore with an appreciation of the changes in the aponeurotic pattern which lead to the production of hernial defect it seems evident that

neither a horizontal transverse overlap (Mayo's), nor a vertical repair would be physiologically sound.

The identification of cause of recurrence is always difficult (Gersor, 1987). The factors believed to result in recurrence of hernia are:

- a. Closure of defect under tension.
- b. Poor surgical technique
- c. Post operative wound infection.
- d. Post operative cough.
- e. Obesity

Of these factors, wound tension is probably the most important. Tension is the enemy of good wound healing because it favours local necrosis and infection. It is one factor that the surgeon can control by the use of prosthetic material to occlude the tissue defect (Danie, 1952; Hope, 1985). With the use of modern mesh prosthetic, it is now possible to repair all hernias without distortion of the normal anatomy and with no suture line tension. The technique is simple, safe, less painful, effective and easily applicable and should be preferred because of low complications and recurrence rates (Irving L Lichtenstein et al, 1989, H Gokbayir et al, 1996).

## AIMS AND OBJECTIVES

1. To compare the merits and demerits of *Mayo's repair* with *mesh repair* especially with respect to
  - a. Post operative complication like wound infection, pain & fever and recurrence.
  - b. Postoperative hospital stay
  - c. Need of post operative analgesia.
2. To find out the more efficient method of repair of umbilical hernias.

## MATERIALS AND METHOD

This prospective study was carried out at Mayo Hospital, Lahore in patients presenting with umbilical and paraumbilical hernias from June 2005 to May 2006. Study included sixty patients with age ranging from 12 to 65 years, who had hernia of small and medium size (3-7cm diameter). Patients of both sex groups were included in this study.

Patients who were below the age of 12 years, known diabetics, hypertensive, had a large & recurrent and obstructed hernia, cirrhosis of liver, ascites and carcinoma were excluded from this study. These patients were divided into two groups each comprising of 30 patients by allocating odd and even serial numbers.

**Group I** This group was composed of 30 patients who had odd serial numbers and *Mayo's operation* was carried for repair.

**Group II** In this group again there were 30 patients with even serial numbers and mesh hernioplasty was used for repair.

All these patients were evaluated by history, clinical examination and investigations before undergoing operation. Postoperatively the patients of both groups were looked for pain and fever, wound infection, hospital stay analgesic requirements and after discharge they were followed for recurrence for two years.

## RESULTS

This study comprised 60 cases with umbilical and para-umbilical herniae in total, who under-went surgery with two different methods of repair. The second part of the study i.e. follow up of cases carried out for two years. Data was collected and analysed.

Results showed that the disease is more common in female with the ratio of 1:3.6 (Table 1) in the third decade of life (Table 2). The study revealed that paraumbilical hernia is the most common in female patients.

Table 1. : Distribution of patients according to sex (n=60)

Sex	No. of Pts.	%age	P/Value
Male	13	21.66	<0.0001
Female	47	78.34	*

\*= Significant

Table 2: Age incidence among male and female patients (n=60)

Age (Years)	Male	Female	Total
12-20	1	1	2
21-30	1	7	8
31-40	6	22	28
41-50	3	14	17
51-60	0	3	3
61-70	2	0	2
Total		60	60

Need for postoperative analgesia was studied. All patients received same analgesic i.e. Ketorolac and prophylactic antibiotics. Total number of analgesic doses were counted from the time of recovery of anaesthesia till the discharge from hospital (Table 3).

Table 3 Distribution of patients according to need of post operative analgesia in relation to the type of repair (n=60)

Type of repair	Dose ranged (mean)	P/Value
Mayo's repair	3-16(6.64)	P>0.05
Mesh repair	1-4(2.7)	NS

NS = Non significant

Post operative complications were studied in both procedures. Both groups of patients were looked for complications such as pain and fever, wound infection etc. and hospital stay. After discharge they

were followed for 2 years. All complications were more common in Mayo's repair (Table 4 & 5).

Table 4: Postoperative complications (n=60)

Complication	Mayo's repair	Mesh repair	P/ Value
Prolonged pain	16(53.33%)	5(16%)	P<0.05*
Fever	5(16.66%)	2(6.66%)	P>0.3 NS
Wound infection	2(6.66%)	1(3.33%)	P>0.5 NS
Infection of the mesh	-	1(3.33%)	
Haematoma	-	1(3.33%)	
Recurrence	1(3.33%)	-	-

\* Significant, NS = Non significant

The period of return to normal activity was 10-14 days (mean 11.46 days) while in Mayo's repair it ranged from 10-30 days (mean 16.76 days)

Table 5: Study of the postoperative hospital stay and return to the normal activity in relation to the type of repair (in days) (n=60)

Days	Mayo's repair	Mesh repair
1	0	11
2	10	16
3	7	3
4	3	-
5	5	-
6	2	-
7	1	-
8	2	-
Mean stay	1.83	0.33
Return to normal activity	10-30 (16.76)	7-12 (9.6)

Follow up for recurrence was carried for a period of 2 years. In 30 patients operated with tension free repair follow up was completed upto 2 years while hernia repaired with Mayo's technique 30 patients completed their follow up. There was single recurrence in all cases repaired with Mayo's technique at ninth month of follow up, while no recurrence was observed in tension free mesh repair.

## DISCUSSION

The umbilical and paraumbilical hernia is unsightly and not infrequently painful. Incarceration, obstruction and strangulation are common, hence surgical treatment should always be recommended (Devlin, 1988). Although it is a common surgical problem, but there is no consensus on the operative procedures and the reported recurrence rate is quite high (Fischer, Turner, 1974). Recurrence free repair continues to challenge the general surgeon, despite various techniques. The common principle underlying

all these techniques is approximation of the fibroaponeurotic linea alba on the anterior rectus sheath to obliterate the hernial defect. The recurrence of hernia is an operative failure resulting from weakness of repaired area necessitating further operation (Devlin, 1988). The factors believed to result in recurrence of hernia include: faulty technique, infection, post operative cough and obesity, however in an individual case the cause of recurrence may be difficult to identify. Of all the factors responsible for recurrence, wound tension is the prime aetiologic factor for most herniorrhaphy failure. Tension is the enemy of good wound healing because it favours local necrosis and infection. It is one factor that the surgeon can control by the use of prosthetic material to occlude the tissue defect (Danie, 1952).

The Mayo's repair has its inherent demerits due to the fact that the separation of the recti muscles is enhanced and that linea alba is used for repair, predisposing to hernia recurrence through the gap between recti muscles (Narayan Singh, 1993). Further more transverse extension of the defect at lateral ends to allow for ample overlap renders the rectus sheath weaker and repair creates undue tension, resulting in high incidence of recurrence (Berman, 1945, Dietel, 1978).

The basic principle of mesh hernioplasty in umbilical hernias is to make tension free repair. It is achieved without enlarging the defect at both lateral extremities and closing the aponeurotic defect with prosthetic mesh to avoid tension. Following the same basic principles this prospective study was designed to find out the most efficient method of repair in patients who presented with umbilical/paraumbilical hernias at Mayo Hospital, Lahore.

Need of postoperative analgesia ranged between 3-16 doses in Mayo's repair as compared to mesh repair which ranged between 1-4 doses, other series has not mentioned the analgesic requirement. The difference of analgesic requirement i.e. less dosage in hernioplasty is due to tension free repair.

In this study post operative hospital stay was higher in Mayo's repair and ranged between 2-8 days as compared to mesh repair which ranged between 1-3 days.

The period of return to normal activity was higher in Mayo's repair, ranged between 10-30 days while in mesh repair it ranged 7-12 days with significant correlation. Other series has not mentioned the period of return to the normal activity. Hence the hernia repaired with mesh proved to be short stayed hospitalization with early return to normal activity. The difference is because the patient gets early pain free in tension free mesh repair as compared to Mayo's repair

Overall complications were higher in Mayo's as compared to mesh repair. In mesh repair, one patient (3.33%) developed haematoma which was evacuated successfully without removal of mesh, one patient (33%) developed superficial wound infection and two (6.66%) patients developed fever and one patient (3.33%) developed infection of mesh. While in Mayo's repair two patients (6.66%) developed wound infection, and five (16%) patients developed fever. In tension free mesh repair five (16%) patients complained of pain upto three months while in Mayo's repair sixteen (53%) patients complained of pain at operative site (upto 3 months). This difference is because of less pain in tension free repair.

The operative treatment of umbilical hernias by conventional methods, i.e. Mayo's repair, the incidence of recurrence varies from 20-40% (Kelly, DuBose) Askar and Omar (1978) observed one recurrence in seven patients in whom defect was closed with mattress sutures, while no recurrence was observed in onlay darning technique, over the follow up of 4-5 years. Study of Narayan Singh (1993) by using rectus repair technique in 55 cases (11 umbilical 44 para-umbilical) observed recurrence of 1.8% after follow up of 18 months. On analysing the results of recurrence in this study, it was observed that there was single recurrence (3.33%) in Mayo's repair, but no recurrence was seen in mesh repair within one year of follow up. While examining the patient for cause of recurrence, it was found that she was pregnant, which had probably increased the intra-abdominal pressure leading to recurrence. In this study mortality remained zero.

On the basis of post operative pain, short hospital stay, early return to normal activity, overall minimum complications and no recurrence, the tension free mesh repair is superior than Mayo's repair. The short stay surgery is much feasible even today or in days to come.

Experience with mesh repair in umbilical hernias is still limited which needs further study. International data show no recurrence at all.

Our study is limited to 60 cases which proved that tension free mesh repair for umbilical/para-umbilical hernias is a very effective method with regards to morbidity and recurrence.

## CONCLUSION

Good results have been reported with tension free mesh repair as regards to recurrence and with minimum post operative pain as compared to Mayo's repair. The other advantages being a shorter hospital stay and early return to routine activity. The overall tension free mesh repair is also cost effective in terms of short hospital stay and less need of analgesia as compared to Mayo's repair.

In our opinion tension free repair is a safe, easily applicable method that has to be preferred technique because of its low complications and free of recurrence rate.

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