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# A COMPARATIVE STUDY OF ONLAY AND PRE-PERITONEAL OPEN MESH REPAIR IN THE MANAGEMENT OF UMBILICAL HERNIA IN ADULTS

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| **Dr M. Krishna Naik** | Professor, Dept of General Surgery, Kurnool Medical College |
| **Dr Pendyala Sri Harsha*** | General Surgery Resident, Kurnool Medical College*Corresponding Author |
| **Dr Kalubandi Uday Shankar** | General Surgery Resident, Kurnool Medical College |

**ABSTRACT** **BACKGROUND** Umbilical hernias in adults are commonly acquired hernias. These are more common in women and in conditions like pregnancy, ascites, obesity etc.Primary closure of umbilical hernia had a high recurrence rate. Now, mesh repair is standard. However, the plane of mesh placement is still under debate due to the range of complications associated with each method.

**KEYWORDS :** Mesh repair; onlay; pre-peritoneal; seroma; wound infection

## INTRODUCTION

Hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls. These defects are seen most commonly in the abdominal wall due to man's erect posture.

Umbilical hernias occurs commonly in infants. They close spontaneously by 2 years of age. Those that do not close even after 5 years of age are repaired surgically.

Umbilical hernias in adults are commonly acquired hernias. These are more common in women and in people with causes of increased intra-abdominal pressure such as pregnancy, ascites, obesity etc.

Umbilical hernia is more common in those who have only a single midline aponeurotic decussation compared with the normal decussation of fibers from all three lateral abdominal muscles.

Small umbilical hernias commonly contain extra-peritoneal fat or omentum. Larger umbilical hernias may contain small or large bowel. The neck of the sac is often very narrow hence they are prone to become irreducible, obstructed and strangulated. Commonly the patients are overweight with a predisposing risk factor and present with swelling in the umbilicus. They may complain of pain due to tissue tension or symptoms of intermittent bowel obstruction. The overlying skin may become thinned, stretched and develop dermatitis. Diagnosis is through clinical examination. Ultrasound scan can reveal details about the defect size, content of sac etc.

Initially, the repair of umbilical hernias was done with primary closure. Repair of the defect with mesh has substantially improved long term outcomes and is now accepted as the standard of care. However, there is a great debate on the plane of mesh placement. Various studies have reported a range of complications like seromas, infections, mesh erosions etc, based on the plane of mesh placement.

## AIMS AND OBJECTIVES OF THE STUDY

To evaluate the outcome of onlay and pre-peritoneal open mesh repair in umbilical hernias in adults regarding operative time, ease of procedure, hospital stay, complications and recurrence if any.

## MATERIAL AND METHODS

Study design: A prospective study.
Sample size: 60 cases

**Inclusion criteria:**

1. Patients above age of 18years.
2. Patients presenting with umbilical hernia.
3. Patients giving verbal written consent

**Exclusion criteria:**

1. Patients under age of 18years.
2. Divarication of recti.
3. Patients medically not fit for surgery due to various co-morbidities.
4. Recurrent hernias.

## OBSERVATIONS AND RESULTS:

**Table 1: Distribution Of Age Between Study Groups**

| AGE(YRS) | TYPE OF MESH REPAIR | | | | p Value |
|---|---|---|---|---|---|
| | Onlay | | Pre-peritoneal | | |
| | N | % | N | % | |
| <20 | 1 | 3.3% | 0 | 0% | 0.660 |
| 21-30 | 3 | 10% | 4 | 13.3% | |
| 31-40 | 9 | 30% | 13 | 43.3% | |
| 41-50 | 13 | 43.3% | 8 | 26.7% | |
| 51-60 | 2 | 6.7% | 2 | 6.7% | |
| >60 | 2 | 6.7% | 3 | 10% | |
| Total | 30 | 100% | 30 | 100% | |

The above table shows the different age groups who were operated for umbilical hernia. In the onlay group, 3.3% of patients were below 20 years of age, 10% between 21-30 years, 30% between 31-40 years, 43.3% between 41-50 years, 6.7% between 51-60 years and6.7% above 60 years of age.

In the pre-peritoneal group, 0% were below 20 years of age, 13.3% between 21-30 years, 43.3% between 31-40 years, 26.7% between 41-50years, 6.7% between 51-60years and 10% above 60 years of age.

The comparison between the respective age groups in onlay and pre-peritoneal group shows p value of 0.660 which is not statistically significant.

**Table 2: Mean Operative Time Between Study Groups**

| PARAMETERS | TYPE OF MESH REPAIR | | | | p Value |
|---|---|---|---|---|---|
| | Onlay | | Pre-peritoneal | | |
| | Mean | SD | Mean | SD | |
| MEAN OPERATIVE TIME(min) | 38.60 | 5.50 | 62.30 | 11.79 | <0.001* |

*p<0.05

The mean operative time in onlay repair was 38.60 minutes and pre-peritoneal repair was 62.30 minutes. The p value for operative time between the two groups was < 0.001 which was statistically significant.

**Table 3: Post Operative Day Of Discharge Between Study Groups**

| PARAMETERS | TYPE OF MESH REPAIR | | | | p Value |
|---|---|---|---|---|---|
| | Onlay | | Pre-peritoneal | | |
| | Mean | SD | Mean | SD | |
| POST OPERATIVE DAY OF DISCHARGE | 5.23 | 2.46 | 4.57 | 1.89 | 0.244 |

The post-operative day of discharge for onlay group was 5.23 +/- 2.46 days and for pre- peritoneal group was 4.57 +/- 1.89 days. The p value was found to be 0.244 which is not statistically significant.

**Table4: Distribution Of Post Operative Complications Between Study Groups**

| POST OPERATIVE COMPLICATIONS | TYPE OF MESH REPAIR | | | | p Value |
|---|---|---|---|---|---|
| | Onlay | | Pre-peritoneal | | |
| | N | % | N | % | |
| CHRONIC PAIN | 6 | 20% | 3 | 10% | 0.278 |
| SEROMA FORMATION | 7 | 23.3% | 1 | 3.3% | 0.023* |
| WOUND INFECTION | 6 | 20% | 1 | 3.3% | 0.044* |
| MESH INFECTION | 1 | 3.3% | 0 | 0% | 0.313 |
| ENTEROTOMY | 0 | 0% | 2 | 6.7% | 0.150 |
| RECURRENCE | 1 | 3.3% | 0 | 0% | 0.313 |
| TOTAL | 30 | 100% | 30 | 100% | |

*p>0.05

The above table shows a list of the most common complications seen in umbilical hernia mesh repair.

6 patients in onlay group complaint of pain post-operatively and on long term follow up (1 year) constituting 20%. 3 patients in pre-peritoneal group complaint of post-operative pain and on 1 year follow up making 10%. On comparison of the two groups p value was 0.278 which is not statistically significant.

In the onlay group, 7 patients developed seroma which was 23.3%. In the pre-peritoneal group, 1 patient developed seroma which was 3.3%. The p value was 0.023% which is statistically significant.

Wound infection (surgical site infection) was found in 6 in onlay group (20%). It was found in 1 patient in pre-peritoneal group (3.3%). The p value was 0.044 (statistically significant).

Mesh infection was found in one patient of onlay group (3.3%) and none in pre- peritoneal group developed (0%). The p value was found to be 0.313 which is not statistically significant.

Enterotomy was not seen in onlay group (0.0%). It was seen in 2 patients of the pre- peritoneal group constituting 6.7%. The p value was 0.150 which was not statistically significant.PERCENTAGE Recurrence was found in one patient with onlay mesh repair (3.3%) and not found in pre- peritoneal repair. The p value was found to be 0.515 which is not statistically significant.

## DISCUSSION

Ventral hernias are commonly encountered in clinical practice. Umbilical hernias are commonly found in infants and usually close by 2 years of age. Those that do not close spontaneously even after 5 years require operative intervention. Adult umbilical hernias occur commonly in middle aged females with raised intra-abdominal pressure due to pregnancy, ascites, obesity etc.

Small hernias less than 2.5 cm in diameter are often successfully closed with primary tissue repairs. However, larger ones have a recurrence rate of up to 30-40% when a tissue repair alone is performed. Repair of ventral hernias with mesh as opposed to suture has substantially improved long-term outcomes and is accepted as the standard of care.

However, many studies demonstrate an increased risk for wound complications with mesh placements including infections, seromas and mesh erosions. The risks involved depends on the plane of mesh placement. While mesh repair of umbilical hernia is considered standard, there is no consensus on the best location to place the mesh.
This study compares two types of mesh repairs- onlay and pre-peritoneal in terms of duration of surgery, ease of procedure, post-operative complications like seroma, wound infection, mesh infection, chronic pain, enterotomy and recurrence.

The mean operative time in our study in onlay repair was 38.60 minutes and pre- peritoneal repair was 62.30 minutes. The p value was < 0.001 which is statistically significant.The difference could be accounted to more time required for dissection for creating pre peritoneal space. Securing adequate hemostasis is another burden on time. Ease of operation was largely subjective, and depends on surgeons' experience, exposure, quality of assistance and conductive facilities. Godara et al. reported a mean duration of 49.35 minutes for Onlay and a mean duration of 63.15 minutes for Pre-peritoneal mesh repair(p<0.0001), while in John.J.Gleysteen et al series the mean duration for Onlay and Pre-peritoneal mesh repair were 42 and 70.5 minutes respectively.

The most common complication observed was seroma. 23.3% were in onlay group and 3.3% in pre-peritoneal group with a p value of 0.023 showing statistical significance. This was managed with drainage of the seroma if necessary and adequate antibiotic cover. Onlay technique requires significant subcutaneous dissection to place the mesh, which can lead to devitalized tissue with seroma formation or infection. Wound infection was found in 7 cases in total. Out of these 1 was in the pre- peritoneal group forming 3.3% and 6 were in onlay group forming 20%. The p value was found to be 0.044 which is statistically significant. These patients were treated with appropriate antibiotics and regular dressing. Wound infections in onlay group occurs due to extensive dissection for mesh placement causing jeopardy to skin vasculature.

## CONCLUSION

In the patients presenting with umbilical hernia it is important to recognize the associated risk factors like diabetes, obesity, parity in order to carefully plan the type of repair either pre-peritoneal or onlay repair to prevent the complications like seroma formation, wound infection, chronic pain and the recurrence.

Seroma formation and infection are found to be more commonly associated with onlay mesh repair compared to pre-peritoneal mesh repair.

Although time taken for surgery in onlay mesh repair is significantly less compared to pre-peritoneal mesh repair, complications associated with it limits its wider usage. Considering the burden of surgeries especially in third world countries with limited number of surgeons, it could provide valuable alternative over pre- peritoneal repair.

Ease of the procedure in performing onlay mesh repair over pre-peritoneal repair gives it the points over pre-peritoneal but associated complications limits its use.

Finally to conclude “Pre-peritoneal mesh repair is superior to onlay mesh repair”

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