

Original article:

A COMPARATIVE STUDY OF ONLAY AND PRE-PERITONEAL MESH REPAIR IN THE MANAGEMENT OF VENTRAL HERNIAS AT PRAVARA RURAL HOSPITAL, LONI

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ABSTRACT:

Background: Ventral hernia in the anterior abdominal wall includes both spontaneous and, most commonly, incisional hernias after an abdominal operation. . Hernia recurrence is distressing to patient and embarrassing to surgeons. Mesh repair can be pre-peritoneal or onlay. Controversy exists among the surgeons regarding the use of type of either meshoplasty, due to differences in ease in performing the surgery, time of surgery, complications occurring in the post operative period and the recurrence.

Materials and methods: 60 patients presenting with ventral hernia admitted to Pravara Rural Hospital and Medical College Loni during August 2017 to August 2019 were preoperatively assessed clinically and by ultrasonography to confirm the diagnosis. 30 patients each underwent pre-peritoneal and onlay mesh repair after obtaining consent and satisfying the inclusion & exclusion criteria. Statistical significance was confirmed using SPSS 11.1 software.

Results : Seroma formation, infection and chronic pain in 20 %, 13.33%, 20% patients respectively in onlay mesh repair group and in 10%, 6.66%, 3.33% patients respectively in pre-peritoneal mesh repair group. Recurrence was seen in 10% patients in onlay group .No recurrence was encountered in the pre-peritoneal mesh repair group. Associated factors morbidity was also found higher in onlay group.

Conclusion: Seroma formation, infection and the chronic pain are found to be more commonly associated with onlay mesh repair compared to pre-peritoneal mesh repair. Recurrence is higher in cases of ventral hernia operated by onlay mesh repair especially in cases with co morbidities like obesity ,diabetes and multiparity. Considering all these observations we concluded that pre-peritoneal mesh repair is superior to onlay mesh repair.

Key Words: Incisional Hernia; Mesh repair; Onlay; Pre-peritoneal; Seroma; Recurrence.

INTRODUCTION

As a result of man's erect posture, his anterior abdominal wall is the site of a variety of hernias. Most of these hernias protrude through the abdominal wall to form obvious palpable swellings. Ventral Hernia is a protrusion of an abdominal viscus or part of a viscus through the anterior abdominal wall occurring at any site other than groin. It includes incisional hernias, paraumbilical hernias, umbilical hernia, epigastric hernias and spigelian hernias respectively.¹ The patient seeks medical advice for swelling, discomfort, acute pain, associated gastrointestinal symptoms or cosmetic symptoms, diagnosis can be achieved with ease by clinical examination or by ultrasound scanning.

A number of predisposing factors have been identified that may be related to specific patient characteristics, an underlying pathologic process, or iatrogenic factors. From the surgeons perspective, repair of hernias is commonly procedure. There are various surgical techniques for the repair. Incisional hernias are unique in that they are the only abdominal wall hernias that are considered to be iatrogenic. It continues to be one of the more common complications of abdominal surgical procedures and is a significant source of morbidity and loss of time from productive employment. For many years, the repair of incisional hernia was associated with a high recurrence rate. In more recent years, the introduction of synthetic prosthetic materials has provided the opportunity to perform a tension free repair, thereby reducing the rate of recurrence. Midline hernia occurring through linea alba abutting superiorly or inferiorly on the umbilicus is called as "PARAUMBILICAL HERNIA". They are generally acquired lesions. If the defect is small it can be repaired surgically. But large hernias with wide openings are difficult to repair surgically and should be treated with synthetic mesh repair.

Epigastric hernia protrude through linea alba above the umbilicus. Approximately 5% of the populations have epigastric hernias. After diagnosis of an epigastric hernia, there is no reason to wait for repair, the chances for incarcerations are high and surgery remains the only permanent cure. Most of the spigelian hernias are acquired and requires surgery as the chances of intestinal obstruction is high.

METHODOLOGY

60 patients presenting with ventral hernia admitted to Pravara Rural Hospital and Medical College from August 2017 to August 2019 were preoperatively assessed clinically and by ultrasonography to confirm the diagnosis. 30 patients each underwent pre-peritoneal and onlay mesh repair after obtaining consent and satisfying the inclusion & exclusion criteria. Statistical significance was confirmed using SPSS 11.1 software.

INCLUSION CRITERIA:

All patients presenting with anterior abdominal wall hernias:

- a. Umbilical hernias
- b. Epigastric Hernias
- c. Paraumbilical Hernias
- d. Incisional Hernias.
- e. spigelian hernias

EXCLUSION CRITERIA:

- a) Groin Hernia
- b) Divarication of Recti
- c) Patients less than twelve years of age
- d) Patients medically not fit for surgery.

RESULTS

The study of 60 cases of Ventral Hernia during August 2017 to August 2019 at Pravara Rural Hospital & Medical College, Loni studied as follows:

The total number of cases studied was 60. The study showed that the maximum number of patients were in 3rd decade of life (58.3%). In a total of 60 cases, 42 patients were females and 18 patients were males.

In our study in cases with incisional hernia 12 cases (50%) had undergone tubectomy, 11 LSCS (45.8%) and 1 hysterectomy (4.2%).

Most of the patients 51 (85%) presented with swelling, 7 (11.66%) with pain and swelling and 2 with pain, swelling and vomiting.

Of the 60 patients 15 (25%) were obese, 8 (13.33%) were diabetic, 1 (1.67%) was anemic, 1 (1.67%) was hypothyroid.

The smallest defect measured 2x2 cm and the largest defect measured 6x6 cm in this study.

All patients were given a dose of third generation cephalosporin before the anaesthesia, continued with intravenous antibiotics post operatively.

Majority of the patients had omentum as the content of the sac 50 (83.34%), 5 (8.33%) had jejunum and 4 (6.66%) had ileum, 1 (1.67%) had transverse colon.

30 (50%) Patients underwent Pre-peritoneal mesh repair and 30 (50%) patients underwent onlay mesh repair.

Mean duration of surgery in Onlay Mesh repair was 45 min, and that in Pre-peritoneal Mesh repair was 60.15 min.

TABLE 1: Post operative complications

SI No	Complications	Pre-peritoneal	Onlay	Percentage (%)		P value
				Pre-peritoneal	Onlay	
1	Seroma	3	6	10	20	0.3
2	Wound infection	2	4	6.66	13.33	0.4
3	Mesh infection	0	0	0	0	-

Table 2) Type of operation

SI No.	Type of operation	Recurrence	Percentage (%)	P value
1	Pre-peritoneal mesh repair	0	0	< 0.04
2	Onlay Mesh repair	4	13.33	

DISCUSSION

Ventral hernia in the anterior abdominal wall includes both spontaneous and, most commonly, incisional hernias after an abdominal operation. It is estimated that 2 to 10% of all abdominal operations result in an incisional hernia. Small hernias less than 2 ½ 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 performed². Hernia recurrence is distressing to patient and embarrassing to surgeons. Nowadays tension free repair using prosthetic mesh has decreased recurrence to negligible. Despite excellent results increased risk of infection with placement of a foreign body and cost factor still exist; however, operating time and hospital length of stay are shortened. Primary tissue repair is associated with higher unacceptable recurrence rate, nowadays; tension free mesh repair is ideal hernia repair technique³.

Mesh repair can be pre-peritoneal or onlay. Controversy exists among the surgeons regarding the use of type of either mesh repair, due to differences in ease in performing the surgery, time of surgery, complications occurring in the post operative period and the recurrence.

In our study attempt has been made to study both types of these mesh repair and their outcome. In the study, 60 patients with Ventral Hernia, attending and admitted to Pravara Rural Hospital and Medical College from August 2017 to August 2019 were treated with pre-peritoneal and onlay mesh repair were studied. Incidence among ventral hernias was Incisional hernia-40%, Paraumbilical hernia-30%, umbilical hernia 18.3%. epigastric hernia 11.7% Ventral hernias are more common in patients aged between 30-40 years (58.3%) in our study. Youngest patient in our study was 25 years old. It was found that ventral hernias are rare after 60 years as no patient was more than 60 years in our study.

Ventral hernias are more common among females. 42 patients were females and 18 patients were male. In literature the ratio is 3:1. in our study it is 2.33:1. There is no significance difference in age distribution in males and females, as disease is more common between 30 to 40 years in both. Ellis H. et al⁴. have obtained a 64.6% of female population in the study of 342 patients In our study female population was 70% , while Godara et al⁵ series had a female population of 42.5%.

Among incisional hernias Gynecological surgeries are the most common associated surgery. Tubectomy was the most common predisposing surgery, constituting 50% followed by LSCS (45.8%), Hysterectomy (4-2%). Godara et al series⁵ also mentions Gynecological surgeries as the most common associated surgery.

In females most precipitating factor was Multiparity. Out of 42 patients 21(50%) were multipara. This can be attributed to stretching and weakening of anterior abdominal wall musculo-aponeurotic layer. Next common factor was obesity-15 patients (25%). Fat penetrates muscle bundles and layers, weakens aponeurosis and favors appearance of hernia.

Eight (13.33%) patients were Diabetic, 1(1.67%) was Anaemic and 1(1.67%) was Hypothyroid. In the present series postoperative morbidity was considerably high in diabetics, contributing 80% of the cases which had postoperative wound infection in the postoperative period. Obesity was another factor that led to increased postoperative morbidity with all 9 cases, of 60 cases in the present series, who developed one or the other postoperative complications being obese. These two important factors are compared with series published by Rios A et al and Weber et al in Table 13. Results in the present series are comparable to both these studies.

All patients presented with swelling. About seven patients had pain in the swelling or dragging type of pain abdomen. One patient with incisional hernia and one with umbilical hernia presented with signs of intestinal obstruction and were operated immediately to reduce the hernia and the defect repaired by onlay mesh repair. Toms P. A. et al. concluded that abdominal hernias can present asymptotically to life treating emergencies. About 51(85%) cases were without complications, 7(11.67%) were irreducible, 2(3.33%) were obstructed. No strangulated case was observed.

The commonest content of the sac observed was Omentum 50(83.33%), followed by Jejunum 5(8.33%), ileum 4(6.66%) and transverse colon was found in 1(1.67%). Mean duration of surgery in our series, in cases that underwent Onlay mesh repair was 45 minutes, while in cases with Pre-peritoneal Mesh repair took more time and the duration of surgery was 60.15 minutes in present series ($p < 0.0001$). 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 conducive 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 al⁷ series the mean duration for Onlay and Pre-peritoneal Mesh repair were 42 and 70.5 minutes respectively. Table 14 shows the comparison of duration of surgery in different series.

The most common complication observed was seroma in 9 patients (15%). Out of 9 patients 3(10%) were in pre-peritoneal and 6(20%) in onlay mesh repair group. This complication was managed with seroma drainage. Onlay technique had more of seroma formation, due to the fact that onlay techniques requires significant subcutaneous dissection to place the mesh, which can lead to devitalized tissue with seroma formation or infection. The superficial location of the mesh also puts it in danger of becoming infected if there is a superficial wound infection.

Wound infection was found in 6 cases (10%). Out of these 2 (6.66%) were in pre-peritoneal group and 4 (13.33%) were in onlay group. These patients were treated with appropriate antibiotics and regular dressing. No patient required removal of mesh because the infection was superficial and responded well to antibiotics.

Chronic pain was complaint of 7 patients (11.6%) in all. Out of this 6 (20%) were in onlay group while 1 (3.33%) in pre-peritoneal mesh repair group ($p < 0.05$). The reason for chronic pain in Onlay Mesh repair may be because mesh is placed below subcutaneous plane over the muscle and sutured over it that causes chronic muscle irritation and because of the fact that the closure is in tension. Significant difference were noticed in chronic pain, between the two techniques, based upon the p value calculated on SPSS Software 11.1 while the other complications were comparable between both types of mesh repairs.

According to the Shackelford primary repair is often under tension in onlay meshoplasty, which can contribute to recurrence. Ideally, the transfascial sutures are placed before primary closure of the fascial defect to avoid the potential bowel injury that can occur if the sutures are placed blindly. Long-term studies are not available to accurately describe the recurrence rate with this technique, but retrospective review suggests a rate of 28%.

Pre-peritoneal mesh repair is considered superior because the mesh with significant overlap placed under the muscular abdominal wall works according to Pascal's principles of hydrostatics. The intra-abdominal cavity functions as a cylinder, and therefore the pressure is distributed uniformly to all aspects of the system. Consequently, the same forces that are attempting to push the mesh through hernia defects are also holding the mesh in place against the intact abdominal wall. In this manner, the prosthetic is held firmly in place by intra-abdominal pressure. The mechanical strength of the prosthetic prevents protrusion of the peritoneal cavity through the hernia because the hernia sac is indistensible against the mesh. Over time, the prosthetic is incorporated into the fascia and unites the abdominal wall, now without an area of weakness.

CONCLUSION

In the patients presenting with ventral hernia it is important to recognise the associated risk factors like diabetes, obesity, parity, previous surgeries 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, infection and the chronic pain are found to be more commonly associated with onlay mesh repair compared to pre-peritoneal mesh repair.
- Recurrence is higher in cases of ventral hernia operated by onlay mesh repair.
- Recurrence is higher in cases with co morbidities like obesity, diabetes and multiparity.
- 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.

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