

Comparison of Onlay Versus Sublay Mesh Placement in Incisional Hernia Repair: A Prospective Study

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Abstract

Background: Incisional hernia is a common surgical condition with a reported incidence of 2-11% of patients subjected to abdominal operations. **Aim:** This is a prospective study to compare the differences in the post-operative events of the onlay mesh repair and the sublay mesh repair in our setup. **Methods:** This is a prospective study of 60 cases of incisional hernia that were operated in the department of general surgery, Govt. medical college, Omandurar govt. estate, Chennai, India from Dec 2017 to June 2018. Patient's history, clinical findings, investigations, operative findings, operative procedures and postoperative complications were all recorded in a proforma specially prepared. All patients underwent open mesh repair. Randomisation was done, as every other case was alternately proceeded with onlay and sublay mesh placement. Patients were followed up for immediate post-operative complications. The two groups were compared using appropriate statistical tests. **Results:** Most of the patients presented with incisional hernia in the infraumbilical region. Both the groups had 30 patients each. Operative time and pain score was significantly higher in the sublay group; whereas the drainage volume and duration and the incidences of seroma, superficial surgical site infection and flap necrosis were higher in the onlay group. **Conclusion:** Even though, the operative time and the pain score were significantly higher in the

sublay group, theoretically, it is considered as a superior technique of mesh placement. The study showed that the post-operative complications were higher in the onlay group.

Keywords: Incisional Hernia; Onlay Mesh Repair; Sublay Mesh Repair; Post-Operative Complications.

Introduction

Incisional hernia is defined as any abdominal wall gap with or without a bulge in the area of a postoperative scar perceptible or palpable by clinical examination or imaging [1]. Incisional hernias develop in 2-11% of all laparotomies. As they are an iatrogenic problem, with the increasing number of laparotomies the incisional hernias also increase. It adds to the morbidity of the patient and increases the health care cost. Recurrence is a nightmare for the hernia surgeon.

Aims & Objectives

There are various methods of repair for an incisional hernia viz. simple anatomical suture repair, mesh repair and laparoscopy methods. Suture repairs have become obsolete now because of its high recurrence rate of 2-3 times greater than mesh repair. Hence now mesh repair has now become the standard procedure of choice [2].

Although polypropylene mesh is regarded as the prosthesis of choice for repairing incisional hernias, there is a controversy regarding the best site of its placement. A prospective study of cases of incisional hernia repairs was done in Govt. Medical College, Omandurar Govt. Estate, Chennai to find out what is the best site of placement of the mesh - either onlay or sublay in open mesh repair techniques.

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Materials & Methods

A prospective study was conducted of all the cases of incisional hernia which were admitted in Govt. Medical College, Omandurar Govt. Estate, Chennai between December 2017 and June 2018. A total of 60 cases were treated during that period. Giant hernias more than 10cm size and those with loss of domain were excluded from the study. Likewise, umbilical and epigastric hernias were also excluded. The patients were investigated for fitness for surgery and patients with comorbid conditions like COPD, diabetes, anemia, hypoproteinemia and hypertension were also excluded from the study.

Out of the 60 patients, 30 patients underwent open mesh repair by the sublay (Retro-rectus) technique and the remaining 30 patients underwent onlay mesh hernioplasty, via Randomization, by simple alternate method.

Operative Technique

Onlay Mesh Repair

A skin incision was made depending on the surgeon’s preference, taking into consideration, the previous surgical scar and any other associated defects. Layers were deepened upto the rectus sheath. Flaps were raised all around the sac. The hernia sac was clearly dissected and the contents were reduced into the abdominal cavity. With non-absorbable suture, the defect in the linea alba was closed and a proline mesh of adequate size was placed on the rectus sheath and fixed with stitches. Hemostasis was secured and wound was closed over a suction drain.

Sublay Mesh Repair

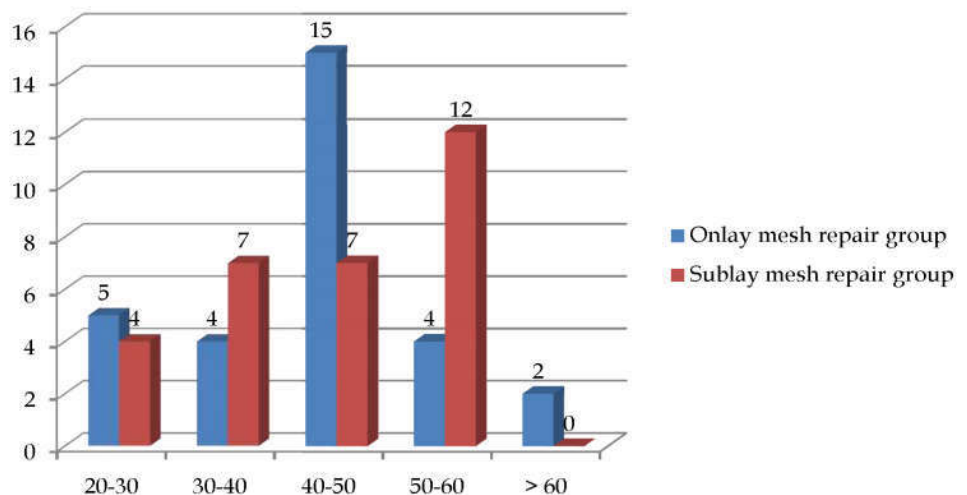
The principles of the retro-rectus or sublay mesh repair include: meshplacement deep to the recti muscles and mesh extension well beyond the hernia defect. After the sac was being dissected and delineated, the defect is opened and the preperitoneal plane is created between the posterior rectus sheath and the rectus muscle for the placement of the mesh. The posterior rectus sheath along with the peritoneum is closed

with non-absorbable sutures. A proline mesh tailored to the size is placed in the already created plane behind the recti. The mesh is secured with few interrupted 2/0 polypropylene sutures. A suction drain is placed over the mesh. The anterior rectus sheath is closed with continuous 1-polypropylene sutures. Another drain is placed in the subcutaneous plane and the skin closed. 1 gm dose of antibiotic prophylaxis I. V. cefotaxime was given at the time of induction, which was continued for 5 days post-operatively. Closed suction drains were removed when the drain output was <30ml/24hrs for 2 successive days.

Observations were noted regarding operative time, bleeding, drain duration and volume, post-operative pain score, seroma, surgical site infection, flap necrosis and recurrence. Early mobilisation was encouraged. The patients were discharged only after suture removal and after making sure they are devoid of even any minor complications. After discharge from hospital the cases were followed up in the OPD noting any complications like sinus, pain, and recurrence etc. Observations were recorded and their significance was analysed using appropriate statistical tests. The study was done after getting clearance from the hospital ethical committee.

Results

Sixty patients underwent incisional hernia repair during the period. All patients were female³, considering that our hospital has an attached gynecological institute. The youngest was 23 yrs old and the oldest was 76 yrs old. Most of the patients were in the 40-60 age-group category (Graph 1). All the hernias were lower midline or pfannensteil incisions scars which were the result of some obstetric or gynaecological surgeries.



Graph 1: Age distribution

The total time for surgery in onlay mesh repair was 60 - 100 minutes with a mean of 83 minutes. Sublay mesh repair took 90-150 minutes with a mean of 110 minutes. The postoperative pain was calculated using the visual analog scale (VAS) of 1-10 (Table 1). Postoperative pain was more in the sublay mesh repair group. The drainage was removed in 6-8 days in onlay mesh repair, while it took only 4-6 days for the drain to be removed in the sublay mesh repair group, after having met the criteria for the removal of the drain [p-value < 0.0001/statistically significant/ paired t test]. There was no significant difference in the duration of hospital stay: a mean of 11 days in the onlay group, compared to that of 9 days in the sublay group [p value - 0.2021/ not statistically significant/ unpaired t test].

Table 1: Post Operative pain Score

Postoperative Pain (VAS)*	Onlay mesh repair group n=30	Sublay mesh repair group n=30
<5	16	9
>5	14	21

*visual analog score; [p value - less than 0.0116/ statistically significant/ paired t test]

In the onlay group three patients developed flap necrosis and five of them developed superficial wound infection. The necrosed areas were excised and wound was dressed, until wound contracture and closure. None of them required for the mesh to be removed. The infection responded to wound debridement and wound dressings and antibiotics. Wound seroma was noticed in four of them which required only opening of one or two skin stitches for drainage.

In the sublay group there was no incidence of flap necrosis. Two patients developed wound seroma and two of them developed superficial wound infection which was treated with drainage by opening one or two skin sutures and dressings (Table 2).

Two patients in the sublay group developed abdominal distension and ileus in the postoperative period which responded to conservative management of nasogastric suction and I.V fluids. None of the patients from either of the group suffered from recurrence during our follow up.

Discussion

All the patients in this study were females, as it occurs more commonly in them [4] and all the hernias were in the lower abdomen [5]. This may be because of the following reasons:

1. Lower abdominal hydrostatic pressure is higher in the lower abdomen than the intra abdominal pressure in the upper abdomen.
2. Absence of posterior rectus sheath below the arcuate line.
3. Pregnancy causes over stretching & weakness of the muscles of the lower abdomen.

The mean total time taken for the operation in our study was 83 min for onlay group and 110 min for the sublay group. This is due to the extra caution needed to separate the plane between the rectus muscle and the posterior rectus sheath in the sublay group patients.

The postoperative pain was more in patients who underwent sublay mesh repair compared to onlay mesh repair (p value-0.0116/ statistically significant). This can also be explained by the pain due to the retro-rectus plane of dissection involved in the sublay mesh repair group. The duration of drain was longer in the onlay group, than when compared with that of the sublay group (p value<0.0001/statistically significant).

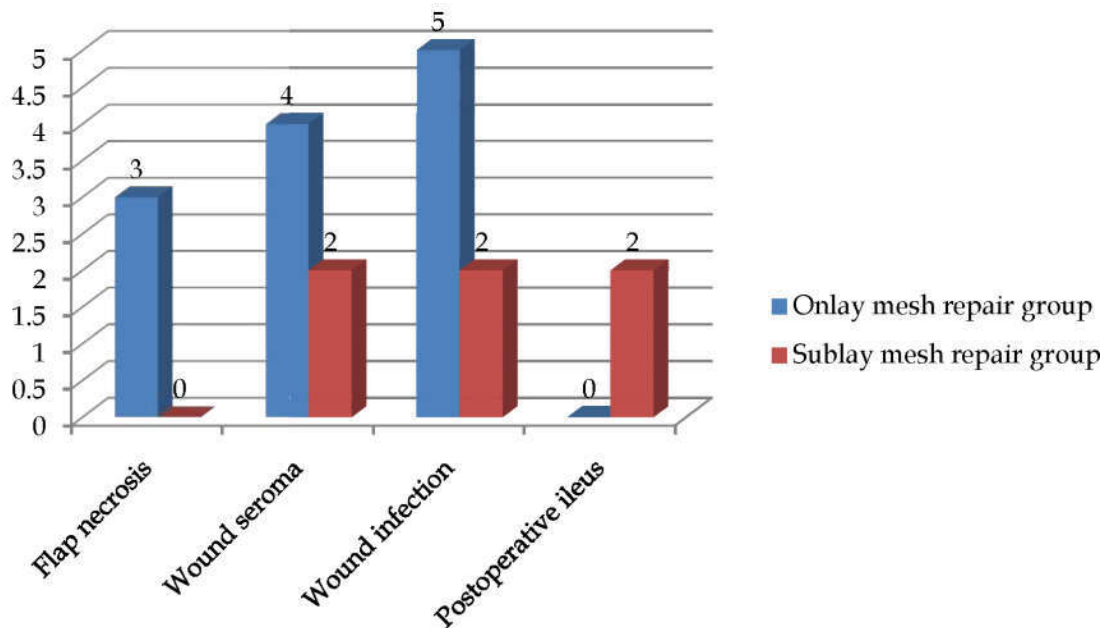
Wound seroma in the present study was 13.33% in the onlay group which is slightly more than that in the sublay group (6.67%). This is because of the preservation of the perforators in the sublay group, which can't be preserved while raising a flap in an onlay mesh group.

In our study in the onlay group, 3 cases (10%) suffered from post- operative flap necrosis (Table 2), when compared with nil cases in the sublay group, because of the wider area of skin flaps that were created for placing the mesh which may have interfered with the perforators of the skin and subcutaneous tissues. There were no recurrences in the present study in both the groups. This is due to the small size of the sample taken.

The complications (Graph 2) & the duration of hospital stay were slightly higher in the onlay mesh repair group. But none of them were statistically significant. The complications were lesser compared to other studies.

Table 2: Postoperative complications

Complication	Onlay mesh repair group n=30	Sublay mesh repair group n=30	Comparing by FISHER TEST - p value/significance
Flap necrosis	3(10%)	Nil	0.2373/ not significant
Wound seroma	4(13.33%)	2(6.67%)	0.6707/ not significant
Wound infection	5(16.67%)	2(6.67%)	0.4238/ not significant
Post operative ileus	-	3(10%)	0.2373/ not significant



Graph 2: Comparison of Post-operative Complications

Conclusion

Although there is no statistically significant difference in the outcome parameters of the two approaches [6,7], that is onlay and sublay mesh repair groups, theoretically the sublay mesh repair is said to be a better technique [8]. Even though it takes a longer time and had significant increase in the pain score, it results in a cosmetically better scar because of the lesser wound-related complications and the mesh placed in the retrorectus plane is the ideal plane for the position of the mesh in which the force of abdominal pressure holds the prosthesis tightly against the deep surface of the muscles.

To conclude, onlay mesh repair appears to be simpler and easier than that of the sublay mesh repair.

To show a statistically significant advantage between the 2 plane of mesh placement, we need a randomized control trial with a large sample size and a long follow-up. Until then plane of mesh placement should be driven by surgeon's preference with respect to the patient's disease and anatomy [9,10].

Conflict of Interest

The authors acknowledged that there is no conflict of interest with regards to this article.

Support: None

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