



A COMPARATIVE STUDY BETWEEN ONLAY AND SUBLAY MESH REPAIR IN THE MANAGEMENT OF INCISIONAL HERNIA

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ABSTRACT **Background:** An incisional hernia is one of the common complications of abdominal surgery and the incidence of incisional hernias continues to be 3 to 11% after laparotomy. The repair of incisional hernia has always been a challenge to the surgeon. Various operative techniques for the repair of incisional hernia are in practice; however, the management is not standardized. **Aim:** To compare onlay mesh placement versus sublay mesh placement in repair of incisional hernias. **Material and Methods:** This prospective study comprised of 50 patients with an incisional hernia. A total of 50 cases were included in the study. Of the 50 cases, 25 cases were operated by the onlay mesh method and 25 by sublay mesh placement. **Results:** The operative time for sublay mesh repair was significantly higher than that of onlay mesh repair, whereas, complications like haemorrhage, seroma formation and deep surgical site infection leading to extrusion of mesh was higher in onlay mesh repair. The recurrence rate was found to be 4% in onlay mesh repair whereas it was 0% in sublay mesh repair. **Conclusion:** Sublay mesh repair, though technically difficult, and takes more time for surgery has the distinct advantage of reducing the rate of infection and recurrence.

KEYWORDS : Incisional hernia, Onlay mesh repair, Sublay mesh repair.

INTRODUCTION:

Incisional hernia, otherwise called as postoperative hernia is a diffuse extrusion of peritoneum and abdominal contents through a weak scar of an operation or accidental wound.^{1,2}

The development of knowledge of aseptic surgery and anaesthesiology and chemotherapy enabled surgeons to enter the peritoneal cavity with increasing safety and lead to phenomenal increase in abdominal operations.

Incisional hernia is a frequent complication of abdominal surgery constituting about 3% to 11% of laparotomy with maximum incidence (63%) during the first 2 yrs after surgery.^{3,4} Incisional hernia usually starts after surgery, as a result of failure of the lines of closure of the abdominal wall following laparotomy. Various factors like the patient characteristics, underlying pathological process and the iatrogenic factors are responsible for incisional hernia.

They can incarcerate (6 to 15%), strangulate (2%) or cause skin necrosis and perforation, all of which markedly increase the risk of patient's life⁵. So, these patients have to be operated as early as possible. Various surgical techniques have been developed for this challenging complication. The tension free repair is the key concept that have revolutionized hernia surgery. The use of sheets of non-absorbable synthetic mesh prosthesis placed across the defect and stitched to the abdominal wall has revolutionized the repair of abdominal wall defects and has rendered the older type of operations obsolete.

AIMS AND OBJECTIVES:

The purpose of this study was to compare the traditional onlay mesh placement and sublay mesh placement in incisional hernia repairs in terms of time taken for surgery, early complications (wound infections, mesh extrusion), and delayed complications (recurrence).

MATERIAL AND METHODS:

This prospective study was conducted in the Department of General Surgery, Government General Hospital, Kakinada from September 2020 to August 2021. The study material comprised of 36 females and 14 males forming a total of 50 patients admitted to General surgery department with incisional hernia. After preliminary investigations, confirmation of diagnosis and pre-anesthetic check-up, the patients were subjected to the required surgery.

Inclusion Criteria

- Midline hernias upto 10 cm in diameter.
- Patients above the age of 20 years

Exclusion Criteria

- Patients under the age of 20 years

- Emergency surgery (incarcerated hernia)
- Parastomal hernia, Primary umbilical, Para umbilical, Spigelian hernias
- Recurrent hernia
- Massive ventral hernias (>10 cm)
- Associated illness: HIV, Hepatitis B, Tuberculosis, malignancy
- Uncontrolled Diabetes, chronic obstructive pulmonary disease

Out of 50 cases 25 cases were operated by onlay and 25 cases by sublay mesh placement. All the surgeries were performed under controlled conditions.

Procedure:

Onlay mesh placement

An overlying incision through the fascia and hernia sac was taken. The entire hernia defect was opened and extended cranially and caudally along the full length of the original incision. Following adhesiolysis, the hernia sac, fascial scar, and subcutaneous fat was dissected away from the rectus sheath (on both sides) for a lateral distance of 7-10 cm. The peritoneal hernia sac and associated scar tissue was excised. The fascial defect was closed using a continuous looped nylon suture. A Prolene mesh was cut to the appropriate size, with a 5-cm overlap of the defect and sewed longitudinally using (2.0) polypropylene suture to the exposed anterior sheath or external oblique fascia on the lateral sides. Additional quilting sutures were applied at cranial, caudal edges of the mesh and to the central part of the mesh along with the underlying fascia. A suction drain (Romovac-no.16) was kept on both the sides over the mesh.

Sublay mesh placement

The retro-rectus mesh reinforcement procedure was performed in the similar fashion, with dissection of the sac and subcutaneous fat from the anterior sheath. On each side, the fascial scar at the inner edge was incised to uncover the rectus muscle, where an open space was created bluntly along the length of the posterior rectus sheath. This layer was then closed using a nylon suture in the midline. A Prolene mesh was then cut to the appropriate size, with a 5-cm overlap of the defect and placed between the posterior rectus sheath and rectus muscle above the arcuate line, and in the pre-peritoneal space below the arcuate line. The mesh was anchored to the posterior rectus sheath using a polypropylene suture. Quilting sutures were applied at cranial, caudal edges and to the central part of mesh and underlying fascia. Suction drains (Romovac-no. 16) were placed on both sides between the mesh and rectus muscle. The anterior rectus sheath was closed using nylon suture.

Common Procedures for both Techniques

- All patients were given intravenous antibiotic prophylactically: Cefotaxime 1 g intravenous single dose at the time of induction of anesthesia and Cefotaxime 1g i.v. BD for a period of 5 days

- post-operatively.
- Diclofenac 75 mg intramuscular injection was given 8th hrly for first 24 hrs, followed by diclofenac (oral) 50 mg 8th hrly for next 24 hrs
- Time was recorded using a stopwatch. The time taken from initial skin incision to skin closure with complete homeostasis was recorded
- Check dressing was carried out after 48 h. Assessment of wound infection if present, was done as per Southampton scoring system. Wound inspection was done daily and observations were recorded as per the criteria.
- Drain was removed if discharge was less than 10 ml in 24 h
- Suture removal was carried out on the 14th post-operative day, and patients were discharged on the 15th post-operative day if no complications were observed. At discharge, patients were advised to avoid carrying heavy weights and advised to wear an abdominal belt.
- Post-operative visits were scheduled at 1 month, 3 months, and 6 months. Patients were examined. Wound assessment was done and recurrence if any was recorded.

RESULTS:

Majority of the patients (56%) were in the age group of 41-50 years. The incidence of incisional hernias was noticed more in females 36(72%) than males 14(28%).

The mean operating time taken for sublay procedure (89.6 min) is more when compared to onlay method (68.5 min).

In our study Seroma formation was the commonest complication observed in both the procedures and was slightly more in onlay method (20%) when compared to sublay mesh placement (16%). The occurrence of superficial infection was same in both the procedures, whereas deep infection leading to removal of mesh was noticed in one case with onlay mesh placement. Flap necrosis and recurrence were observed in one case each in onlay procedure, whereas it was 0% with sublay mesh repair.

Table I: Age wise distribution of cases

Age group	No. of cases	percentage
31-40	4	8%
41-50	28	56%
51-60	10	20%
61-70	8	16%

Table II: Sex wise distribution of cases

Sex	No. of cases	Percentage
Male	14	28%
Female	36	72%

Table III: Operating time

Parameter	Onlay	Sublay
Range	50-100 min	70-130 min
Mean time	68.5 min	89.6 min

Table IV: Occurrence of post-operative complications

Complication	Onlay	Sublay
Seroma	5(20%)	4(16%)
Superficial SSI	3 (12%)	3 (12%)
Mesh extrusion (deep SSI)	1 (4%)	0
Flap necrosis	1 (4%)	0
Recurrence	1 (4%)	0

DISCUSSION:

In the present study it was observed that the incidence of incisional hernia was highest in the 4th and 5th decades of life with a female preponderance. Radwa M. Mohamed et al⁶, Bantu Rajsiddharth et al⁷, Kundan Kharde et al⁸ and J Sridhar et al⁹ also reported more number of cases in females when compared to males In our study, the mean operative time was higher in sublay repair (89.6 min) when compared to onlay (68.5 min) which is coinciding with the studies of Radwa M. Mohamed et al⁶ (70min and 50min), Bantu Rajsiddharth et al⁷ (60.15min and 45min), Kundan Kharde et al⁸ (77.8min and 69.8min) and Miller K et al¹⁰ (70.5min and 42min) who also noted that the operative time for sublay mesh repair was more than that required for onlay mesh repair.

noted in 18% of the total patients. Onlay had 20% and sublay had 16% incidence of seroma. Radwa M. Mohamed et al⁶ noted seroma in 16% and 1%, Bantu Rajsiddharth et al⁷ in 20% and 10%, Kundan Kharde et al⁸ in 16% and 12%, and Manimegalai et al¹¹ in 20% and 4% of the cases managed by onlay mesh repair and sublay mesh repair respectively.

This shows that seroma formation is mostly observed in onlay repair when compared to sublay repair. The reason might be due to the fact that onlay techniques require significant subcutaneous dissection to place the mesh, which can lead to devitalized tissue with seroma formation In our study, deep SSI was noted in one case of onlay repair, where the mesh got infected and had to be removed. Whereas in sublay method, there was no incidence of mesh getting infected. Radwa M. Mohamed et al⁶, Bantu Rajsiddharth et al⁷, Kundan Kharde et al⁸ and J Sridhar et al⁹ in their studies also found that the rate of infection was higher in patients treated with onlay mesh repair when compared to sublay mesh repair. Radwa M. Mohamed et al⁶ had to remove the mesh in 4% cases because of infection. The superficial location of the mesh puts it in danger of becoming infected if there is superficial wound infection.

A recurrence rate of 4% was observed in onlay mesh repair, whereas sublay repair showed 0% recurrence rate in our study, which is quite comparable to the studies by Radwa M. Mohamed et al⁶, Bantu Rajsiddharth et al⁷, Kundan Kharde et al⁸ and J Sridhar et al⁹ who also showed 0% recurrence in sublay repair.

CONCLUSION:

Sublay mesh repair is a good alternative to onlay mesh repair as the mesh related complications like seroma, surgical site infections, flap necrosis are less compared to onlay mesh repair. Recurrence rate is also higher in onlay mesh repair than sublay mesh repair. Although the operative time for sublay mesh placement is significantly higher than that of onlay mesh repair complications and morbidity associated with it are lower than onlay method. Hence this study emphasizes the fact that sublay mesh repair can be used as the preferred method of choice for the treatment of incisional hernias.

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In the present study, seroma was the common complication that was