

A Comparative Study of Onlay versus Retrorectus Mesh Placement in Incisional Hernia Repair

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Abstract

Background: The incisional hernias are an iatrogenic complication, which has always been a challenge to the surgeons with respect to complications & recurrences. Various surgical techniques are in practice with data supporting the placement of retro-rectus mesh repair over onlay mesh repair.

Aims & Objectives: To evaluate & compare the efficacy of onlay mesh repair and retrorectus mesh placement for repair of incisional hernia.

Material & Methods: In this prospective study 60 recruited patients with midline hernias up to 10 cm in diameter, who were admitted to the General surgery department of our tertiary care hospital from November 2021 till August 2023. The socio-demographic details & complete history taken & investigations carried out. Patients were randomized into two groups. Group A – patients who had undergone traditional on-lay mesh repair (n=30); Group B - included patients who had undergone retro-rectus mesh repair (n=30). Patients underwent either traditional on-lay mesh repair or retro-rectus mesh repair according to their groups. Surgery was completed in both groups. Parameters recorded were operating time, postoperative pain scores at 2, 5, and 7 days, Complications, and wound infection if present. Sutures were removed on the 14th post-operative day & patients were discharged on the 15th post-operative day if no complications were present. Follows were scheduled at 1 month, 3 months & 6 months.

Results: The operative time was more for Group A patients as compared to Group B (p<0.05). In Group A, the postoperative pain scores on days 2, 5 & 7 were 7.21±0.57, 5.33±0.85 & 2.31±0.75. For Group B, the postoperative pain scores on days 2, 5 & 7 were 6.26±0.28, 4.06±0.339 & 1.42±0.84. The post-operative pain scores showed statistically significant higher values for Group A patients than for Group B(p<0.05). The complications in Group A were seroma, deep surgical site infection, mesh removal & recurrence which were statistically significantly higher than Group B(p<0.05).

Conclusion: Retrorectus Mesh Repair is a technique-sensitive procedure with the advantage of reducing the recurrence rate and surgical site infection as compared to onlay mesh repair.

Keywords: Incisional hernia, onlay mesh repair, and retrorectus mesh repair, recurrence

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Introduction

Hemorrhoids Incisional hernia is defined as “Any abdominal wall gap with or without a bulge in the area of a post-operative scar perceptible or palpable by clinical examination or imaging”. [1] It is in a true sense an iatrogenic hernia, a post-operative complication arising out of abdominal surgery. [2] It can occur after any type of abdominal wall incision, although the highest incidence is seen with midline and transverse incisions. [3]

The incidence of hernia is 2-11% after laparotomy with an increased incidence of 63% during the first 24 months after surgery. [4] Etiological factors responsible may be patient characteristics, underlying pathology & iatrogenic factors, like

technique of wound closure and type of suture material. This results in incomplete closure of the lines of the abdominal wall following laparotomy. 6 to 15% of which can incarcerate, 2% can strangulate & cause skin necrosis and perforation, and this may pose a risk to the life of patients. It also poses a great financial burden to the families of the affected & thus needs to be operated. [5]

Various techniques have been described for the repair of incisional hernia with time. Initially, anatomical repair was used to repair the abdominal wall defects which were associated with a high rate of recurrence between 10-50%. [6] Newer techniques using prosthetic mesh repair &

laparoscopic repair, show better results with fewer complications & recurrences. Retro-muscular Mesh Placement technique was first described by Stoppa. While used in small defects, the mesh does not require to be sutured since it is held in place by intraabdominal pressure (Pascal's principle), with eventual incorporation into the surrounding tissues.[7]

The type of prosthetic reinforced repair, choice of prosthetic & suture material along with preoperative and perioperative care are of the utmost importance as they reduce complications & recurrence.[8] Thus, the present prospective study aimed to evaluate and compare the efficacy of onlay mesh repair and retrorectus mesh placement for the repair of incisional hernia.

Material & Methods

In this prospective study, 60 recruited patients with midline hernias up to 10 cm in diameter, who were admitted to the General surgery department of our tertiary care hospital from November 2021 till August 2023. Patients with a parastomal hernia, primary umbilical, para umbilical, spigelian hernias, massive ventral hernias (>10 cm), HIV, Hepatitis B, Tuberculosis, uncontrolled diabetes, chronic obstructive pulmonary disease like asthma were excluded.

The socio-demographic details & complete history i.e. clinical signs, symptoms, and predisposing risk factors. Investigations were being undertaken to confirm the diagnosis of the ventral hernia.

Patients were randomized into two groups.

Group A – patients who have undergone traditional on-lay mesh repair (n=30)

Group B - included patients who had undergone retro-rectus mesh repair (n=30)

Pre-anesthetic check-ups were scheduled before the surgery, Patients underwent either traditional on-lay mesh repair or retro-rectus mesh repair according to their groups.

Operating procedure

Group A: Incisions were placed through the fascia & hernia sac, the hernia defect opened and extended cranially and caudally along the full length of the original incision. The hernia sac, fascial scar, and subcutaneous fat were dissected away from the rectus sheath (on both sides) for a lateral distance of 7-10 cm. The hernial sac and scar tissue were excised. The defect was sutured using a continuous looped nylon suture. A prolene mesh was cut 5 mm oversized of the defect & sutured 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 the cranial, caudal edges & central part of the mesh along with the underlying fascia with a suction drain (Romovac-no. 16) on both sides over the mesh.

Group B: Similarly, as Group A, incisions were placed and sac and subcutaneous fat were dissected out from the anterior sheath. The rectus muscle was uncovered by incising the fascial scar at the inner edge, where open space was created bluntly along the length of the posterior rectus sheath. The space closure was done using nylon sutures in the midline. A Prolene mesh was cut measuring the defect with a 5-cm overlap, which was then 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, and 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 a nylon suture.

After completion of surgery in both groups, all the patients were given intravenous (i.v.) antibiotic prophylactically: Cefotaxime 1 g i.v. single dose at the time of induction of anesthesia and Cefotaxime 1 g intravenous BD for 5 days postoperatively. Diclofenac 75 mg intramuscular injection TDS was given for the first 24 h, followed by diclofenac (oral) 50 mg TDS for the next 24 h.

The parameters recorded were:

1. Operating time (time taken from initial skin incision to skin closure with complete homeostasis)
2. Postoperative pain scores (Visual analogue scale)- at 2,5 and 7 day
3. Complications
4. Dressing checked after 48 h. Evaluation of wound infection if present, was done daily & recorded. Sutures were removed on the 14th post-operative day & patients were discharged on the 15th post-operative day if no complications were present. Follows were scheduled at 1 month, 3 months & 6 months. Any observations were recorded.

Statistical analysis

The tabulated data was statistically analyzed using SPSS version 22.0 for Windows (IBM Corp, India). Quantitative data are presented as mean \pm SD or proportions. Intergroup comparisons were made using Student's paired t-test. A P-value of 0.05 at a 90% confidence interval was considered to be statistically significant. Values were expressed as number (n) and percentage (%).

Results

Both Groups A & B showed no significant difference statistically when comparing socio-demographic variables ($p>0.05$). The operative time as measured from the time taken from initial skin incision to skin closure with complete hemostasis was more for Group A patients with onlay mesh

repair as compared to Group B with Retrorectus Mesh Repair which was statistically significant ($p < 0.05$) (Table 1) In Group A, the postoperative pain scores at day 2, 5 & 7 were 7.21 ± 0.57 , 5.33 ± 0.85 & 2.31 ± 0.75 . For Group B, the postoperative pain scores on days 2, 5 & 7 were 6.26 ± 0.28 , 4.06 ± 0.339 & 1.42 ± 0.84 . The post-

operative pain scores showed statistically significant higher values for Group A patients than for Group B ($p < 0.05$). The complications in Group A were seroma, deep surgical site infection, mesh removal & recurrence which were statistically significantly higher than Group B ($p < 0.05$). (Table 2)

Table 1

Variables	Group A (n=30)	Group B (n=30)	P value
Age	55.47±11.92	53.58±13.20	P >0.05
Gender (M, F)	9,21	11,19	P >0.05
Obesity	15	14	P >0.05
Diabetes Mellitus	6	8	P >0.05
Smoking	4	6	P >0.05
Operating time (min)	70.4±9.52	78.56±10.34	P <0.05

Table 2: Complications encountered in Group A & Group B

Complications	Group A	Group B	p-value
Seroma	6	3	P <0.05
Deep Surgical site infections	3	0	P <0.05
Hematoma	0	0	-
Sinus formation	0	0	-
Recurrence	3	0	P <0.05
Mesh removal	2	0	P <0.05

Discussion

The gold standard in the management of incisional hernias is Mesh repair.[5] It has been grouped based on the way the mesh is placed in relationship to the abdominal wall fascia. Mesh can either be placed as an underlay deep to the fascial defect, as an inter-lay, as an onlay, or as a retro-rectus mesh placement.[4]

In the present study, 30 patients underwent onlay mesh repair while 30 patients underwent rectorectus mesh repair. Out of them 63.3 % in Group A & 70% in Group B were females. The mean age in Group A was 55.47 ± 11.92 yrs, while in Group B was 53.58 ± 13.20 yrs. Similar findings were observed by Savitha S et al [7] & Kharde K et al.[9].

In the present study, In Group A, the mean pain scores on postoperative days 2,5 & 7 were statistically significantly higher than Group B ($p < 0.05$). This could be attributed to the fact that mesh is placed subcutaneously and sutured just over the anterior rectus sheath which has abundant nerve fibers stimulating more pain. Accordingly, studies conducted by Thangamani et al [10], and Rajsiddharth et al have shown similar results.[11]

In the present study, in Group A patients, with onlay mesh placement, complications observed were seroma in 6 patients & in 3 patient deep surgical site infection & recurrence was observed. While in Group B, with rectorectus mesh placement, the complication observed was seroma in 3 patients. Savitha S et al observed wound hematoma in 1, wound infection & seroma in 4, and wound edge necrosis & recurrence in 2 patients.[7] A study by Gleysteen, et al noted, recurrence rate of 20% for

onlay and 4% for preperitoneal mesh repair.[12] Thus, the incidence of wound infection was observed to be higher in patients undergoing onlay mesh repair as compared to the retrorectus mesh repair. Due to the subcutaneous placement of the mesh, onlay repairs are more susceptible to wound infections which in turn cause more pain. Studies conducted by Thangamani et al [10], and Rajsiddharth et al have shown similar results.[11]

Al-Tai et al, the study observed wound infection in one in sublay & 6 patients in onlay group. Wound edge necrosis was observed in one patient in one patient in onlay repair as compared to none in sublay group.[13] A randomized control trial conducted by Venclauskas et al showed that the sublay technique had a statistically significant lower risk of surgical site infection than the onlay technique.[14] However, studies conducted by Sevinç et al [15], Ahmed et al [16] & Kumar et al [17] found no statistically significant difference in the risk of surgical site infection between only and sublay mesh repair.

Hatata et al noted 33 patients with surgical site infection in the onlay group as compared to one in the sublay group. Also, in retrorectus repair, one patient developed a hematoma and in onlay group, one patient developed skin flap necrosis with no statistical significance.[18]

Onlay mesh repair is a technically simple and easy procedure with higher complications of seroma formation, deep surgical defects & recurrence rates. Retrorectus Mesh Repair is a technically difficult procedure with the distinct advantage of reduced recurrence rate and surgical site infection, as the

chances of transmission of infection from subcutaneous tissues to the mesh are low as it lies quite deep in the preperitoneal plane.[19] Two meta-analyses by Köckerling F [20] & Timmermans L,[21] supported the use of sublay mesh repair over onlay mesh repair for incisional hernias, as it is associated with fewer chances of post-surgical complications.

Conclusion

The Rectorectus mesh repair technique is associated with low postoperative pain scores & fewer postsurgical complications & thus less number of hospitalization days. Rectorectus mesh repair technique in the management of incisional hernia is superior to onlay (traditional) mesh repair technique. Additionally, long-term follow-up studies should be undertaken into account the issues of delayed wound healing & recurrences.

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