DUAL MESH REPAIR WITH SANDWICH TECHNIQUE FOR LARGE INCISIONAL HERNIAS AND ABDOMINAL WALL DEFECTS; A SINGLE SURGEON EXPERIENCE OF 35 CASES

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ABSTRACT

Background: Despite progress in surgical techniques and availability of prosthetic materials, treating large incisional hernias and abdominal defects is still a challenge even in hands of experienced surgeons. Although not very popular but dual mesh repairs with sandwich technique may be a good option for large hernia.

Objective: To determine the outcome of treating large incisional henias and abdominal wall defects with dual mesh technique.

Methodology: In this cross sectional study, 35 cases with large incisional hernias or defects (>100cm^2) underwent through dual mesh repair with sandwich technique, over a period of 4 years from June 2013 to June 2017. Postoperatively, patients were followed up for complications like wound infection, seroma or hematoma formation. Follow up was continued up to 1 year to see any recurrence. Data was entered and analyzed through SPSS 20.

Results: Mean age of patients was 45 +11 years (range 35 - 58 years). There were 22 (62.86%) male and 13 (37.14%) female patients. Mean size of hernia or defect was 325 +31 cm^2. Postopearative complications occurred in 11 (31.4%) patients. Of these, wound infection was seen among 1 (2.86%) patients, hematoma in 3 (8.57%), seroma in 7 (20%) patients. After one year follow up, there was no recurrence and no mesh erosion was seen. One (2.85%) had chronic sinus formation. There was no mortality.

Conclusion: Dual mesh repair with sandwich technique is a feasible and safe procedure among patients with large incisional hernia or abdominal wall defects.

Keywords: Large incisional hernia, Abdominal wall defects, Dual mesh repair, Sandwich mesh technique

INTRODUCTION

Incisions for abdominal surgeries, trauma, tumor resections, or extensive debridement's of infective process of abdominal wall like necrotizing fasciits may complicate in the form of defects or hernias called incisional hernias.[1,2] The overall incidence of incisional hernia after abdominal surgeries has variably been described in literature from 50% to 60% with a recurrence rate from 10% - 30%, even with the aid of prosthetic materials.[3,4,5]

Primary closure of the smaller defect by tissue approximation is still achievable in some smaller defects, but is discouraged due to high rates of recurrence.[6] Currently, the standard of care is achievement of tension free repair which is usually aided by prosthetic mesh.[6,7] In literature, various techniques have been described for incisional hernia repair including primary repairs, repairs with darn suturing and mesh placement with fascia repair.

Both open and laparoscopic approaches are equally effective. Similarly, various mesh materials including absorbable or non absorbable or biologic mesh have been introduced, but still no operative technique or mesh material is superior to others. [8,9] The basic problem with large incisional hernia or defects (> 100cm^2) is failure to achieve an edge to edge approximation of hernia sac and even if approximation is achieved, it is achieve under tension and often fails to produce recurrence.[10,11,12] So, surgeons are left with only few choices to cover these defects. Multiple methods of covering these large hernias or defects have been described including, sublay, onlay, reteromuscular, or inlay, but none have been considered as gold standard. Biomeshare may be a good option, but still not popular due to its expensiveness and no clear guidelines for its use.[13,14]

Another available option is the novel technique of using dual mesh repair with sandwich technique in which an inner mesh can be placed over the hernia sac which will act as a protective barrier between the mesh and intestine.[15,16] This mesh is covered with myoaponeurotic layers, followed by placement of an only prosthetic mesh of adequate size. The objective of this study was to evaluate the outcome of the dual mesh repair with sandwich technique for large incisional hernia and defects.

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METHODOLOGY

This cross sectional study included 35 selected cases of large incisional hernias or abdominal wall defects of age > 18 years and both gender from outpatient or emergency departments of three tertiary care units (i.e. Services Hospital, Lahore, Rasheed Hospital, Lahore and Sharif Medical City Hospital, Lahore) over a period of 4 years i.e. from 1st June 2013 to 30th June 2017. Inclusion criteria were presence of large incisional hernia or abdominal wall defects measuring > 100cm^2 on clinical examination, ultrasonography, CT scan or preoperatively. The patients with malignant diseases, immunocompromised staus, cardiac failure, respiratory failures, uncontrolled diabetes, heavy smokers (>20 pack years) were excluded from study. The patients who were unwilling for surgery or unfit for general anesthesia were also excluded. After the demographic history was taken, the patients were counseled about the procedure and an informed consent was obtained. All the mandatory investigations required for anesthesia fitness were done. All the surgeries were done under general anesthesia.All the patients received an antibiotic prophylactic dose of injection ceftriaxone 1gm (Injection Aventrix 1 gram intravenously 30 minutes before surgery.

The following surgical technique was adopted. Antiseptic preparation of the skin was done. Incision was marked and previous cutaneous scar was excised in an elliptic fashion. Careful dissection was carried out to mobilize the skin flap around the hernia sac till the edge of the sac were reached. The dissection was continued in the all around the sac till all the circumference of the hernia sac is bared. Care was taken not to damage the hernia sac. If some part of the sac was damaged or a rent was created, it was repaired at the same time with vicryl 3/0 suture. The dissection was continued under the flaps of the skin and subcutaneous tissue over the myoapneural sheeth. This dissection was continued approximately 5 centimeters away from margin of sac. After raising the skin and subcutaneous tissue flaps, a meticulous dissection was continued around the margins of the junction of the sac with the peritoneum. A cicumferential dissection around the sac was continued in continuity with peritoneum.

This way, hernia sac plays a part of bridge between the layers of peritoneum all around. Hernia sac is then plicated. Then, a suitable sized mesh preferably a Vypro mesh,ULTRAPRO® (Ethicon, Johnson & Johnson, Somerville, NJ) was placed over this layer and is fixed over the peritoneal layer with absorbable interrupted sutures. In cases, where no peritoneal layers or hernia sac was available, we used an intraperitoneal Parietex compositum mesh (Covidien,Dublin, Ireland) was used instead of Vypro. In cases, where affordability was an issue, polypropylene mesh PROLENE® (Ethicon, Johnson & Johnson, Somerville, NJ) was also used. This mesh was covered up with available tissue. In some case, it was myoaponeural layers, muscle fibers. We did not need component separation technique in any case. The part of the inner mesh was left uncovered superiorly, if there was no tissue available. This was later covered up with a polypropylene mesh PROLENE® (Ethicon, Johnson & Johnson, Somerville, NJ) in a similar fashion of onlay repair. Mesh was spread to cover approximately 5 cm margins lateral to defect. After this a suction drain (No. 18) was left under the skin and subcutaneous tissue flap. Subcutaneous layer was closed with an absorbable suture vicryl 2/0 and skin with either skin stapler or with prolene 2/0 suture.

The wound was tapped with antiseptic dressings. Postoperatively, the patients were monitored for hemodynamic and respiratory system for next 24 hours in ICU or till they were fully conscious. They received intravenous analgesia (injection paracetamol) and three doses of intravenous antibiotics (injectable ceftriaxone) till the time they were oral free. The patients were discharged to home in the next couple of days till they were mobile and pain free. Drains were removed when there was no drainage till 24 hours. The patients were followed up for one month for following complications, like hematoma, seroma, minor or major surgical site infection, or flap ischemia. Serial ultrasonographic guided aspiration with antibiotic cover was planed for patients who develop seroma or hematoma. Open drainage was an option if not covered up with serial aspirations. A debridement or opening of the wound was an option for patients with wound infection or flap ischemia. Later on the patients were followed up regularly after every 2 months till one year for presence of recurrence. Data was entered SPSS 20 and analysed.

RESULTS

In this study, the mean age of patients was 45 +11 years (minimum 35 years and maximum 58 years). There were 22 (62.86%) male and 13 (37.14%)

female patients. The mean BMI was 19.10±0.46 kg/m^2. The detail of sites of incisions and surgical procedures causing incisional hernia or abdominal defects is given in table I. The mean size of hernia sac or defects was 325.11+31.33 cm^2.

The mean operative time was 115.47+15.91 minutes. The mean hospital stay was 1.47+0.91 days. We used polypropylene mesh in all cases as an outer mesh. For inner mesh, we used intraperitoneal Parietex compositum mesh in 3 (8.57%) patients, Vypro mesh in 23 (65.71%) patients and polypropylene mesh in 9 (25.72% patients).

Table I: Detail of sites of incisions and surgical procedures causing incisional hernia or abdominal defects

Site of incisional hernia or abdominal wall defects	Surgical procedure	No	%age
Midline	Emergency laparotomy	17	48.57
	Elective laparotomy	5	14.28
Right hypochondrium	Cholecystectomy	3	8.57
Right lumbar region	Nephrectomy	2	5.71
Right iliac fossa	Ileostomy	2	5.71
Left iliac fossa	Colostomy	3	8.57
Midline defect	Tumor resection abdominal wall	1	2.85
	Resection of abdominal wall muscles for necrotizing fasciitis	2	5.71

Table II: Complications of the procedure

Parameters		No	% age
Total		11	31.43
Peroperative complications	Visceral injury	0	0
	Bleeding (> 500 ml)	0	0
Postoperative complication (30 days)	Urinary retention	0	0
	Wound seroma	7	20
	Wound hematoma	3	8.57
	Wound infection	1	2.86
	Pelvic abscess	0	0
	Fecal fistula	0	0
Mortality		0	0
Late complication (1 year follow up)	Recurrence	0	0
	Sinus tract formation	0	0
	Scar complications (Keloid)	0	0

The details of intra and postoperative complications and long term follow up are given in table II. Among 7 (20%) patients, who developed seroma formation, all were managed with ultrosonographic guided aspirations. None of the patients required surgical exploration. One (2.86%) patient required surgical exploration for drainage of hematoma.

In this patient, the hematoma was evacuated with suction and drain left in place. In only patient who got wound infection, wound stitches were removed and pus was allowed to drain. Regular dressing was carried out and wound was allowed to heal with secondary closure. One (2.85%) patient who developed chronic sinus tract formation, required an excision of sinus tract under general anesthesia. Overall surgical procedure was required in 3 (8.57%) patients, with no loss of mesh.

DISCUSSION

Our experience of using dual mesh repair technique shows that it is a useful option among patients with larger hernias and defects. We found no recurrence although the frequency of wound site infection was high (31.43%). Defining the large incisional hernia has always been debatable in literature till European Hernia Society defined large hernia as the hernias with a defect width of 10 cm or more or a surface of 100 cm2 or more in two dimensions.[10,11] The main problem in treatment of large incisional hernia or abdominal wall defects is deficit or weak wall substance caused by detachment of muscles. Moreover, muscle traction causes further increase in size of the defect. Surgeons, in this arena are compelled to perform tension free repair in order to reduce the abdominal diameter and possible chances of muscular ischemia.[12-15]

In our study, the mean size of the hernial defect was 325.11+31.33cm2. Like our study, Hosseini et al,[2] preferred a sandwich mesh technique in patients with mean hernia defect diameters 31 ± 24.6 cm. Koraney M, et al,[16] also favored double mesh technique for patients with hernia defects of size 10- 25 cm. But this is not universally practiced as in study by Memon et al,[15] who used an only mesh technique for hernia defects size 14.4 X10.5 cm.

The term dual mesh repair with 'sandwich' technique is a broader term which denotes a number of techniques utilized for treatment of large incisional hernia. Review of literature describes a variety of techniques used under this category like double onlayintraperitonealonlay mesh technique,[17] double onlay mesh technique.[18] Double underlay and onlay mesh technique,[19] and component separation with

double mesh technique.[20,21] We adopted a dual mesh technique with a l ittle variation. We used hernia sac as a barrier between the intestine and mesh. This is a preperitoneal space, also can be called as sublay space as is used in Rives-Stopp technique.[22] The other mesh was an onlay mesh placed just below the skin and subcutaneous flap. In some cases, we used intraperitoneal Parietex compositum mesh (in 8.57% patients). One of the advantages of using sublay technique was the cost effectiveness. This way, we were able to place a Vypro mesh as an inner mesh using a sac as a barrier between mesh and intestine. Vypro is a lighter mesh with some component of absorbale suture, hence produced less tissue trauma and lesser chances of mesh erosion.[23] Surgeons are free to select the choice of prosthetic materials and technique for dual mesh placement. We also modified selection of mesh materials according to situation. Prosthetic mesh material is notorious for tissue reaction. Some authors believe that only structural repair is enough and the best results with hernia repair is just only due to inadequate length of follow up.[2] In our study, we also had a very high frequency of wound site complications like seroma in 20%, hematoma in 8.57% and wound infection in 2.86% patients. This complication rate is on higher side, but is comparable with a low (0%) recurrence rate. A higher wound site complication rate may be attributed to using polypropylene mesh.

This can be reduced by using a light weight mesh like vypro mesh. When compared to the other studies, we also see a higher complication rates. In study by Koraney M, et al,[16] over all complication rate was 24%. In their study, wound infection was seen in 6% patients, hematoma in 2% and seroma in 8% patients. In a study by Hosseini et al,[2] hematoma was seen among 19.6% patients, seroma in 13% patients, and wound infection in 4.3% patients. Although complication rate was higher in our study, we required minor surgical intervention in only 3 (8.57%) patients with no mortality. All were minor surgeries performed in day care setting. One of the advantages in our technique was no recurrence. This is quite comparable to the reported recurrence rates described in literature i.e. from 0% to 13.3%, with most of the studies demonstrating a rate of 0%.[23] This study had certain limitations. This is a multicenter experience of a single surgeon with a limited number of selected patients. Comparative trials on larger number of patients may help us in making some guidelines.

CONCLUSION

For large incisional hernia and defects, dual mesh repair with sandwich technique have shown promising outcome in the terms of no recurrence but with a higher wound complication rate. Seroma and hematoma are the most common complications which however can be managed with simple aspiration or surgical intervention in quite a few cases. Although it is surgeon's choice, sublay technique for inner mesh and onlay for outer mesh as used in our study may be a good option for repair in large incisional hernia and defects.

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