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Original Article

Comparison of Onlay versus Sublay Mesh Repair in Ventral Hernia : Our Experience in a Peripheral Hospital

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Abstract

Background: Mesh repair is the standard procedure of choice for the ventral hernia repair. The common techniques for this surgery are onlay and sublay repair. But the superior technique between the two is yet to be established objectives.

Objectives: We conducted this study to compare the results of Onlay with Sublay mesh repair for the treatment of ventral hernia.

Methods: This comparative study was conducted at the department of Surgery, Shaheed Tajuddin Ahmad Medical College Hospital, Gazipur from April 2018 to April 2019. 20 patients withclinically diagnosed ventral hernia were randomized into two groups. The patients in group A had onlay mesh repair while those of group B hadsublay mesh repair. Comparison between the two methods were made in terms of operative time, technical ease, early post operative events specially drain & complication, hospital stay, recurrence.

Result: Twenty patients between 20 to 70 years of age among whom 6 are male and 14 are female with different types of ventral hernia including paraumbilical, umbilical, epigastric and incisional, except with defect more than 15 cm were studied. The sublay repair took significantly longer operative time (p = .023). Onlay repair group had more seroma formation, wound infection and recurrence, though not statistically significant. Patients who underwent sublay repair had early removal of drains (3.7 ± .823 days vs 6 ± .738 days) which was significant (p= .000). At the same time sublay repair group had significantly shorter hospital stay than the onlay group (4.5 ± 1.900 days vs 6 ± 1.354 days, p= .023).

Conclusion: Sublay repair seems to be a better alternative than onlay repair of Ventral hernia. Randomised controlled trial with larger case numbers is needed to validate the result.

Keywords: Ventral hernia, sublay mesh repair, onlay mesh repair.

Introduction

Ventral hernias are commonly encountered in surgical practice which includes incisional hernia and those caused by primary defect in abdominal fascia namely umbilical, epigastric and paraumbilical hernia. The estimated incidence of ventral hernia is 11 - 20%[1]. The implantation of prosthetic mesh remains the most efficient method for the repair of ventral hernia [1,2]. In surgical practice, the two most frequently used operative technique in case of ventral hernia repair are the onlay and sublay repair. However, it remains unclear which technique is superior in respect to operative time and outcomes.

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Patient and Methods

The study was carried out on 20 patients with ventral hernia at the department of Surgery of ShaheedTajuddin Ahmad Medical College Hospital, Gazipur fromApril 2018 to April2020. The study was

approved by the ethical committee of Shaheed Tajuddin Ahmad Medical College Hospital. Patients were divided equally into two groups. Twenty Patients with different types of ventral hernia including paraumbilical, umbilical, epigastric and incisional hernia with defect more than 15 cm, where a more complex procedure is indicated and the ages between 20 – 70 years without sex discrimination were included in the study. Ten(10) patients of group A had onlay mesh repair and the 10 others at group B underwent sublay mesh repair. We have excluded patients under 20 years, Groin hernia and Complicated hernia, Recurrent hernia, Hernia with defect more than 15 cm and patient with abdominal malignancy.

Statistical Analysis

Observations were collected in a pre-designed structured questionnaire. The collected data were analyzed with IBM SPSS statistics software 23.0 Version. For categorical variables descriptive statistics like frequency analysis and percentage analysis was used. For continuous variables the median (as the sample size is low, median used instead of mean) and S.D were used to describe about the data. Boxplot was also used to show the distribution of the data. The Shapiro Wilk's test for normality shows the data was skewed hence to find the significant difference in the median values the Mann-Whitney U test were used. To find the significance in categorical data Fisher's Exact test was used. The P value of less than .05 was considered as significant.

Operative Procedures

The operations were performed under general anesthesia. In case of incisional hernia, the old scar was excised and in case of epigastric, vertical incision and for both umbilical and paraumbilical hernia, transverse incisions were given. Then the hernial sac and defect were exposed adequately. The sac was opened and the content was reduced after lysis of the adhesions. The excess sac was excised.

In onlay repair, the hernia defect was closed primarily where the defect was small and approximated without tension with an interrupted or running continuous non absorbable suture. After that the mesh was cut to a diameter 10 cm greater that the defect and fixed to the fascia with two concentric rings of interrupted 2/0 polypropylene sutures. A suction drain was used and skin was closed.

In sublay repair, the preperitonealretromuscular space was dissected about 5-6 cm beyond the edge of the defect where the mesh was positioned and fixed by 2/0 polypropylene sutures. Suction drains were laid on the mesh and brought out through a separate stab wound. The muscular aponeurotic structures were repaired with polypropylene no 1 followed by skin closure.

In all patients, a soft polypropylene non absorbable synthetic surgical mesh was used. The suction drain was removed when drainage was less than 20 ml.

Result

Total 20 patient were included in this study, comprising 6 male and 14 female (70%). The mean age of our study population was 50.35 ± 14.383 years, ranged between 20 to 70 years.

Table-I. *Patients demographic and baseline characteristics with outcome variables (n = 20)*

Variables	Group A (onlay) (sublay)	Group B	P value (Fisher's exact Test, 2-sided)
Gender			
Male	2 (20%)		
Female	4 (80%)		.628
Diabetes Mellitus	6 (20%)	8 (80%)	
Comorbidities	3 (30%)	1 (10%)	.582
Hypertension	4 (40%)	5 (50%)	1.000
Obese	2 (20%)	6 (60%)	.170
Defect size<5 cm	2 (20%)	3 (30%)	1.000
>5 cm	8 (80%)	7 (70%)	
Operative time			.023
<60 min	8 (80%)	2 (20%)	
>60 min	2 (20%)	8 (80%)	
Wound Infection	3 (30%)	1 (10%)	.582
Seroma formation	4 (40%)	1(10%)	.303
Recurrence	2 (20%)	0 (0%)	.474

Overall 8 (45%) patients had hypertension, 4 (20%) had diabetes mellitus and 8 (40%) were obese. Though there was no significant difference in between two groups (Table I). Most of the patients of both the groups had a defect size >5 cm.

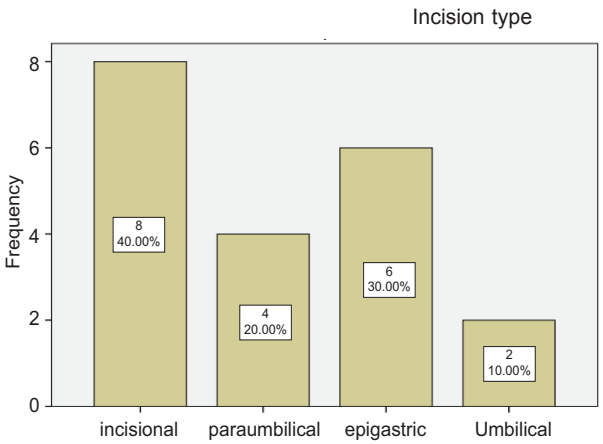

Fig. 1: *Type of hernia operated*

The type of hernia operated were mostly of incisional (40%) and epigastric (30%) type (Fig 1).

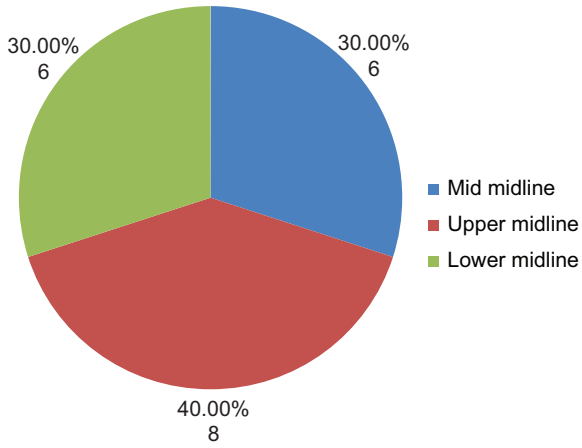

Fig 2: *Type of incision*

Three types of incision were given for the repairs namely midline (vertical), curved transverse incision (smiling incision) and transverse incision amongst which upper midline was most frequent (40%) (Fig 2).

The operative time of sublay repairs were significantly higher than onlay repair (p = .023). 80% of the sublay repairs took > 60 minutes whereas only 20% of onlay cases took longer than 60 minutes (Table 2). There were no significant differences between the two operative procedures in respect to wound infection, seroma formation and recurrence. Although there were two recurrent cases in the onlay group and 40% of the patients in the onlay group has developed Seroma (Table 2). The Seroma was managed with Seroma drainage. On the other hand, there was no recurrence on the sublay group and the Seroma formation was also minimum (10%). The onlay group had higher wound infection (30%). Though no patient required removal of mesh because the infection was superficial and responded well to antibiotics and regular dressings.

The mean value for "days required for drain removal" as well as was 6 ± .738 days in cases of onlay group. For sublay group, it was 3.7 ± .823 days (Fig 3). Mean hospital stay was 6 ± 1.354 days for onlay groupwhereas it was 4.5 ± 1.900 days for sublay group (Fig 4). To compare the two groups Mann-Whitney U test was applied.

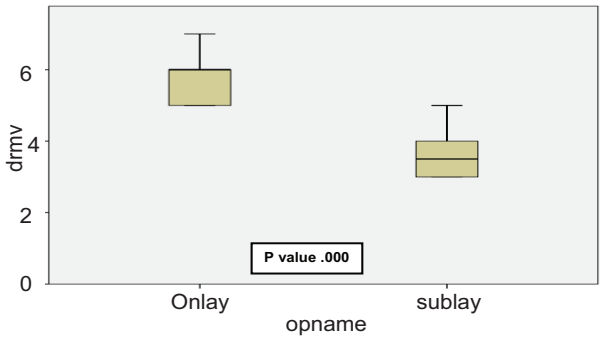

Fig 3:*Comparison of days taken for removal of drains between the two techniques*

There was a significant difference between the days taken for drain removal after the two procedures of hernia repair (U = 3, N1 = 10, N2 =10, p = .000, 2-tailed)

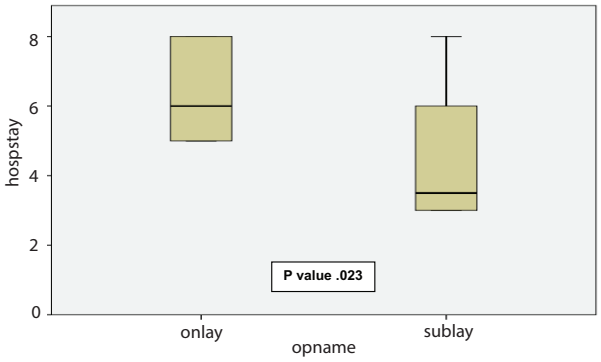

Fig 4: *Comparison of hospital stay between the two techniques*

The hospital stay for the sublay repair was significantly lower than the onlay repair (U = 20, N1 = 10, N2 =10, p = 0.23, 2- tailed)

Discussion

Ventral hernia in the anterior abdominal wall includes both de novo and most commonly incisional hernias after an abdominal surgery. It is estimated that 11-20 % of all abdominal operations result in an incisional hernia [1]. Mesh repair is an excellent method of repair due to less recurrence rate that has led to the widespread acceptance of the procedure [1,2]. Mesh hernioplasty varies from – primary closure with onlay mesh reinforcement, onlay mesh placement only, inlay mesh placement, sublay mesh placement between the peritoneum and abdominal wall or rectus muscle and posterior rectus sheath.

In our study, we evaluated 20 patients who underwent onlay and sublay mesh repair for ventral hernia and were followed up and at 3, 6, 9 and 12 months post operatively. The mean age was 50 ± 14.383 years. Incisional hernias are common in elderly patients and it corresponds to other studies [3,4].

Most of the patients operated were with incisional hernia (40%). Some other series also showed the same result[3].

Sublay repair required longer operative time than onlay group, which was found to be significant. The longer operative times for sublay repair were observed in different studies in India, Middle East, Europe and the United States as well [3–6] which seems to be a drawback of this surgery.

Seroma formation is a common complication after mesh hernioplasty. Our study showed more postoperative seroma formation (40% vs 10%) with onlay technique in comparison to the sublay group. Manimegalai*et al* reported 20% Seroma formation in onlay group and 4% in sublay group[7]. In another study, Saber *et al* reported seroma formation after suction drain removal was observed in 6% patients in onlay repair and in 2% in sublay repair [8]. In another series, seroma was seen in 8 % patients in onlay group and 2% in sublay group [3].

Postoperative wound infection occurred in 3 patients (30%) in onlay group and 1 (10%) in sublay group at our series. Some similar studies reported higher wound infection rates in onlay group [3,4,7,9–12]. Recurrence is an important indicator of successful hernia repair. Two patients of onlay group of our study recurred within 12 months of follow up whereas no patients of sublay group had recurrence during this follow up period. Since these complications were generally wound complications and seroma, it is thought that they were attributable to the more extensive dissection in the abdominal wall for exposure of the anterior rectus sheath and the anterior abdominal wall fascia for mesh placement in the onlay position. The lower recurrence rate in the sublay group was also found in other studies 1% vs 0% by Dhaigude BD*et al* and 4.35 % vs 8.51% by Raghuveer MN*et al*[3,13].

Most importantly there were significant difference in the mean days required for drain removal and hospital stay in between these 2 procedures. Patients with sublay repair group had drain removed by 3.7 ± .823 days vs 6 ± .738 days for the onlay repair group (p = .000) . At the same time the hospital stay for sublay group was 4.5 ± 1.9 days vs 6 ± 1.354 days for onlay group (p = .023). other studies also supported shorter hospital stay and early drain removal for patients who underwent sublay repair. [3, 4, 8, 10, 13, 14]

Conclusion

From our study on a small sample size we can conclude that Sublay mesh repair might be considered to be a better alternative to onlay mesh repair in terms of less seroma formation, less wound infection, early drain removal, less hospital stay and most importantly fewer recurrences, though it takes longer operative time.

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