

## A PROSPECTIVE COMPARATIVE STUDY ON RETROMUSCULARPREPERITONEAL (SUBLAY) VERSUS PREFASCIAL (ONLAY) MESH REPAIR OF VENTRAL HERNIAS

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### ABSTRACT

**Background:** Ventral hernias are one of the important issues encountered in surgical practice. This study was planned to compare the peroperative and postoperative outcomes of sublay and onlay mesh repair of ventral hernia. **Materials and Methods:** A prospective study involving 50 patients with ventral hernia was carried out in a tertiary care hospital. The cases were operated using sublay and onlay mesh repair. The cases were thoroughly examined and biochemical and hematological investigations were done. All the patients were subjected for complete preoperative assessment. Peroperative hemorrhage, postoperative wound infection and recurrence was compared between both the groups. **Result:** The mean age and gender distribution was statistically similar between both the groups. The proportion of patients with peroperative hemorrhage was high in sublay mesh (27.3%) than onlay mesh (14.3%). The early postoperative complication of wound infection was more common with onlay mesh compared to pre peritoneal mesh. The late postoperative complication of recurrence was noticed in 1 (2%) patient in the onlay mesh group and none in the pre peritoneal mesh group. **Conclusion:** Sublay procedure has lower rate of post operative complications such as surgical site infection and there was no recurrence compared to the onlay procedure. Except for peroperative hemorrhage, other factors are favourable towards sublay procedure and hence can be considered over onlay procedure.

## INTRODUCTION

A hernia is abnormal protrusion of an organ or tissue through presence of a defect in its surrounding walls. Ventral hernias include the non-inguinal, non-hiatal defects in the fascia of the abdominal wall. It is reported that almost 350000 ventral hernia surgeries are performed every year worldwide which highlights the importance of such hernias.<sup>[1]</sup>

The repair of abdominal wall defects is a common procedure performed by general surgeons in their practice. Surgery is usually recommended for individuals those who present with symptomatic hernias and those at increased risk of developing complications. If untreated, ventral hernias may result in hospitalization due to complications associated with it and even death. It also affects the quality of life.<sup>[2-4]</sup>

Ventral hernias are categorized as congenital or acquired with later constituting to majority of the cases. Acquired type commonly occur due previous surgery which results in incisional hernia, trauma or repetitive stress on the natural weak areas of abdominal wall resulting in incisional hernia,

umbilical hernia, epigastric hernia.<sup>[1]</sup> There are multiple techniques for repair of ventral hernias. Many variations and combinations of mesh repair have been described which include intraperitoneal mesh, inlay mesh, onlay mesh and Rives-Stoppa technique. Each of this technique has its own advantages and disadvantages. Considering the increasing incidence of ventral hernias and its impact, it is important to identify appropriate technique that is cost effective with low postoperative complications.

Objectives of the study were, to compare the ease and duration of surgery, duration of hospital stay and various complications following the ventral hernia repair with sublay and onlay mesh repair.

## MATERIALS AND METHODS

This prospective study was carried out among 50 patients who were admitted in the General Surgical wards at Government Medical College, The Nilgiris over a period of one year from March 2023 to February 2024. The study comprised of 38 females and 12 males forming a total of 50 patients. For the

purposes of this study, umbilical and para umbilical hernia were included collectively as ventral hernia.

**Inclusion criteria:**

Patients with uncomplicated ventral hernia, those who were fit for surgery and patients' those agreed to undergo the surgery with either sublay or onlay methods of repair.

**Exclusion criteria:**

Patients with complicated hernia (inflamed, obstructed or strangulated), uncompensated heart or lung diseases, presence of hemorrhagic disorders and those who did not provide consent to participate in the study.

**Method:** After obtaining written informed consent, a detailed history was collected and thorough general examination was made and cases were studied using a structured proforma. Routine lab investigations of urine and blood and chest screening and ECG were done. All cases were subjected to ultrasound imaging. Pulmonary function tests were carried out in selected cases who had previous history of bronchial asthma and respiratory disorder.

The other things noted were type of incision and suture materials used, postoperative healing of

wound, size of defect, presence of other predisposing factors like obesity.

Poly propylene mesh was used in all 50 cases. The patients were followed up for a maximum of one year. Of the 50 cases, 22 patients underwent retromuscularpreperitoneal mesh placement and 28 patients underwent onlay mesh graft.

**Statistical analysis:** All the data collected was entered in a spreadsheet which was then coded. The data was analyzed using IBM SPSS software version 26.0. Qualitative data was described with frequency and percentage. Quantitative data was described using mean with standard deviation. For inferential statistics, the significance of the obtained results was judged at alpha level of 5% denoting p value of <0.05.

**RESULTS**

A total of 50 patients were studied and their age and gender distribution is described in the table 1. Majority were in the age group of 31 to 40 years (32%) followed by 41 to 50 years (24%). The incidence was more in the female cases than male.

**Table 1: Age and sex distribution of the study patients with ventral hernia (N=50)**

Variables	Categories	Frequency	Percentage
Age (years)	Below 30	7	14.0
	31 to 40	16	32.0
	41 to 50	12	24.0
	51 to 60	9	18.0
	61 & above	6	12.0
Sex	Male	12	24
	Female	38	76
	Total	50	100.0

In the onlay mesh group, majority were in the age group of 31 to 40 years (32.1%). In the sublay mesh group, majority were in the age group of 31 to 40 years and 41 to 50 years with 31.8% each. No

significant difference was found between the age distribution of the cases in both study groups i.e., onlay and sublay mesh repair [Table 2].

**Table 2: Age distribution in both types of mesh repair (N=50)**

Age	Onlay (n=28)		Sublay (n=22)		Total (n=50)		P value
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	
Below 30 years	5	17.9%	2	9.1%	7	14.0%	0.703
31 to 40 years	9	32.1%	7	31.8%	16	32.0%	
41 to 50 years	5	17.9%	7	31.8%	12	24.0%	
51 to 60 years	6	21.4%	3	13.6%	9	18.0%	
61 years & above	3	10.7%	3	13.6%	6	12.0%	

With regard to the presenting complaints, all the 50 patients had bulge. Pain occurred in 22 (44%) patients. Skin changes occurred in 1 patient (2%). Comorbid conditions such as diabetes mellitus and hypertension were present in 10 (20%) and 3 (6%) patients respectively.

Peroperative hemorrhage was found in 10 (20%) cases. Though not statistically significant, the incidence of haemorrhage was more common with preperitoneal mesh (27.3%) compared to onlay mesh (14.3%) [Table 3].

**Table 3: Difference in peroperative hemorrhage between onlay and sublay mesh**

Per op (Haemorrhage)	Onlay	Sublay	Total	P value
No	24 (85.7%)	16 (72.7%)	40 (80%)	0.254
Yes	4 (14.3%)	6 (27.3%)	10 (20%)	
Total	28 (100%)	22 (100%)	50 (100%)	

The early postoperative complications include superficial and deep sepsis in 8 (16%) and 9 (18%)

patients respectively. Incidence of wound infection is more common with onlay mesh compared to pre

peritoneal mesh which was not statistically significant. There was no early postoperative complication in 33 (66%). The late postoperative complication (recurrence) was noticed in 1 (2%) patient. No statistically significant

difference was found in the incidence of recurrence between onlay mesh compared to pre peritoneal mesh [Table 4].

**Table 4: Difference in late postoperative complication between onlay and sublay mesh**

Late Post Op (Recurrence)	Onlay	Sublay	Total	P value
No	27 (96.4%)	22 (100%)	49 (98%)	0.371
Yes	1 (3.6%)	0 (0%)	1 (2%)	
Total	28	22	50	

## DISCUSSION

The present study compared various factors between onlay and sublay mesh repair procedure for ventral hernia. After the advent of mesh repair, the other procedures have become obsolete. Though it is associated with increased incidence of local complications, it reduces the recurrence rate. The rationale behind using mesh repair invariably for all cases independent of size of defect, age, sex and weight of patient was to reduce the incidence of recurrence.

Onlay is technically simple and easy procedure compared to others. Yet, it is reported to be associated with local wound infection. Sublay mesh repair is believed to have lower rate of such issues.<sup>[5-7]</sup>

In the present study, there was no statistically significant difference in the wound infection between onlay and sublay mesh group. Similar to this, a study by Dharmendra BL et al also did not find any significant difference in the wound infection between on-lay and sub-lay mesh repair.<sup>[8]</sup> However, it was found in the current study that onlay mesh had higher rate of wound infection than sublay mesh repair.

In line with the present study, a study by EL Badawy et al also reported non significant higher rate of wound infection with onlay group compared to sublay group which was 11.7% and 3.3% respectively.<sup>[9]</sup>

The incidence of deep surgical site infection was higher in the onlay repair group than sublay repair group which was 8% and 4% respectively in a study by Reddy KR et al which is also similar to the present study.<sup>[10]</sup>

A meta-analysis was performed by Shaikat W et al which analysed 6 studies involving 468 cases.<sup>[11]</sup> The pooled data of the meta-analysis showed that sublay mesh repair had consistently lower hernia recurrence rates and this differences did not have statistical significance. Sublay repair was also demonstrated to have fewer postoperative complications in different studies, in terms of less seroma formation and surgical site infection.

Fewer postoperative complications were reported in a study by Deherkar et al among patients treated with sublay technique compared to onlay technique. This is also consistent with the present study finding.<sup>[12]</sup>

In their study Shah et al reported more infection rate with onlay procedure compared to sublay procedure

(16.7% vs 3.3%). This is also inline with the present study finding.<sup>[13]</sup>

In our study recurrence was present in one patient during the time of follow-up and was operated with onlay mesh repair procedure. There was no recurrence with the sublay procedure. Similar result was found in a study by EL Badawy et al in which recurrence was reported in 1.7% and 5% of the cases treated with sublay and onlay procedure.<sup>[9]</sup> The recurrence rate was reported as 6.7% in the onlay group compared to no recurrence in the sublay group in a study by Shah et al which is also similar to the present study.<sup>[13]</sup>

The rate of peroperative blood loss was high with sublay procedure compared to onlay procedure in the present study. Similar to this, a study by Alsoudany SEM also reported that average volume of blood loss was higher with sublay than overlay mesh (77.9cc vs 74.2cc).<sup>[14]</sup>

## CONCLUSION

Among the various techniques described in the mesh placement, onlayrepair, though technically easier and associated with the lower incidence of blood loss, is complicated by a higher rate of sepsis and recurrence. Pre peritoneal mesh repair, though technically difficult for the novice, plagued with a higher rate of blood loss has the distinct advantage of reducing the rate of infection and recurrence.

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