

# An Experience to Compare the Outcome of Sublay Versus Onlay Mesh Repair in Ventral Hernias

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## ABSTRACT

**Objective:** To compare the recurrence and complication rates in sublay and onlay mesh repair in primary and secondary ventral hernias.

**Methods:** This prospective randomized controlled comparative and interventional study was conducted at Surgical Unit III of Peoples University of Medical & Health Sciences for Women Nawabshah and Jinnah Medical Center Nawabshah, from January 2014 to December 2015. Sixty patients were randomly selected having paraumbilical, epigastric hernia of different sizes and recurrent ventral hernias. Synthetic polypropylene mesh sublay and onlay was used to repair. Follow up time was about two years, monthly for six months and 6 monthly up to years.

**Results:** In this study we include 60 patients; age range was 20 to 76, and mean age  $46.2 \pm 14.5$  -years. Most of the patients (63.3%) having age of 25 to 50 -years. 50 (83.3%) were female. Out of 60 patients 30 (50%) were included in both groups. Mean Age of patients was  $45.25 \pm 6.45$  and  $42.30 \pm 5.46$  years in group A and B respectively. Predisposing factors were overweight 28 (46.7%) and Obese patients 11 (18.3%) with a mean BMI  $32.6 \pm 6.3$ , whereas 21 patients (35%) were of normal weight with mean BMI  $21.3 \pm 3.6$  p-value of ( $\leq 0.002$ ).

**Conclusion:** Sublay mesh repair is superior, in respect of recurrence rates, surgical site infection, and seroma formation as compared to Onlay mesh repair for ventral hernias. However the procedure is demanding and difficult to perform has excellent results and recommended to do this procedure.

**Key Words:** Ventral Hernias, Sublay Mesh Repair, Onlay Repair,

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## INTRODUCTION:

Hernia is an abnormal, protrusion of viscus or a part of viscus through a natural or an artificial opening, of its containing cavity and coverings and sac. Among ventral hernias Para umbilical hernia (PUH) common in adults and Umbilical Hernia (UH) common in children

occur in the region of the umbilicus or around the umbilicus<sup>1,2</sup>, 10% of abdominal hernias are UH which results in children, and PUH develops in adults<sup>3</sup>. Paraumbilical and epigastric hernias develop through an opening in the midline in linea Alba. These are common in obese, multiparous, elderly and middle aged women consisting of 10% of all primary hernias in surgery<sup>1-3</sup>. The predisposing factors are obesity and multiple pregnancies, for both primary and recurrent hernias<sup>5,6</sup>. Omentum, intestine, or peritoneal fat may be the contents of hernias and occasionally the combination of all these is seen<sup>7</sup>. Most common symptom is pain which may be due to obstruction, strangulation or incarceration and hence elective surgery should be performed before

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the complications develops<sup>4</sup>:

Anatomical repair by tension free sutures was the technique in the past, few peoples still performing, has high recurrence rate hence its popularity is reduced. Open or laparoscopic mesh repair to close the defect for all types of hernias is the procedure of choice, now a days and has reduced the recurrence rate drastically<sup>8,9</sup>. Several factors are responsible for high recurrence rate (20-55%) in anatomical repair of paraumbilical and epigastric hernia repair<sup>5,7</sup> like, infection, seroma formation, and tension sutures. Weight gain and obesity after hernia repair are additional factors for recurrence<sup>6,10,11</sup>. Regarding the size of defect to perform mesh repair is controversial, many surgeons preferred mesh repair if the size is more than 4cm and other surgeons even use mesh in defects less than 2cm.

There are different methods to apply mesh, Onlay, on the anterior rectus sheath, Inlay, just underneath the rectus sheath, Sublay, behind the rectus muscle and superficial to peritoneum and posterior rectus sheath, Underlay intra-abdominal on the peritoneal surface. All the methods of open or laparoscopic mesh repair has advantages and disadvantages and recurrence rates and complications. The easiest method is open onlay mesh repair it requires subcutaneous dissection that results, Infection, Seroma and Hematoma formation and sometimes may need to remove to subside the infection. Sublay mesh repair is more difficult and challenging to perform is has an excellent results minimum infection and recurrence rate In this study we compared the outcomes of two common open techniques, Onlay proline mesh repair, and Sublay mesh repair on the basis of Infection, recurrence rate, seroma and hematoma formation.

#### METHODS:

This study was conducted at Surgical Unit III of Peoples University of Medical & Health Sciences for Women Nawabshah and Jinnah Medical Center Nawabshah, from January 2014 to December 2015. Sixty patients were randomly selected of paraumbilical and epigastric hernia of different sizes, synthetic polypropylene mesh

sublay and onlay was used to repair. Patient's bio data, age, gender and Body Mass Index (BMI) were recorded. In both varieties Under general anesthesia through transverse incision over the bulge, the rectus sheath was separated by sharp and blunt dissection. The defect was opened contents reduced, peritoneum and posterior rectus sheath were closed with vicryl 2/0, a plane was made behind muscle upto lateral border of rectus muscle for sublay mesh repair, in other group of onlay the defect was closed with proline zero and adequate size of mesh applied onlay and fixed with proline 2/0 suturs and were closed over a redivac drain of 16FR size. Obstructed, incarcerated, and strangulated hernias were excluded. Sulbactam +Cephoperazone 2 gram was used as prophylactic antibiotic at the time of induction of anaesthesia and continued for 3 days as a 12 hourly dose. Post operatively every patient was instructed to wear belt on the first postoperative day and continued for at least 6 months, at the time of walking and working and avoid weight lifting. Follow up time was about two years, monthly for six months and 6 monthly 18 months. Data was statistically analyzed.

#### RESULTS

In this study we include 60 patients; age range was 20 to 76, and mean age  $46.2 \pm 14.5$  years. Most of the patients (63.3%) were aged between 25 to 50 years. 50 (83.3%) were female. Out of 60 patients 30 (50%) were included in both groups. Mean Age of patients was  $45.25 \pm 6.45$ , and  $42.30 \pm 5.46$  years in group A and B respectively. Out of all patients 12(22%) had hypertension, and 9 (15%) Diabetes Mellitus (p value:  $<0.005$ ). Predisposing factors were overweight 28 (46.7%) and Obese patients 11 (18.3%) with a mean BMI  $32.6 \pm 6.3$  whereas 21 patients (35%) were of normal weight with mean BMI  $21.3 \pm 3.6$  p-value of  $\leq 0.002$ . Other predisposing factor was parity; from 50 female patients; 39 (78%) were multipara and 7(14%) nulliparous 4(8%) unmarried (p-value:  $<0.005$ ). There was relation to weight lifting because most the patients were belonging to farmers and villages about 52(86.7) patients 46 females and 6 males and 8(13.3%) patients had usual work. (Table I)

sublay and onlay was used to repair. Patient's bio data, age, gender and Body Mass Index (BMI) were recorded. In both varieties Under general anesthesia through The patients presented for first time as paraumbilical 35(58.3%) (sublay 18 and onlay 17) and epigastric hernia 13(21.7%) (sublay 6 and onlay 7) and 12(20%) (sublay 6 and onlay 6) patients presented with recurrent incisional hernia 8 PUH, and 5 epigastric were repaired in the past without mesh by non-absorbable polypropylene sutures anatomical repair or Mayo's repair. Regarding hernia defect 18 patients had less than 2cm and 42 patients had more than 2cm measured by inserting fingers at the time of operation one finger equal to 1cm. Follow-up time was at least 2 years, all patients visited for two years, 35 for three years and 16 patients for 4 years. Seroma and Surgical site infection occurred in 8 (26.7%) patients (6 female and 2 male) of onlay repair, and only one (1.7%) female patient in sublay repair. Regarding recurrence 4 (13.3%) females of onlay repair who developed surgical site infection resulted in recurrent incisional hernia in whom mesh was removed due to uncontrolled infection. No one patient developed recurrent hernia in sublay group. Table No II & III.

**Table No I: Demographic Distribution / Predisposing Factors**

Variable		frequency	%age	p-value
Sex	Male	10	16.6	<0.002
	Female	50	83.3	
Age (years)	22 - 40	28	46.7	<0.001
	.....	15	25	
	.....	11	18.3	
	More than 60 yrs	07	11.7	
Parity-	Multiparity	39	78	<0.001
	Nullipara unmaried	07 04	14 08	
BMI-	Normal weight	21	35	<0.001
	overweight	28	46.7	
	obese	11	18.3	
Occupation-	Farmers villagers	52	86.7	<0.001
	Female	46	76.7	
	male	06	10	
	Usual work	08	13.3	
	Female	04	6.7	
Male	04	6.7		

## DISCUSSION

Generally ventral hernia are common in females<sup>14</sup> and also in this study women were suffering more than men 50 (83.3%) and 10 (16.6%) respectively with p value of <0.001. this looks to be due to extra adipose tissue in females which results in more hernia formation<sup>15</sup>. Ventral hernia includes both primary and incisional hernia and it has been reported that incisional hernia results in 3-12% of all abdominal surgeries<sup>16</sup>. There was high recurrence rate in open primary suture technique about 44%<sup>17</sup> Mesh repair has excellent results however still complications may occur and burden of cost is an additional factor, A study demonstrated the use of mesh has about doubled from 35.5% in 1986 to 85.6% in 2000<sup>18</sup>. Short hospital stay, early return to work, less recurrence rate, has led to the widespread acceptance of mesh repair<sup>19</sup>. Ventral hernia are repaired by using mesh to prevent recurrence. We used polypropylene mesh in two planes, onlay and sublay and compared the results. The plane where the mesh would be applied is still under debate and reports show no association of recurrence and other complications with plane of placing mesh and is still controversial<sup>20-22</sup>. In our study complication rates were high in onlay location as compared to sublay mesh repair, there was no haematoma, and one (03%) patient has seroma and infection in sublay as compared onlay which shows 6 (20%) out of 30 patients and these complications may increase the recurrence risk by 4.2, 3.9 and 3.6 times respectively<sup>20</sup>. It is somewhat less than a study which shows seroma and infection in sublay was 12% and in onlay was 28%<sup>23</sup>. Hence sublay mesh repair is an alternative to onlay mesh repair that may be used in all types of ventral herniae<sup>24</sup>.

The European hernia Society classified the hernia defect in to three categories, small, less than 2cm, medium 2-4cm, and large more than 4cm diameter. In our study we divided into two less than 2cm in 18 (30%) as small and >2cm in 42 (70%) as large, which shows about same results in a study which shows 34.5% and 65.5% respectively<sup>25</sup>. In another study hernia defects was classified as small size (12 cm) in (62.5%),

**Table No II: Surgical Site Infection and Seroma Distribution**

Variable		PUH/Epigastric Hernia/Incisional Hernia	Operation Sublay/ Onlay 30/30	Surgical Site Infection		p-value	Seroma		p-value
				No	Yes		No	Yes	
		35/13/12	(18/17) (06/07) (06/06)						
Sex	Male	04/03/03		8	2	0.66	8	2	0.67
	Female	31/10/09		44	6		49	1	
Age (Years)	22 - 40			24	4	0.98	28	0	0.38
	41 - 60			23	3		25	1	
	>60			6	1		7	0	
Parity	Multipara			33	6	0.33		1	0.71
	Nulliparous/ Unmarried			11	0		11	0	
Weight	Normal			21	0	0.57	4	0	0.54
	Overweight			24	4		26	2	
	Obese			07	4		11	4	
Work	Farmers/ villagers hard work			45	7	0.45	50	02	0.71
	Non-Hard work			07	1		07	1	
Hernia defect size	≤2 cm			16	2	0.54	18	0	0.46
	≥2 cm			36	6		41	1	

**Table No III: Surgical Site Infection and Seroma Formation in First Time and Recurrent Surgery**

Complications		Surgery		p-value
		First time	Recurrent	
Wound infection-	Yes	03 onlay 00 sublay	04 onlay 01 sublay	0.35
	No	48	12	
Seroma	Yes	00	03 onlay 00 sublay	0.61
	No	48	09	
Recurrence	Yes	00	04 onlay 00 sublay	0.62
	No	48	08	

and medium defects (24 cm) in (37.5%)<sup>26</sup> which is nearly reverse to our study.

In our study most of the patients age range was 22-50 (70%) mean age (40.2 ±14.1) with a peak incidence between 26 to 42 years age, and is consistent with Daudpoto and his colleagues and another study shows mean age of 40 years<sup>27</sup>.

The average BMI of the patients was 25.4 range 21-35, and the variable is significant for the obese patients for ventral hernias even with small defects. Parity and overweight are the factors which may cause ventral hernias<sup>5,27-29</sup> and a recent study shows obesity and parity were predisposing factors; 35% patients were overweight and 25% were obese of 50 females with BMI 29.1±1.2 and p value <0.001 and

39 (78%) out of 50 females were multipara and 7(14%) nullipara and 4 (8%) unmarried with p value <0.002.

In our clinical trials the recurrent rate was negligible in sublay mesh repair whereas 4 patients developed recurrence within 2 years in onlay group as all the patients were followed up for two years. These patients were obese with BMI 30 and the defect was >4cm and reported by Kingsnorth et al in UK17 about 3.5%<sup>30</sup>, 4.5% by Dirk et al and 9.5% by Kensarh<sup>31</sup>.

Primary umbilical hernia repair with mesh onlay or sublay has decreased the recurrence rate as compared to tissue repair. Onlay mesh repair is easy, simple, safe and good results with recurrence of acceptable rate as compared to sublay mesh repair it is demanding, with long learning curve, and operation time no recurrence<sup>32,33</sup>, thought the risk of serious complication like severe infection, pain may occur in mesh repair but regarding recurrence rate mesh repair is excellent procedure and sublay is superior than the onlay mesh repair.

#### CONCLUSION:

Sublay mesh repair is superior, in respect of recurrence rates, surgical site infection, and seroma formation as compared to Onlay mesh repair for ventral hernias. However the procedure is demanding and difficult to perform has excellent results and recommended to do this procedure.

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