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## Para Umbilical Hernia Mesh Repair, On Lay or Sub Lay Mesh Placement? Comparative Study.

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### ABSTRACT

Mesh hernioplasty for Para umbilical hernia is the standard treatment with very low recurrence rate but the position of mesh prosthesis still a controversial issue, on lay or sub lay? as each position has its own advantages and disadvantages. In this comparative study we compared two groups of patients with PUH each group 19 patients group A underwent sub lay mesh placement and group B underwent on lay mesh placement. Preoperative, operative and follow up data were collected and properly analyzed to withdraw our conclusion. In this study the age mean was  $44.61 \pm 8.67$  years and  $43.15 \pm 10.42$  years in sub lay and on lay respectively, BMI was  $27.36 \pm 1.75$  and  $27.98 \pm 2.32$  in sub lay and on lay respectively, most of cases were female in both groups the operative time was statistically longer in sub lay group, duration of drainage was statistically longer in the on-lay group, wound complications rate and recurrence rate were longer in on lay group without statistical significance. Sub lay mesh placement is associated with much less complications than on lay position in treatment of Para umbilical hernia

**Keywords:** Para umbilical hernia, on lay, sub lay, mesh repair

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## INTRODUCTION

Umbilical Hernia contributes to about 10% of abdominal wall hernias (1), it is caused by any cause that leads to weakness of abdominal wall fascia at umbilical level or increases intra-abdominal pressure as (obesity, ascites, multiple pregnancies and large abdominal tumors). (2) Typically umbilical hernia has a narrow neck which makes higher liability for irreducibility and strangulation, umbilical hernia is either true where the defect lies through the umbilical ring, especially in children, or para umbilical (PUH) where the defect lies near the umbilical ring and the hernia distorts the shape of the umbilicus(3,4).

Hernia repair has many options, either open or laparoscopic, robotic and laparoscopic repair was considered when there were the facilities and expertise to do so, as it shows better outcome in terms of postoperative pain, recurrence to normal activities and surgical site occurrences specially in obese patients,

Open repair of the umbilical hernia is accustomed procedure which could be performed by most of surgeons, anatomical or mayo repair showed a high recurrence rate specially in high risk patients, so mesh implant should augment the repair, type of mesh and site of mesh placement differs according to patient preference, on lay or sub lay positions are the most common positions used as the intra peritoneal position needs a special type of mesh prosthesis, each of the sub lay or on lay positions has its own advantages and disadvantages, here in this study we are trying to hold a comparison between both positions.

## PATIENTS AND METHODS

### Study design and patient selection:

This study was carried out in General Surgery Department, Zagazig University hospitals, from February 2019 to March 2020. On 38 patients with PUH, patients were randomly allocated into two groups Group A (On lay mesh repair) and Group B (Sub lay mesh repair) (19 patients in each group). We included Patients of both genders above 18 years of age with uncomplicated PUH, under ASA class I to II. We excluded cases with Complicated PUH, patients unfit for surgery, patients under ASA class III and IV, Patients with known bleeding disorders, renal failure, collagen vascular disorders and COPD.

### Operative technique

In **group A** (On lay mesh repair) patients were operated by placing the mesh on the anterior rectus sheath and the external oblique apponeurosis as follows; a transverse supra or infra – umbilical incision was done based on the site of the hernia, hernia sac was dissected around to its neck for 3-7 cm around the defect, contents reduced back into the abdomen after opening the sac which was excised, omentum was occasionally excised if involved in the contents of the sac, suturing of the edges of the defect in the midline was done non absorbable sutures, then mesh was stretched over the rectus sheath and external oblique apponeurosis 3-4cm vast the defect it was fixed in position with polypropylene 0 suture, suction drain was left over the mesh, figure 1 shows mesh in the on lay position fig (1).

In **group B** (Sub lay mesh repair) , patients were operated on by placing the mesh in the retro- rectal position. Initial steps are the same as the onlay method, until the hernia sac was dealt with, the retro rectal space was entered by incising the most medial part of the posterior rectus sheath, exposing the medial edge of the rectus muscle, the plane between the rectus muscle and the posterior rectus sheath was entered by blunt dissection till its lateral boundary, making a place for mesh placement and fixation, a suitable mesh size was tailored in the required dimensions placed and fixed with polypropylene sutures to the posterior rectus sheath, suction drain was left in the retro rectal and subcutaneous spaces, figure 2 shows mesh in the sub lay position, drain was removed when the drainage is less than 30 cc per day in both groups.

**Figure 1: Mesh fixed in on-lay position****Figure 2: Mesh in the sub-lay position**

**Follow up;** after discharge, patients follow up was carried out in the outpatient clinics, by the attendant surgeon, visits was planned on the 7th and 14th postoperative days, after 1 month, after 6 months, and if the patient had a complaint.

**Statistical analysis;** the data collected through preoperative work up, operative procedures, hospital admission and follow up data, qualitative data was represented as number and percentage, quantitative continues data was summarized in means and standard deviation, and analyzed using two sample t test and qi square tests in Statistical Package for the Social Sciences (SPSS version 20.0)

## RESULTS

In the current study, demographic criteria of both groups is nearly the same as the mean age was  $44.61 \pm 8.67$  years and  $43.15 \pm 10.42$  years in sub-lay and on-lay groups respectively, without any significant difference, females constituted the majority of patients in both groups (68.42 and 73.68%) in sub lay and on lay groups BMI was  $27.36 \pm 1.75$  and  $27.98 \pm 2.32$  in sublay and onlay groups respectively. (table 1)

**Table 1: Demographic criteria.**

			Sublay Group	Onlay group	P
Age			44.61±8.67	43.15±10.42	0.470
BMI			27.36±1.75	27.98±2.32	0.311
Sex	Male	N	6	5	0.71
		%	31.58%	26.32%	
	Female	N	13	14	
		%	68.42%	73.68%	

In this study hypertension was present in 26.3% in sub lay group and 15.8% in the onlay group, diabetes mellitus was found in 26.3% in both groups, ischemic heart disease was found in 5.3% in sub lay group and 10.5% in on lay group, liver cirrhosis was present in 15.8% in the sub lay group and 10.5% in the onlay group and chronic chest disease was found in 21.5% in the sub lay group and 26.3% in the on lay group there was no statistically significant differences between both groups regarding the associated co morbidities. Table 2

**Table 2: Associated diseases in both groups.**

			Group		P
			Sublay Group	Onlay Group	
HTN	-VE	N	5	3	0.42
		%	26.3%	15.8%	
DM	-VE	N	5	5	1.00
		%	26.3%	26.3%	
IHD	-VE	N	1	2	0.55
		%	5.3%	10.5%	
Liver cirrhosis	-VE	N	3	2	0.63
		%	15.8%	10.5%	
Ch chest diseases	-VE	N	4	5	0.70
		%	21.5%	26.3%	

The surgical procedures was completed successfully in both groups without any intraoperative complications, the operative time in the sub lay group was 106.52±13.2 minutes and in the onlay group it was significantly lower being 83.11±5.67 minutes (Operation duration was significantly longer in Sublay).

The length of hospital admission was 1.1±0.41 in the sublay group and 1.21±0.42 in the onlay group without any statistically significant difference. Drainage duration was significantly shorter in the sub lay group being 3.32±0.81 than in the onlay group it was 5.52±1.2. table 3

**Table 3: operative time and hospital stay**

	Sublay Group	Onlay group	P
Operation duration	106.52±13.2	83.11±5.67	0.00**
Hospital stay in days	1.1±0.41	1.21±0.42	0.118
Hospital stay in days	1.1±0.41	1.21±0.42	0.118
Drainage days	3.32±0.81	5.52±1.2	

The follow up time ranged between 7 month and 12 months, we detected non-significant differences between both groups regarding post-operative complications as surgical site infection rate was 21.1% in the sub lay group and 15.8 % in the on lay group, seroma formation rate was 15.8% in both groups, chest infection rate was 21.1% and no cases in the sublay group, we had only one case of recurrence in the onlay group in hepatic patient as the liver function deteriorated and the patient developed ascitis, there was no cases of recurrence in the sublay group, table 4

**Table 4: Complication distribution between studied groups.**

		Group		P
		Sublay Group	Onlay Group	
<b>Superficial wound infection</b>	N	4	3	<b>0.67</b>
	%	21.1%	15.8%	
<b>Seroma</b>	N	3	3	<b>1</b>
	%	15.8%	15.8%	
<b>Chest infection</b>	N	0	4	<b>0.11</b>
	%	0.0%	21.1%	
<b>Recurrence</b>	N	0	1	<b>0.54</b>

**DISCUSSION**

Primary repair without mesh prosthesis of PUH is associated with high recurrence rate as the tension of the sutures exerted on defect edges seems to impair healing and leads to recurrence, the concept of tension free repair emerged with the use of mesh prosthesis as the use of sheet of mesh prosthesis suturing it to the edges of the defect helps decreasing the tension exerted on the defect edges, recurrence rate of PUH repair without mesh reached in some studies above 40% especially if the defect diameter is > 1cm.while recurrence rate with the use of mesh may be as low as 1.8% in some studies. The position of mesh prosthesis depends largely on surgeon preference and availability of facilities, intra-peritoneal, on lay or sub lay each position is associated with its own complications and intra-peritoneal position needs special type of mesh that doesn't make any reaction to avoid erosion of the intra-abdominal viscera, sub lay and on-lay positions are to be investigated in this study regarding their complications hospital stay and operative time.

In our study 38 patients with Para umbilical hernia were enrolled (19 in Sub lay group and 19 in On lay group). Age distributed was 44.61±8.67 and 43.15±10.42 in sub lay and on lay respectively with no significant difference, also there was no significant difference between groups regard BMI, and gender distribution, the majority of patients in both groups were female. Statistical analysis of preoperative data showed non-significant differences regarding neither associated comorbidities nor the duration of illness.

In our study operative time was significantly shorter in the on lay group, hospital stay time was nearly the same in both groups but the drainage time was statistically shorter in the sub lay group.

In our study that Superficial wound infection, Seroma, Chest infection, Recurrence and overall complication distribution was more in on lay group with non-significant difference between both groups, one European study shown that on-lay technique had significantly more complications than sub-lay technique.(9, 10) Thus, it can be safely said that based on above parameters, sub lay is a better technique than on lay in terms of placement and overall decreased complications and morbidity.(10, 11), we recorded recurrence in only one case of the onlay group in a hepatic patient as liver cell failure impaired healing and development of ascites added to increased intra-abdominal pressure.

This study was limited by its small sample size.

**CONCLUSION**

sub lay mesh placement is associated with much less complications than on lay position in treatment of Para umbilical hernia

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