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ORIGINAL ARTICLE

Comparison of Onlay versus Sublay Mesh Repair for Management of Paraumbilical Hernia

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ABSTRACT

Background: in the last few decades mesh repair of hernia became the standard treatment in all types of hernia including para umbilical hernia(PUH), position of mesh placement either onlay or sublay still an issue of debate, in this study we trying to address advantages and disadvantages of each position.

Methods: in this study we recruited 32 patients with paraumbilical hernia, patients were randomly allocated according to mesh placement position into sublay group 16 patients and onlay group 16 patients, preoperative, operative and follow up data of all participants were properly presented and analyzed using the suitable statistical tests.

Results: The mean operative time in the sublay group was 111.9 minutes, while in the onlay group it was 85.6. Hospital stay in the onlay group was significantly longer compared to the onlay group (p=0.03). Duration for drain removal was significantly shorter in sub lay group. post-operative complications in the form of superficial wound infection occured in 4 patients of the onlay group and only 2 cases of the sublay group, seroma formation occured in 3 patients of the onlay group & 2 patients of the sublay group, While post-operative chest infection was encountered in 1 patient of the sublay group, No incidence of recurrence was recorded from both groups during the 6 month follow up.

Conclusions: Both sublay and onlay mesh placement techniques are safe, both produced acceptable results, and are associated with comparable complications and recurrence rates.

Key Words: Paraumbilical hernia, mesh repair, onlay, sublay.

INTRODUCTION

Hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity[1,2]. Paraumbilical hernias are abdominal defects through the linea alba in the region of the umbilicus and usually related to diastasis of the rectus abdominis muscle. [3,4,5] Umbilical hernias constitute around 10% of abdominal wall hernias. Indirect umbilical hernias, also known as Paraumbilical hernias, protrude above or below the umbilicus and are the most common type of umbilical hernias in adults, more frequently occurring in women[6,7]. Paraumbilical hernias usually occur as result of an acquired abdominal wall defect associated with weakened peri umbilical fascia and conditions that lead to chronic elevation of intra-abdominal pressure [8] (e.g., obesity, multiple pregnancies, ascites, and large abdominal tumours). Wound infections, recurrence, mesh infections, seroma or sinus formation are common reported complications after Paraumbilical Hernia repair **[**9, 10]

METHODS

This comparative study was carried out in General Surgery Department, Faculty of Medicine, Zagazig University, from February 2019 to February 2020. A total of 32 patients with para umbilical hernia (PUH) were inclcluded. We included Patients of both genders above 16 years of age with uncomplicated Paraumbilical hernia, “American Society of Anesthesiologists" ASA class 1 or 2.

We excluded complicated Paraumbilical hernia Patients (peritonitis, Inflamed, obstructed or strangulated hernia , ASA class 3 or ٤, Patients with known bleeding disorders, renal failure , collagen vascular disorders, and COPD.

All patients signed a written consent prior to participation in the study, the study ran in accordance with CONSORT guidelines, it was approved by institutional review board of Zagazig

University. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans. Patients were randomly divided into two equal groups (group A and B) each one 16 patients. Group-A patients underwent mesh repair of Paraumbilical hernia h by onlay technique while group-B patients underwent mesh repair of Paraumbilical hernia by sublay technique.

In group A, the mesh was placed above the rectus sheath. The defect was closed primarily by prolene 1/0 suture followed by placement of prolene mesh. The mesh was extended 3-4 cm beyond the edges of the defect and is not merely sewn to the hernia edges. (Figure 1)

In group B, mesh was placed broadly under the defect in the retro muscular space of abdominal wall posterior to the rectus muscles and anterior to the posterior rectus sheath. The mesh was placed such that it extended over the entire posterior rectus sheath. The contact between intestines and mesh is avoided by the posterior rectus sheath and the layer of peritoneum that lies under the mesh. (Figure 2)

All the operations were carried out under general anesthesia and prophylactic antibiotic (Amoxicillin/Clavulanic Acid) 1.2 grams was given IV at the time of induction of anesthesia. Suction drain was placed in all patients after the surgery. Patients were discharged on 2nd postoperative day, the drain was removed if the output was less than 30 ml in 24 hours. Operation time was measured in minutes from time of incision till the application of last stitch at the end of operation. All patients follow up data were obtained during return visits at 2 weeks, 1 & 6 months after the operation, or when the patient had a complaint.

Statistical analysis; data were expressed as mean ± SD for quantitative variable, number and percentage for descriptive variables. Chi-squared (X^2) test, or fisher exact test and t test were used when appropriate. P < 0.05 was statistically significant.

RESULTS

Demographic data of the two study groups were comparable in regards to age, gender distribution, as the sublay group composed of 2 males (12.5%) & 14 (87.5%) females, with age ranging from 26 to 60 years old, while the onlay group composed of 4 males (25%) & 12 females (75%), with age ranging from 24 to 55 years old.as presented in (table 1)

The two study groups were comparable as regards complaint and duration, with no significant difference in the position of hernia or duration of complaint. Table 2

Also co morbidities shows non-significant differences between both groups (table 3)

Operative time was significantly longer in the sublay group compared to the onlay group, the operative time in the sublay group ranged from 73 to 160 minutes, with a mean of 111.9 minutes, while the onlay group ranged from 75 to 95 minutes with mean of 85.6. The median operative time was statistically different between both groups (p<0.001). intaraoperative blood loss was slightly higher in the onlay group (76.31±34.83 ml) than in the sublay group (100.0±32.5 ml) without statistical significance (table 4)

Hospital stay in the onlay group was significantly longer compared to the sublay group (p=0.03).The post-operative hospital stay was limited to only 24 hours in all patients of the sublay group & 14 patients of the onlay group, while the remaining 2 patients extended their stay to 48h due to the observed continuingly collected blood in the suction drain in the first 24 hours before the amount rate subsided.Duration for drain removal was significantly shorter in sublay group compared to onlay group. The time required to remove the suction drain in onlay group ranged from 3 to 7 days with significantly larger median of 5.75 days compared to the sublay group which ranged from 2 to 5 days with a median of 3.75, P=0.0014.(table 5)Post-operative complications were minimally encountered in both groups, in the form of superficial wound infection in 4 patients from the onlay group and only 2 from the sublay group, and significant seroma formation in 3 patients from the onlay group & 2 patients from the sublay group. While post-operative chest infection was encountered in 1 patient from the sublay group this patient was known COPD patients. No incidence of recurrence was recorded from both groups during the 6 month follow up. (table 6)

Table (1) Demographic data

	Sublay N=16	Onlay N=16	T	P
Age (Years) **Mean± SD** **Range**	 48.9 ± 12.6 26-60	 43.3 ± 10.7 24-55	0.6	0.54
Gender **Male** **Female**	 2 (12.5%) 14 (87.5%)	 4 (25%) 12 (75%)	0.25	0.65

Table (2) Complaint and its duration

	Sublay		Onlay		X^2	P
	N	%	N	%		
Swelling & Pain					0.59	0.74
Supra-umbilical	4	25%	5	31.5%		
Infra-umbilical	6	37.5%	4	25%	Non-significant	
Para-umbilical	6	37.5%	7	43.8%		
Median Duration					**T**	**P**
(Months)	8		12		1.47	0.15
Mean ± SD	11.7 ± 12		18.7 ± 13.3		Non-Significant	
Range	1 - 36		3 - 48			

Table (3) Associated Co-morbidities

	Sublay		Onlay		X^2	p
	N	%	N	%		
D.M	2	12.5	3	18.75	0.0	1.0
HTN	3	18.7	3	18.75	0.0	1.0
IHD	0	0.0	1	6.3	0.0	1.0
Chronic Chest disease	1	6.3	2	12.5	0.0	1.0
Liver Cirrhosis	5	31.25	4	25	0.0	1.0

Table (4) Operative data

	Sublay	Onlay	T	p
Operative time (minuits)			3.73	<0.001
$\bar{X}$ ± SD	111.9± 27.3	85.6 ± 6.4		
Range	73 - 160	75 - 95		
Blood loss	76.31±34.83	100.0±32.5	-1.837	0.074

Table (5) Post-Operative follow up

	Sublay	Onlay	T	p
Hospital stay (hours)	24 ± 0		2.23	0.03
$\bar{X}$ ± SD		30 ± 10.7		
Range		24 - 48		
Drain removal (Days)			3.5	0.0014
$\bar{X}$ ± SD	3.75 ± 1.4	5.75±1.8		
Range	2 - 5	3 - 7		

Table (6) Post-Operative Complication

	Sublay		Onlay		X^2	p
	N	%	N	%		
Superficial wound infection	2	12.5	4	25	0.21	0.6
Seroma	2	12.5	3	18.8	0.0	1.0
Chest infection	1	6.3	0	0.0	0.0	1.0
Recurrence	0	0%	0	0.0	0.0	1.0

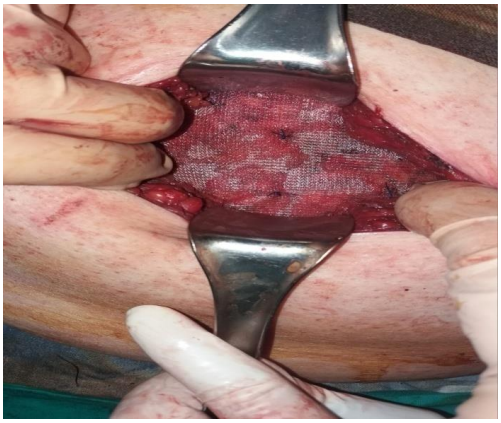

Figure 1: Mesh fixed in on-lay position

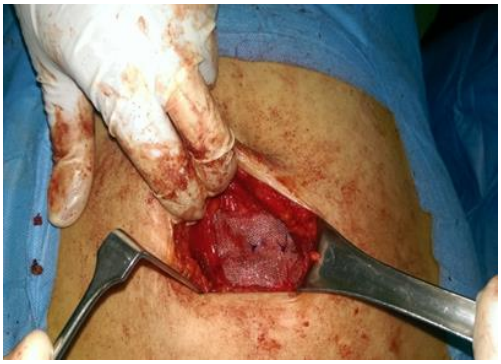

Figure 2: Mesh in the sub-lay position

DISCUSSION

Although polypropylene mesh has long been regarded as the implant of choice for repairing abdominal wall defects, there is still controversy regarding the best site of its placement [11, 12, 13]**.** The number of Females was notably higher than males (7:1 in sublay group & 3:1 in onlay group), this conforms to the previously documented fact of high female to male ratio.We recorded the duration of surgery in patients treated with sublay mesh repair (Group B) that ranged from 73-160 minutes (median 111.9) Post-operative hospital stay in the onlay group was significantly longer compared to the onlay group (p=0.03).The post-operative hospital stay was limited to only 24 hours in the whole the sublay group & 14 patients of the onlay group, while the remaining 2 patients extended their stay to 48h due to the observed continuingly collected blood in the suction drain in the first 24 hours before the amount rate subsided. Duration for drain removal was significantly shorter in sublay group compared to onlay group. The time required to remove the suction drain in the sublay group ranged from 2 to 5 days with significantly lower median of 3.75 days in the sublay group compared to the onlay group, in which the duration ranged from 3 to 7 days with a median of 5.75 days. These findings was coincide with that of Hameed et al and Baracs et al [11, 12]In this study superficial wound infection was encountered in 4 patients (25%) from the onlay group, While only 2 cases (12.5%) in the sublay group developed wound infection. seroma formation following removal of suction drain was recorded in 3 patients (18.75%) from the onlay group, While in the sublay group, 2 cases developed wound seroma (12.5%). One cases of post-operative chest infection were encountered in patients from the sublay group with known pre-operative history of chest problems, and resolved with proper treatment. The difference in post-operative complications was not statistically different (P>0.05). No incidence of recurrence was recorded in either group, which can be attributed to the relatively small number of cases included, and the relatively short period of follow up. Most of the studies[10,13,14] had a recurrence rate more than ours may be due to short follow up in our study

CONCLUSIONS

Both sublay and onlay mesh placement techniques are safe, efficient in the management of non-complicated Para-umbilical hernia, both produced acceptable results, and are associated with comparable complications and recurrence rates.

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Conflict of interest: None

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