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COMPARISON OF SUTURE AND STAPLER PROCEDURES OF MESH FIXATION IN PATIENTS OF VENTRAL HERNIA

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Abstract:

Objective: *Occurrence of the chronic pain in 20% to 30% patients after surgical intervention for hernia. As a result of this particular pain, about one third patients are not able to perform their routine activities. The aim of this study is to provide comparison of the polypropylene suture and skin staples for repair of mesh in ventral hernioplasty regarding pain after surgical intervention and to provide the comparison about the duration for fixation of mesh between both procedures in treatment of ventral hernia.*

Methodology*: This research work carried out in Department of Surgery in CMH, Lahore and included 53 patients from February 2018 to December 2019. We took the consent from patients. We operated all the patients under General Anesthesia by same team of professionals. We separated the patients into two groups, in first group we fixed the mesh with the 2/0 polypropylene suture whereas we used the mesh stapler for the patients of second group. We noted the duration of time in minutes for both procedures. We used the VAS scale for the measurement of the severity of pain after surgery after 7 days, 1 month and one year after the process. We used the SPSS V. 22 for the statistical analysis of the collected information.*

Results: *The characteristics of the patients and outcomes of surgery were same in the patients of both groups. And these values were not significant in both groups. Early pain after surgical intervention was high after the suture fixation but this outcome was also not significant. Average scores of pain after 7 days were 3.47 ± 2.7 after sutures whereas 2.91 ± 1.88 after the stapler. After 4 weeks, 0.4 ± 0.49 were after suture whereas 0.35 ± 0.48 after the stapler. In both groups of research work, 30% to 34% patients felt pain in follow ups after one year. Pain's severity after suture was 0.6 ± 0.62 whereas 1.65 ± 1.94 after mesh stapler, this finding is much significant ($p < 0.007$). Average duration of surgery was 15.33 ± 6.33 minutes for suture whereas it was 1.56 ± 0.41 minutes' stapler fixation with P value of 0.001.*

Conclusion: *The fixation procedure is not the reason for important difference in initial pain after surgical intervention but there is high chronic pain after the mesh repair by stapler fixation. However, there was decreased duration of surgery in group of staple fixation in comparison with the group of suture fixation.*

KEYWORDS: *Chronic, Fixation, Abdominal, Significant, Suture, Stapler, Mesh, Hernia.*

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INTRODUCTION:

The bulging parts of the abdominal cavity's contents from the musculoaponeurotic covering of abdominal covering from inner side is the ventral hernia. Ventral hernias comprise IH (Incisional Hernia (15% to 20% of all hernias of abdominal walls) and umbilical and epigastric hernias (10% of all hernias) [1]. Almost 150000 repairs of ventral hernia are in progress every year in United States of America [1]. The standard treatment in the past was primary suture repair which was present with very high rates of recurrence [2]. There was decrease in the rates of recurrence after the development of mesh repair [2]. In the patients of ventral hernias, for defects greater than two centimeters in diameter, the recommended method for treatment is mesh repair [3].

The standard procedure of mesh fixation on the rectus sheath is with non-absorbable sutures [4]. The decrease in the duration of surgery is present in the reports with skin staples instead of conventional methods of fixation for mesh with suture [5]. Chronic pain is very complicate issue and many factors of risk are detected including mesh fixation by sutures [6, 7]. There are very few research works on mesh fixation and we are unable to find randomized research works providing comparisons of fixation of mesh in the repair of ventral hernia [8, 9].

MATERIAL AND METHODS:

This research work was carried out in Department of Surgery in CMH, Lahore. 53 patients were included in our study from February 2018 to December 2019. The average difference in scores of pain between 2 techniques of fixation was 0.7 (Sutures: average± SD= 3.2 ± 0.7 and Spiral tacks: average± SD= 2.5 ± 0.8) [8]. With 80% power and 95% CI, total size of sample came out to be 38, minimum 19 patients in every group [10]. All the patients with ventral hernia of not complicate condition were the participants of this research work. We took the written consent from every patient after describing him the purpose of this research work. We separated the patients into two groups randomly. Group-A contained the patients in whom fixation of mesh carried out by polypropylene suture and Group-B comprised the patients in whom mesh fixation carried out by stapler.

We operated all the patients under General Anesthesia. We noted the duration of surgery for both procedures. We used VAS for the measurement of the pain severity. We gathered all the information on a well-organized Performa. We used SPSS V.22 for the statistical analysis of collected information. We used the descriptive statistics for description of various variables of the study. We presented the continuous variables as patient's age, body mass index, duration of surgery in averages and standard deviations. We presented the categorical data in frequencies as gender, site of hernia, stay in hospital, hernia size, and techniques of fixation.

RESULTS:

53 patients were the participants of this research work. We randomly selected the patients for both groups of mesh fixation. We followed up the patients in OPD after their discharge. Average age of the patients was 44.55 ± 8.74, average body mass index was 30.04 ± 5.05 and there was dominancy of female gender (84.9% vs. 15.1%). Patients who underwent suture fixation were 56.6% (n: 30) and patients who underwent staple fixation method were 43.4% (n: 23). Incisional and para-umbilical sites of hernia were the common. Clinical and surgical traits of the patients in accordance with the fixation method are present in Table-1 and Table-2. The comparisons between both methods showed that there were highly significant disparities with body mass index (P-value 0.034), size of hernia (P-value 0.014) and duration of surgery (P-value < 0.001). The duration of suture fixation (15.33 ± 6.33) was high in comparison with staple fixation (1.56 ± 0.41).

Table-I: Descriptive Characteristics And Fixation Techniques (n= 53).

Individual Characteristics		Fixation Technique				p-value
		Suture (n = 30)		Staple (n = 23)		
		No	Percent	No	Percent	
Age in years	Mean ± SD	46.47	8.17	31.32	4.49	0.068
BMI	Mean ± SD	42.07	9	28.37	5.35	0.034
Sex	Male (n, %)	8	26.7	-	-	-
	Female (n, %)	22	73.3	23	100	

We found no significant disparity between both methods regarding age of patient and stay in hospital. We found the same measurement of the scores of pain at 4th follow-up week. After complete one year, the severity of pain was more in the patients present with staple fixation (1.65 ± 1.94) in comparison to the scores of pain with the suture fixation (0.6 ± 0.61) with P –value of 0.007.

Table-II: Clinical And Operative Characteristics With Fixation Techniques (n=53).

Characteristics		Fixation Technique				p-value
		Suture		Staple		
		No	Percent	No	Percent	
Hernia site	Epigastric	4	13.3	-		-
	Incisional	12	40	7	30.4	
	Incisional midline	-	-	2	8.7	
	Incisional Port site	-	-	2	8.7	
	Incisional (C-section)	4	13.3	8	34.8	
	Periumbilical	10	33.3	2	8.7	
	Umbilical and epigastric	-	-	2	8.7	
Size of hernia (cm)	< 4 cm	4	13.3	10	43.5	0.014
	> 4 cm	26	86.7	13	56.5	
Hospital stay	2 days	16	53.3	17	73.9	0.126
	3-4 days	14	46.7	6	26.1	
Operative time (minutes)	Mean / SD	15.3	6.33	1.6	0.41	<0.001

The scores of pain after surgery in both groups at various periods of evaluation are present in Table-3. At 1st week, pain after surgery was available as more severe after suture fixation in comparison with staple fixation (average score: 3.47 vs. 2.91), but it was not much significant.

Table-III: VAS Pain Scores At Different Time Periods Regarding To Fixation Techniques

Postoperative Time	Suture Fixation	Staple Fixation	p-value
	Mean ± SD	Mean ± SD	
1 week	3.47 ± 2.7	2.91 ± 1.88	0.406
4 week	0.4 ± 0.49	0.35 ± 0.48	0.704
1 year	0.6 ± 0.62	1.65 ± 1.94	0.007

DISCUSSION:

We discovered noteworthy disparities in the average body mass index of both groups (BMI of Group-A 42.04 ± 9 vs Group-B 28.37 ± 5.35, P-value < 0.034), but the average age was not much different significantly in both groups (Group-A 46.47 ± 8.17 vs Group-B 31.32 ± 4.49 with P-value of 0.068). This result is not consistent with the current studies of Beldi G conducted in 2011 and Wessenaar E in 2013 [10, 11]. Wessenaar E also stated no significant difference in his all 3 groups with different techniques of fixation with respect to size of hernia and stay in hospital [11], but we found a significant disparity between both compared groups about size of hernia with P-value of 0.014 but there was not significant difference regarding stay in hospital (P-value 0.126). We found a significant difference in duration of surgery between both groups which is also consistent with many other research works of Dhillon RS, Khan A and Sheikh FA [5, 12, and 13].

In this research work, we found that the chronic pain after surgery was much severe in the group of suture fixation with P-value of 0.007. These results are not consistent with some other research work as it is reported that there is no presence of any significant disparity in chronic pain after the application of mesh plasty between various groups in research works of Sheikh FA, Kitamura RK, Beldi G, and Wessenaar E and Colak E [17, 18, 10, 11, and 14]. But some research works have displayed a statistically significant disparity in early pain after surgery [10, 13, and 19]. One research work conducted by Chatzimavroudis in 2017, he concluded that there was no ideal method for mesh fixation [16, 20].

CONCLUSION:

Approach of mesh fixation is not the reason of any important disparity in early pain after surgical intervention for ventral hernia. But the occurrence of chronic pain is much high after the mesh repair by stapler fixation. But the duration of surgery was much decreased in the group of staple fixation in comparison with the group present with suture fixation.

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