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Comparison of Mayo's Repair and Mesh Repair in Para Umbilical Hernias

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Abstract

Objective: To compare the outcome of Mayo's repair and mesh repair of para umbilical hernia in Lady reading Hospital Peshawar.

Setting: Department of Surgery, Lady Reading Hospital, Peshawar.

Study Design: Randomized Controlled Trial.

Duration of Study: From 26/03/2020 to 27/09/2020.

Materials and Methods: A total of 60 patients with para umbilical hernia were randomly allocated in two groups, patients in group A were subjected to Mayo's repair and in group B to Mesh repair. All patients were followed up to determine the pain on 3rd postoperative day and hospital stay in days.

Results: The mean age of the whole study sample was 43.2 (9.9 SD) years. Mean age of group A was 44.3 (9.6) years and in group B it was 42.1 (10.3) years (p 0.390). There were 53.3% males in group A compared to 66.7% in group B (p 0.292). The mean BMI of the study sample was 27.6 (3.3) kg/m². The mean BMI in group A was 27.9 (3.5) kg/m²

compared to 27.4 (3.2) kg/m² in group B (p 0.561). On 3rd post operative day, the difference in pain on VAS between two groups was comparable; no pain (30% vs 33%), mild pain (46.7% vs 50%) and moderate pain (23.3% vs 16.7%) between Mayo repair and mesh repair respectively (p 0.810). With regards to hospital stay, the difference between two groups was comparable; 1-3 days (33.3% vs 30%), 4-6 days (43.3% vs 53.3%) and > 6 days (23.3% vs 16.7%) between Mayo repair and mesh repair respectively (p 0.706).

Conclusion: Mayo's repair is not superior to Mesh repair in terms of pain and hospital stay. However, our sample size of low and many effect modifiers were not addressed in this study which can affect the outcome. We recommend more research comparing these two methods on a larger sample size and taking into account the predictors of poor or worse pain outcome before recommending Mayo's repair as a routine for paraumbilical hernia repair.

Keywords: Para Umbilical Hernia, Mesh Repair, Mayo's Repair, Pain, Hospital Stay, Body Mass Index

Introduction

Hernia is the bulging of part of the contents of abdominal cavity (fat, bowel) through a weakness in the abdominal wall. An umbilical and para umbilical hernia (PUH) forms when this weakness is through or immediately adjacent to the umbilicus in median raphe below and above, most commonly is above umbilicus. Umbilical hernia is the most common of all the abdominal hernias representing 6% of all abdominal hernias in adult [1, 2].

As a result of high risk of strangulation, surgery would be advised in cases where the hernia contains bowel either elective or in emergency (obstruction, strangulation) however small and asymptomatic hernias may left as such but may enlarge with time and require surgery at a later date [3]. Surgery may be done either open or laparoscopically, there are 2 common surgical procedures done in open technique depending upon size of the defect i.e., Mayo's repair and Open Mesh repair" [4].

Mayo's Repair is a double breasting technique used for the large defects of hernia. This was commonly practiced all over the world earlier but with time this procedure was replaced by Open or laparoscopic mesh repairs [5]. Mayo repair is associated with more complications as compared to the open mesh repair procedure. One study done in Mayo hospital Lahore showed that Mayo repair was associated with more complications as compared to the mesh repair" [6]. According to this study, out of 60 patients, 16 (53.33%) patients had prolonged pain in Mayo repair group and 5 (16%) patients had prolonged pain in Mesh repair group.

Another study done in Gambat Institute of Medical Sciences; Pakistan III terms of analgesia dose shows the same result of increase complications rate in Mayo's repair then in tension free mesh repair [7]. The recurrence rate of hernia is the main complication of different procedure. A study by Mustafa SIT, *et al* showed that recurrence rate of hernia was 38.3% in Mayo repair and was 9.8% in Mesh repair" [8].

There are controversies about the best technique for para umbilical hernia repair. Few studies have favored the Mayo repair in terms of less post op complications and short hospital stay while few have preferred the Mesh repair [9, 10].

The rationale of our study is to compare outcome of surgery on basis of post-operative pain, this study will help doctors to choose better surgical procedure. As no such study has been conducted on this topic in our setup in last 5 years, therefore this study will provide latest updated information. On the basis of result of this study we will be able to develop recommendation locally and will be use by surgery practitioner in future.

Objective

To compare the outcome of Mayo's repair and mesh repair of para umbilical hernia in Lady reading Hospital Peshawar.

Hypothesis

Mesh repair is better than Mayo's repair in paraumbilical hernias in terms of post-operative pain and length of hospital stay.

Materials and Methods

Study Settings: Surgical Department, Lady Reading Hospital, Peshawar

Study Design: Randomized Controlled Trial.

Duration of Study: 6 months after approval of synopsis.

From 26/03/2020 to 27/09/2020.

Sample Size: 60 (30 in each group)

Calculated through the WHO sample Size calculator, using the formula of hypothesis test for two-proportions (one-sided), with the following assumptions:

Confidence Level: 95%

Statistical power=80%

Anticipated proportion of prolonged pain in procedure A (Mayo's repair) = 53.33 %

Anticipated proportion of prolonged pain in procedure B (Mesh repair) = 16 %

Size, n = 60 patients (30 in each group)

Sampling Technique: Consecutive (non-probability) sampling.

Data Collection Procedure

This study will be conducted after approval from hospital ethical committee CPSP research committee (Annexure 2). All the patients fulfilling the inclusion criteria will be enrolled in the study. The purpose, risk and benefits of the study will be explained to all included patient and their attendants, they will be assured that the study is purely conducted for research and data publication and informed written consent will be obtained from all included patients (Annexure 3). An effort will be made to make a presumptive diagnosis based on history, clinical examination and routine investigations. Abdominal ultrasound will confirm anterior

abdominal wall defect in Para umbilical region reported by an expert radiologist with at least 5 years' experience. The patients will be randomly allocated in two groups by lottery method. Patients in group A will undergo standard Mayo's repair and group B will undergo standard mesh repair. All the patients will be prepared for surgery for 1 to 2 hours after admission. All surgeries will be performed by transverse incision at umbilical region, performed by single experienced surgeon having minimal experience 5 years. Post operatively all patients will be kept in ward for a minimum of 3 days. Outcome i.e post-operative pain on 3rd post of day and length of hospital stay will be evaluated. All the above information will be recorded in a predesigned proforma including age, gender, BMI, VAS score, hospital stay and Post Op complications. Exclusion criteria will be followed strictly to control confounders and bias in the study results.

Data Analysis Procedure

All the data will be analyzed by SPSS 22. Mean and standard deviation will be calculated for continuous variables like age, BMI, VAS score and hospital stay. Frequency and percentages will be calculated for categorical variables like gender and Post Op complications. Outcome of both the groups will be stratified among age, gender, BMI and Post Op complications to see the effect modifications. Post stratification Chi-square test for qualitative variables and independent t test for quantitative variables will be used in which P value of <0.05 will be considered significant. All the results will be presented on tables and graphs.

Results

The study comprised a total of 60 patients between 25 to 60 years of age. The patients were selected on the basis of operational definition of para umbilical hernia. Patients were randomly allocated in two groups. Patients in group A were subjected to Mayo's repair while those in group B were subjected to Mesh repair.

The mean age of the whole study sample was 43.2 (9.9 SD) years. Mean age of group A was 44.3 (9.6) years and in group B it was 42.1 (10.3) years (p 0.390). See Table 1 for comparison of age categories.

There were 53.3% males in group A compared to 66.7% in group B (p 0.292). See Table 2. The mean BMI of the study sample was 27.6 (3.3) kg/m². The mean BMI in group A was 27.9 (3.5) kg/m² compared to 27.4 (3.2) kg/m² in group B (p 0.561). See Table 3.

All the patients were subjected to the surgical procedure according to their treatment groups. On 3rd post operative day, the difference in pain on VAS between two groups was comparable; no pain (30% vs 33%), mild pain (46.7% vs 50%) and moderate pain (23.3% vs 16.7%) between Mayo repair and mesh repair respectively (p 0.810). See Table 4.

With regards to hospital stay, the difference between two groups was comparable; 1-3 days (33.3% vs 30%), 4-6 days (43.3% vs 53.3%) and > 6 days (23.3% vs 16.7%) between Mayo repair and mesh repair respectively (p 0.706). See Table 5.

The subsequent tables elaborate age groups, gender and BMI categories wise stratification of post operative pain and hospital stay.

Table 1: Age Categories Wise Stratification of Postoperative Pain

Age categories			Groups		P value
			Mayo repair	Mesh repair	
25-35 years	Post operative pain	No pain	4 66.7%	2 33.3%	0.219
		Mild pain	2 22.2%	7 77.8%	
		Moderate	1 33.3%	2 66.7%	
> 35-45 years	Post operative pain	No pain	4 57.1%	3 42.9%	0.962
		Mild pain	3 50.0%	3 50.0%	
		Moderate	1 50.0%	1 50.0%	
> 45-60 years	Post operative pain	No pain	1 16.7%	5 83.3%	0.090
		Mild pain	9 64.3%	5 35.7%	
		Moderate	5 71.4%	2 28.6%	

Table 2: Gender Wise Stratification of Postoperative Pain

Gender			Groups		P value
			Mayo repair	Mesh repair	
Male	Post operative pain	No pain	5 41.7%	7 58.3%	0.821
		Mild pain	8 50.0%	8 50.0%	
		Moderate	3 37.5%	5 62.5%	
Female	Post operative pain	No pain	4 57.1%	3 42.9%	0.161
		Mild pain	6 46.2%	7 53.8%	
		Moderate	4 100.0%	0 0.0%	

Table 3: BMI Categories Wise Stratification of Postoperative Pain

BMI Categories			Groups		P value
			Mayo repair	Mesh repair	
25-35 years	Post operative pain	No pain	2 50.0%	2 50.0%	0.497
		Mild pain	4 40.0%	6 60.0%	
		Moderate	3 75.0%	1 25.0%	
> 35-45 years	Post operative pain	No pain	4 36.4%	7 63.6%	0.390
		Mild pain	4 40.0%	6 60.0%	
		Moderate	3 75.0%	1 25.0%	
> 45-60 years	Post operative pain	No pain	3 75.0%	1 25.0%	0.279
		Mild pain	6 66.7%	3 33.3%	
		Moderate	1 25.0%	3 75.0%	

Table 4: Age Categories Wise Stratification of Hospital Stay

Age categories			Groups		P value
			Mayo repair	Mesh repair	
25-35 years	Hospital stay	1-3 days	2 25.0%	6 75.0%	0.557
		4-6 days	4 50.0%	4 50.0%	
		> 6 days	1 50.0%	1 50.0%	
> 35-45 years	Hospital stay	1-3 days	4 57.1%	3 42.9%	0.352
		4-6 days	3 75.0%	1 25.0%	
		> 6 days	1 25.0%	3 75.0%	
> 45-60 years	Hospital stay	1-3 days	4 100.0%	0 0.0%	0.019
		4-6 days	6 35.3%	11 64.7%	
		> 6 days	5 83.3%	1 16.7%	

Table 5: Gender Wise Stratification of Hospital Stay

Gender			Groups		Total
			Mayo repair	Mesh repair	
Male	Hospital stay	1-3 days	6 50.0%	6 50.0%	0.891
		4-6 days	7 41.2%	10 58.8%	
		> 6 days	3 42.9%	4 57.1%	
Female	Hospital stay	1-3 days	4 57.1%	3 42.9%	0.519
		4-6 days	6 50.0%	6 50.0%	
		> 6 days	4 80.0%	1 20.0%	

Table 6: BMI Categories Wise Stratification of Hospital Stay

BMI Categories			Groups		P value
			Mayo repair	Mesh repair	
25-35 years	Hospital stay	1-3 days	5 62.5%	3 37.5%	0.558
		4-6 days	2 33.3%	4 66.7%	
		> 6 days	2 50.0%	2 50.0%	
> 35-45 years	Hospital stay	1-3 days	4 44.4%	5 55.6%	0.921
		4-6 days	6 46.2%	7 53.8%	
		> 6 days	1 33.3%	2 66.7%	
> 45-60 years	Hospital stay	1-3 days	1 50.0%	1 50.0%	0.519
		4-6 days	5 50.0%	5 50.0%	
		> 6 days	4 80.0%	1 20.0%	

Discussion

One of the most common ventral abdominal hernias, globally speaking, is para-umbilical hernia comprising about 85% of the patients worldwide. The mechanism involves protrusion of a viscous or part of a viscous through a weak point in the anterior abdominal wall [11]. Patients usually present with pain at the hernia site followed by a dragging

sensation and occasionally nausea and vomiting [12]. Some of the adverse events like irreducibility, obstruction, strangulation and gangrene are more commonly seen in paraumbilical hernias as compared to other hernias [13]. They are frequently diagnosed on clinical examination rather than investigations and compared to other types of hernias they are usually more common in females [14]. The general criteria

for operating on a paraumbilical hernia is large defect (about greater than 2 cm) persisting for more than 5 years (if asymptomatic) [15-18].

In literature, some of the documented post-operative outcomes of mesh repair for paraumbilical hernias include pain (77%), hematoma (46%) and seroma formation (19%) [19]. A study by Lawrence and his colleagues discovered that out of all the ventral abdominal hernias, paraumbilical hernia was on top (49.8%) followed by incisional hernia (24%) and complications included mild pain as short term and foreign body sensation as long-term complications [20]. Recurrence of the hernia is more commonly documented in mayo repair 9.37% as compared to mesh repair 2.71% [21]. Timely surgical intervention is required for umbilical hernias in comparison to inguinal hernias because of a relatively higher risk for strangulation and obstruction resulting in more morbidity and mortality [22-28].

A paper by Malik AM *et al* [12] that included 101 patients proposed that post procedure pain was noticed in 13.8% of the patients as short-term event and foreign body sensation was noticed in 3% of the patients in the long run. Daudpoto AQ [13] and his colleagues compared Mayo repair and mesh repair in an RCT. It was discovered that mesh repair patients had longer duration of surgeries (61-80 minutes) compared to mayo repair (45-60 minutes) but mayo repair patients had longer average hospital stays (5.5 days) as compared to mesh repair patients (4.5 days). The rate of wound infections was 11.11% and 6.22% in mesh repair and mayo repair patients respectively while hematoma/seroma formation was more commonly seen in mesh repair (5.5%) and less frequent in mayo repair (3.1%) [13].

Conservative management for treating infections have been successfully proven in some studies for both types of repairs [18, 14, 15]. Paajanen H, *et al* [16] published their study stating that, as a result of suture repair, chronic abdominal discomfort was seen in 13.86% patients and in 2.96% patients following mesh repair. Likewise, the mean duration of surgery in mesh versus mayo repair was 30-50 mins and 30-55 mins respectively. Post-operative stay was longer in mayo group and pain severity was not different between the two techniques [17].

In a study by Lak K *et al*, Supra umbilical swelling was the commonest presentation 82%. Cough impulse and reducibility was positive in 100% of cases. Contents of sac were omentum in 66% to 88% and small intestine 31% to 33% operative time was longer in group one (mesh repair) ranged from 55 to 85 minutes while that was 45 to 75 minutes in group two anatomical repair. There was no recurrence observed in group one but three cases of group two suffered from the recurrence in which mesh was applied during 2nd surgery. The mean hospital stay for group one was 5.5 days and for group was 6.5 days. Conclusion: Mesh repair is with less post-operative pain, less hospital stay and less recurrence for large para umbilical hernia of defect more than 4 c.m in lenia alba [19].

Conclusion

Mayo's repair is not superior to Mesh repair in terms of pain and hospital stay. However, our sample size of low and many effect modifiers were not addressed in this study which can affect the outcome. We recommend more research comparing these two methods on a larger sample sizes and taking into account the predictors of poor or worse

pain outcome before recommending Mayo's repair as a routine for paraumbilical hernia repair.

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