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ORIGINAL ARTICLE

Comparison of prosthetic mesh repair and tissue repair in the emergency management of incarcerated para-umbilical hernia.

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ABSTRACT… Objective: To compare the outcomes of prosthetic repair and tissue repair in the emergency management of acutely incarcerated para-umbilical hernia (PUH). **Study Design:** Randomized Clinical Trial. **Setting:** Department of Surgery, DHQ Hospital KDA Kohat, Pakistan. **Period:** July 2021 to December 2022. **Material & Methods:** A total of 40 patients (20 in each group) of either gender aged above 18 years with acutely incarcerated PUH undergoing emergency management were randomized in to either mesh repair or tissue repair. The length of the procedure, the hospital stay following the procedure, and any postoperative issues were noted up till 6 months post-operatively. **Results:** In a total of 40 patients, 35 (87.5%) were female. The difference in the mean operating times for prosthetic repair group and tissue repair group were significantly different (97.2±15.2 minutes vs. 66.2±15.2 minutes, $p<0.0001$). Duration of incarceration and characteristics of the defect were statistically similar ($p>0.05$). Postoperative complications were encountered in 6 (30.0%) patients in prosthetic repair groups versus (25.0%) in tissue repair groups while the difference between various complications were found to be statistically insignificant ($p>0.05$). Throughout the course of the trial, there were no permanent difficulties caused by the mesh and none of the mesh had to be taken out. **Conclusion:** The use of prosthetic repair for emergency management of incarcerated PUH was safer and resulted in better outcomes as compared to conventional tissue repair.

Key words: Hernia, Mesh, Para-umbilical, Prosthetic, Tissue Repair.

INTRODUCTION

Over 90% of instances of para-umbilical hernia (PUH), a disorder that is rather prevalent, include an acquired abnormality.[1-3] Patients who have cirrhosis, obesity or multiparous women are the groups most likely to experience PUH.[1-4] The most popular approach over the past century for the resolution of PUH has been herniorrhaphy with simple suture or Mayo's repair (vest over pants).[5] However, numerous retrospective studies have shown that these procedures have an abnormally high recurrence (10–30%).[6,7]

In the elective care of PUH, reoccurrence is expressively reduced for prosthetic repairs compared to traditional repairs, according to a number of recent studies.[8-11] This has prompted some researchers to argue that the best course of action for treating PUH may be prosthetic repair.[8,9] In the elective care of PUH, recurrence is suggestively reduced for prosthetic repairs compared to conventional repairs, according to a number of recent studies.[8-11]

This has prompted some writers to argue that the best course of action for treating PUH may be prosthetic repair.[8-10] A significant number of these hernias are present at our study location manifest with acute incarceration.

Because of the potential for prosthetic infection, traditional surgical trainings are inclined against using prosthetic materials when incarcerated.[1,2] These patients now face high risk of recurrence as a result of this policy. We did this research to assess the outcomes of prosthesis repair and tissue repair in treating acutely imprisoned PUH.

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MATERIAL & METHODS

This open labeled, randomized clinical trial was conducted at Department of Surgery, DHQ Hospital KDA Kohat, Pakistan from July 2021 to December 2022. Informed and written consents were obtained from all participants explaining them objectives of this study. Approval from "Institutional Ethical Committee" was taken. A total of 40 patients (20 in each group) of either gender aged above 18 years with acutely incarcerated PUH undergoing emergency management were randomized in to either mesh repair or tissue repair. Patients having chronic liver disease, chronic kidney disease or those who had hematological disorders were excluded.

At the time of enrollment, demographical and clinical characteristics of patients were noted. The phrase "time passed from the start of incarceration until the start of surgery" was used to characterize the length of incarceration. Patients were randomly allotted to prosthesis repair (n=20) or tissue repair (n=20) groups after preoperative testing and surgical preparation. All patients received third generation cephalosporin and metronidazole at the beginning of the procedure, and they continued receiving them eight hours a day for 48 hours afterwards. Low-molecular-weight heparin was administered to obese patients preoperatively and was continued for an additional 48 hours postoperatively. General anaesthesia or epidural anaesthesia was used for all surgeries. Standard surgical procedures were adopted.

The duration of the procedure, the length of the hospital stay and any postoperative issues were noted. For the first six postoperative weeks and then every three months after that, physical examinations were used during follow-up in the outpatient clinic to look for recurrence. Patients were followed up for duration of 6 months postoperatively. A special proforma was made to record study data.

For data analysis, "Statistical Package for Social Sciences (SPSS)", version 26.0 was utilized. Comparison of qualitative data between study variables was performed employing chi-square test whereas independent sample t-test was utilized for comparing numeric data. P-value < 0.05 was judged to be significant.

RESULTS

In a total of 40 patients, 35 (87.5%) were female and 5 (12.5%) male, representing a female to male ratio 7:1. The mean age was 49.2±16.1 year ranging between 22-85 years. Thirty three (82.5%) patients were obese whereas 13 (32.5%) patients had recurrent hernia with history of hernia repair following tissue repair approach. Table-I is showing comparison of baseline characteristics between study groups.

Variables		Prosthetic-repair (n=20)	Tissue-repair (n= 20)	P-Value
Age years	Mean±SD	49.9±16.5	49.2±16. 1	0.8927
Sex	Male	3 (15.0%)	2 (10.0%)	0.6326
	Female	17 (85.0%)	18 (90.0%)	
BMI(kg/m2)	Mean±SD	33.2±3.6	33.1±4.5	0.9386
American Society of Anesthesiologists (ASA) Grade	I and II	18 (90.0%)	17 (85.0%)	0.6326
	III	2 (10.0%)	3 (15.0%)	
Associated Co-Morbidities	Diabetes	5 (25.0%)	6 (30.0%)	0.8472
	Hypertension	6 (30.0%)	6 (30.0%)	
	Ischemic heart disease	2 (10.0%)	1 (5.0%)	
	Bronchial asthma	3 (9.7%)	5(20%)	
Previous Surgery	PUH repair	6 (30.0%)	7 (35.0%)	0.2387
	Caesarian section	4 (20.0%)	3 (15.0%)	
	Modified radical mastectomy	-	2 (10.0%)	
	Total abdominal hysterectomy	2 (10.0%)	-	

Table-I. Baseline characteristics

The difference in the mean operating times for prosthetic repair group and tissue repair group were significantly different (97.2±15.2 minutes vs. 66.2±15.2 minutes, p<0.0001). Duration of incarceration and characteristics of the defect were statistically similar (p>0.05) as shown in Table-II.

The skin and subcutaneous tissue was the only area of the body where wound infections occurred in this study, and all of them were successfully treated with local measures and the proper antibiotics under the direction of culture and sensitivity investigations. Postoperative complications were encountered in 6 (30.0%) patients in prosthetic repair groups versus (25.0%) in tissue repair groups while the difference between various complications were found to be statistically insignificant (p>0.05) as shown in table-3. Throughout the course of the trial, there were no permanent difficulties caused by the mesh and none of the mesh had to be taken out.

DISCUSSION

Some studies have shown that prosthetic repair for incarcerated PUH in the emergency settings have yielded good outcomes.[11-16] Pre-peritoneal prosthetic mesh was inserted successfully into 35 patients with strangulated groin hernias by Pans et al.[12] Polypropylene meshes was used successfully by Wysocki et al. to treat strangulated inguinal and incisional hernias.[14] Patients received Lichtenstein treatment for incarcerated groin hernias in a later report by the same group.[14] One patient had their non-viable intestine resected. Out of the 25 patients that survived, only one had a subcutaneous fluid collection. No recurrences occurred during their 1.5-year follow-up, and no meshes needed to be taken out.[14] Another study revealed that only one seroma developed in the 16 cases who had a Lichtenstein repair for strangulated groin hernias.[17] In this study, 82.5% patients were obese and 32.5% had recurrent PUH after tissue repair approach. The fact that they might have manifested during incarceration after prior tissue repairs and justifies the necessity to look into the efficacy and safety of prosthetic repairs in the treatment of the incarcerated PUH as was found very effective in the present study.

The present research was the first one describing prospective evaluation for two common surgical approaches in emergency management of incarcerated PUH. For a number of reasons, the mesh was used as the sole patch in this study. First, we felt that applying the mesh as an onlay patch was a simple and quick approach adopting pre-peritoneal technique. If mesh staplers had been employed, this would have been especially true.

Variables		Prosthetic Repair (n= 20)	Tissue Repair (n=20)	P-Value
Duration of incarceration (hours)	Mean + SD	11.2±7.5	13.0±10.1	0.5235
Operative time (min)	Mean + SD	97.2±15.2	66.2±15.2	<0.0001
Characteristics of the defect	Mean + SD	4.9±0.8	4.6±0.9	0.2722
	size>3 cm	19 (95.0%)	20 (100%)	0.3112
	Non-viable sac contents	7 (35.0%)	8 (40.0%)	0.7440
	Omentum	4 (20.0%)	5 (25.0%)	0.7050
	Small intestine	4 (20.0%)	4 (20.0%)	-

Table-II. Duration of incarceration, operative time, size and characteristics of the defect (N=40)

Complications	Prosthetic Repair (n=20)	Tissue Repair (n=40)	P-Value
Wound infection	2 (9.8%)	3 (15.2%)	0.6326
Seroma	2 (9.8%)	-	0.1468
Prolonged Redivack eZuent (>2 weeks)	1 (5.2%)	-	0.3112
Chest infection	1 (5.2%)	1 (5.2%)	-
Deep vein thrombosis	-	1 (5.2%)	0.3112

Table-III. Postoperative complications (N=40)

Second, any difficulties that might arise from the mesh's implantation, such as an infection or migration, would only affect the subcutaneous region, posing no threat to the intestine. Last but not least, if a mesh needs to be removed, it could be safe and relatively simpler if the implantation was done subcutaneously.[18,19]

In the present study, post-surgery complications were relatively similar among patients of both groups ($p>0.05$). Wound infection rates after intestinal resection and mesh implantation as stated by others[17] was likely made possible by the use of perioperative antibiotics, careful preparation of the operating field, and sufficient hemostasis. For cases who had intestinal resection proceeded by pre-peritoneal mesh implantation, it has been previously reported that no wound infections occurred.[12] The literature describes frequency of seroma formation among patients undergoing prosthetic repairs for PUH between 2 to 6%.[8-10] In this study, although the mesh was implanted while the patient was incarcerated and non-viable bowel was resected among patients undergoing prosthetic-repair, no mesh had to be withdrawn and all problems were successfully treated.

This prospective randomized study's main findings support a number of conclusions. First, when compared to traditional tissue repair, the use of prosthetic repair in the emergency care of the imprisoned PUH produces reported good recurrence prevention results. Second, using a prosthetic substance like prolene mesh as an onlay patch in the emergency treatment of the incarcerated PUH is risk-free, simple to carry out, and not linked to significant systemic or mesh-related problems. Finally, as previously demonstrated by others[12-15], intestinal ischemia or necrosis, and subsequent need for the intestinal resection may not be considered contra indications for the mesh repair.

Single center study place and small sample size were some of the limitations linked with this research. To make more definite conclusions, large sample size and follow-ups are needed to further verify our findings.

CONCLUSION

Comparing prosthetic repair to conventional tissue repair, the use of prosthetic repair for emergency care of imprisoned PUH is safer and has better outcomes. Furthermore, prosthetic repair cannot be ruled out because of the existence of non-viable intestine.

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2	Khan Karim Afridi	Methodology, Discussion.	
3	Viqar Aslam	Study concept, Data analysis, Proof reading.	
4	Mohammad Nasir	Data collection, Literature search.	
5	Fazal Ahmad	Data collection, Literature search.