

A prospective comparative study using two different approaches in the management of small paraumbilical hernias

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Abstract

Aim: comparison between herniorrhaphy alone versus hernioplasty in small-sized paraumbilical hernia.

Material and methods: A prospective comparative study was conducted in the Department of General Surgery, SRMS IMS, Bareilly, Uttar Pradesh, India. The study included 120 patients divided into two groups. Group 1 was included 60 patients randomized to paraumbilical hernioplasty with mesh insertion. Group 2 was included 60 patients randomized to paraumbilical herniorrhaphy. Paraumbilical hernia patients aging 20-60 years old with small defect size (less than 3 cm) by preoperative ultrasound. A transverse incision was made, and the sac was dissected all around. Opening of the sac at the neck and exposure of the contents was done then excision of the sac. Suture (anatomical) repair of the defect was done using polypropylene sutures. In group (1), mesh was then inserted and fixed with interrupted polypropylene sutures, while in group (2) and only anatomical suture repair was done without mesh use.

Results: Gender of patients in both groups: In group (1): 25 males (41.67% of group) and 35 females (58.33% of group), while in group (2): 28 males and 32 females with $p=0.45$. Comparison of age of patients in both groups, it was found that: In both groups the range of age was 24-57 years old with $p=0.632$. There were significant differences between both groups as regarding operative details. Drain was inserted in only 40 patients of group (2) while all patients of group (1) had drains inserted $p\leq 0.001$. Incision size mean in group (1) was about 11.07 ± 1.26 cm. while in group (2) it was only 8.87 ± 0.82 cm with $p\leq 0.001$. Also, operation time was reduced in herniorrhaphy group with a mean 31.15 ± 3.11 minutes while in hernioplasty group was 41.23 ± 3.17 minutes with $p\leq 0.001$. In comparison between both groups in wound complications, it was found that seroma occurred in 4 patients of group (1) and 2 patient in group (2) $p=0.298$. Infection occurred in 6 patients in group (1) while only 2 patient in group (2) had wound infection $p=0.177$. Dehiscence occurred in only 2 patient in group (1) with $p=0.336$. As regarding recurrence rates, both groups had no statistically significant differences during the 6-month follow-up period; only 2 case had hernia recurrence, which was identified clinically and by ultrasonography after 5 months of operation in group (2) while no cases in group (1) had hernia recurrence during the period of follow-up with $p=0.336$.

Conclusion: We concluded that the anatomical non-mesh repair of small-sized

paraumbilical hernia had significant correlation with shorter duration of operation, smaller incision size and lowered overall costs than mesh repairs.

Keyword: *Paraumbilical, herniorrhaphy, hernioplasty*

Introduction

Total 33.9 percent of anterior abdominal wall hernias are located in the para-umbilical region^[1]. These hernias are more common in women and during times of elevated intra-abdominal pressure, such as new-onset constipation, pregnancy, ascites, and COPD, to name a few examples.

A paraumbilical hernia can be categorised as small, medium, or big according to the European Hernia Society, with sizes ranging from 2cm to 2-4cm and 4cm, respectively^[2].

For many years, an open suture repair, such as the Mayo repair, was considered the gold standard for treating para-umbilical hernias.

Minor stress can be used to heal the majority of paraumbilical hernias, which are modest to medium-sized in size. Small para-umbilical hernias, on the other hand, have a significant recurrence risk of around 30% after being repaired with sutures^[3].

Since the advent of mesh treatment into the contemporary therapy of para-umbilical hernias, there has been a significant reduction in complications^[4].

When it comes to placing the mesh, there are a variety of ways to choose from, but no prospective evidence has decisively shown that one technique is clearly superior than another.

Mesh implantation options include bridging the defect with mesh, inserting a preperitoneal underlay of mesh reinforced with suture repair, and installing it laparoscopically, among other techniques.

In general, women are more likely than males to have umbilical hernias; nevertheless, there are certain series in which male patients are more prevalent^[5]. Typically, a mass can be seen near the umbilicus.

When it comes to seeking medical attention and undergoing surgery, pain is the most prevalent reason^[6]. Even in situations when a prosthetic mesh is utilised, recurrence may occur. The size of recurrent umbilical hernias is frequently larger than the size of original hernias and they can mimic the appearance of incisional hernias.

Comparing umbilical hernia to inguinal hernia, an umbilical hernia is more likely to be linked with significant morbidity and mortality. This is due to the increased risk of incarceration and strangling, both of which necessitate immediate treatment.

There is still a noticeable disparity between the seriousness of this condition and the amount of attention it receives in the literature, despite a 2.6-fold rise in the number of publications with the title term "umbilical hernia" between 1991-2000 and 2001-2010^[7].

Patients who are older, obese, have diabetes, are malnourished, have a longer preoperative hospital stay, or are using systemic immunocompromising medications are more likely to develop surgical site infection. Wound infection is caused by a variety of factors, including prosthetic mesh repair, which has been demonstrated to be associated with greater rates of infection than basic suture repair^[8]. Hence the present comparative study was conducted check the outcome of two different approaches in the management of small paraumbilical hernias.

Material and methods

A Prospective comparative study was conducted in the Department of General Surgery, SRMS IMS, Bareilly, Uttar Pradesh, India after taking the approval of the protocol review committee and institutional ethics committee. After taking informed consent detailed history was taken from the patient. The study included 120 patients divided into two groups.

Group 1 was included 60 patients randomized to paraumbilical hernioplasty with mesh insertion.

Inclusion criteria

- Paraumbilical hernia patients aging 20-60 years old with small defect size (less than 3 cm) by preoperative ultrasound.

Exclusion criteria

- Patients with defect more than 3 cm, complicated or recurrent paraumbilical hernias.
- All patients in both groups were subjected to preoperative clinical assessment, all of them were assessed for vital signs, associated medical diseases (diabetes, hypertension and renal, pulmonary and heart diseases). Complete blood count, blood sugar, liver function tests and international normalized ratio were drawn. Abdominal ultra-sonography was used to determine the size of the abdominal wall defect, and revealing the hernia contents and associated pathology.

Surgical technique

All patients were operated on by a fixed team of surgeons and received a single dose of preoperative prophylactic antibiotic administered intravenously. A transverse incision was made, and the sac was dissected all around. Opening of the sac at the neck and exposure of the contents was done then excision of the sac. Suture (anatomical) repair of the defect was done using polypropylene sutures. In group (1), mesh was then inserted and fixed with interrupted polypropylene sutures, while in group (2) and only anatomical suture repair was done without mesh use. Both groups were compared according: size of incision, time of operation, occurrence of wound complications including infection and seroma, recurrence rate and overall cost during the period of follow-up which was six months.

Results

As regarding comparison of gender of patients in both groups: In group (1): 25 males (41.67% of group) and 35 females (58.33% of group), while in group (2): 28 males and 32 females with $p=0.45$ (Table 1). As regarding comparison of age of patients in both groups, it was found that: In both groups the range of age was 24-57 years old with $p=0.632$ (Table 1). There were significant differences between both groups as regarding operative details.

Table 1: Demographics profile of the patients

Parameter		Study Groups				t- test	P value
		Hernioplasty (n=60)		Herniorrhaphy (n=60)			
Age (in years)	Mean±SD	44.26±7.22		43.36±8.57			
	Range	24-57		24-57		0.422	0.632
	Mean differences	0.752					
		No.	%	No.	%	X ²	
Sex	Male	25	41.67	28	46.67	1.71	0.45
	Female	35	58.33	32	53.33		

SD: standard deviation t: student t test X²: chi-square

Drain was inserted in only 40 patients of group (2) while all patients of group (1) had drains inserted $p\leq 0.001$. Incision size mean in group (1) was about 11.07 ± 1.26 cm. while in group (2) it was only 8.87 ± 0.82 cm with $p\leq 0.001$. Also, operation time was reduced in

herniorrhaphy group with a mean 31.15 ± 3.11 minutes while in hernioplasty group was 41.23 ± 3.17 minutes with $p \leq 0.001$. This had a significant impact on overall financial cost among both groups with a mean of 2688 ± 286.67 Indian rupees in group (1) and of 2399 ± 155.69 Indian rupees in group (2) with also $p \leq 0.001$ (Table 2). In comparison between both groups in wound complications, it was found that seroma occurred in 4 patients of group (1) and 2 patient in group (2) $p=0.298$. Infection occurred in 6 patients in group (1) while only 2 patient in group (2) had wound infection $p=0.177$. Dehiscence occurred in only 2 patient in group (1) with $p=0.336$ (Table 3).

As regarding recurrence rates, both groups had no statistically significant differences during the 6-month follow-up period; only 2 case had hernia recurrence, which was identified clinically and by ultrasonography after 5 months of operation in group (2) while no cases in group (1) had hernia recurrence during the period of follow-up with $p=0.336$ (Table 4).

Table 2: Difference of operative details between both groups

Operative details		Hernioplasty (n=60)	Herniorrhaphy (n=60)	P value
Drain insertion		60	40	<0.001*
Incision size (cm)	Mean±SD	11.07±1.26	8.87±0.82	
	Range	7-14	7.10-10.70	<0.001*
	Mean differences	2.11		
Time of operation (min)	Mean±SD	41.23±3.17	31.15±3.11	
	Range	30-47	22-42	<0.001*
	Mean differences	9.79		
Overall cost (LE)	Mean±SD	2688±286.67	2399±155.69	
	Range	2100-3550	2100-3300	<0.001*
	Mean differences	295.50		

Table 3: Difference between both groups in wound complications

Complications	Hernioplasty (n=60)	Herniorrhaphy (n=60)	P value
Seroma	4	2	0.298
Infection	6	2	0.177
Wound dehiscence	2	0	0.336

Table 4: Comparison between both groups regarding recurrence rates

Recurrence rates		Study Groups						X ²	P value
		Hernioplasty (n=60)		Herniorrhaphy (n=60)		Total (n=120)			
		N	%	N	%	N	%		
3 rd month	No	60	100	60	100	120	100	0.00	1.22 ^{NS}
	Yes	0	0.00	0	0.00	0	0.00		
6 th month	No	60	100	58	96.67	118	98.33	1.12	0.336 NS
	Yes	0	0.00	2	3.33	2	1.67		

X²: chi-square, NS: non-significant

Discussion

Hernias of the abdominal wall are one of the most often encountered surgical issues.

It is believed that they are mostly caused by any disease that raises pressure in the intra-abdominal space^[9].

The use of meshes for paraumbilical hernia repair results in postoperative problems such as wound seroma occurring in between 5.6 percent and 42 percent of patients.

It has been implicated as a cause of surgical wound infection, suppuration, and hernia recurrence in some cases^[10].

All of our patients were operated on by a set team of surgeons who were separated into two groups: group 1 had mesh repair and group 2 received simply anatomical repair without mesh.

Everyone who participated in this study underwent a 6-month follow-up period with periodic evaluations to detect any problems. With a mean of 31.15 ± 3.11 minutes in the herniorrhaphy group and 41.23 ± 3.17 minutes in the hernioplasty group, the surgery time was reduced in our research, with a $p < 0.001$ difference between the two groups.

Our findings in terms of operation time were consistent with those of Kaufmann *et al.*, who discovered that the average operation time in the hernioplasty group was 44 minutes, which was significantly greater than the average operation time in the herniorrhaphy group, which was 33 minutes^[11].

Malik *et al.*, on the other hand, found that Suture repair patients required a longer period of surgery than Mesh repair patients. These findings, on the other hand, are in disagreement with Malik *et al.*,^[12]

In terms of incision size, the mean in group (1) was around 11.071.26 cm, but the mean in group (2) was just 8.870.82 cm, with a $p = 0.001$ significance.

In addition, the surgery time was reduced in the herniorrhaphy group, with a mean of 31.1 ± 5.31 minutes, whereas the operation time in the hernioplasty group was 41.2 ± 3.17 minutes, with a $p = 0.001$ difference.

In terms of wound complications, it was discovered that seroma occurred in 4 patients (6.67 percent) in group (1) and 2 patients (3.33 percent) in group (2), with a p -value of 0.198.

A total of 6 (10 percent) patients in group (1) had wound infection, whereas only 2 (3.33%) patients in group (2) developed wound infection, $p = 0.177$.

Dehiscence occurred in just 2 patients (3.33 percent) in group (1), with a p -value of 0.336. These findings were consistent with those of Anjum *et al.*, who found that the suture repair group had two cases of wound infection (8 percent), but group B (mesh repair) had four cases of wound infection (16 percent)^[13]. Furthermore, our findings are consistent with Kensarah's: 7 percent of patients in group A (mesh repair) had a postoperative wound infection, compared to just 4 percent of patients in group B (non-mesh repair)^[14].

These findings are similarly consistent with those of Kaufmann *et al.*, who discovered a slightly greater frequency of wound infection in the Mesh group compared to the non-mesh group^[11].

This study also revealed that there was no statistically significant difference between the two methods in terms of the incidence of seroma development postoperatively, which is consistent with our initial findings.

Along with wound problems, recurrence is another important factor in our findings.

Our findings revealed that only two cases of hernia recurrence occurred among the suture repair group after five months of follow-up, both of which were recognised clinically and by ultrasound and necessitated re-operation, as opposed to no occurrences of recurrence documented among the mesh group.

These findings, which show no statistically significant differences between the two groups, are consistent with those of Dalenback *et al.*, who conducted a long-term follow-up after elective adult paraumbilical hernia repair and discovered that there was no statistically significant difference in recurrence rates between the two groups^[15].

These findings are consistent with those of Sadiq *et al.*, who found that there was no significant difference in recurrence rates after six months of follow-up in their study^[16].

The only documented recurrence instances were after one year of follow-up; two cases occurred in the suture repair method group and one case occurred in the herniorrhaphy group, with no statistically significant difference between the groups.

Additionally, they are consistent with Amin *et al.*, whose records were virtually comparable to ours in terms of recurrence after a 6-month follow-up period; there was one incidence in the non-mesh group and none in the hernioplasty group^[17].

A further study by Anjum *et al.*, discovered that there was no statistically significant difference between the two procedures in terms of recurrence rates: 3/25 in the suture repair group and 1/25 in the mesh repair group, with no relationship to the kind of anaesthetic

employed^[13, 18].

These findings, on the other hand, are in contrast to those of Kaufmann *et al.*, who found a percent recurrence rate in the suture group, compared to a 1 percent recurrence rate in the Mesh group^[11].

Conclusion

Anatomical non-mesh repair of minor paraumbilical hernias has a strong association with faster operation time, smaller incision size, and cheaper total expenses when compared to mesh surgery.

We also came to the conclusion that there is no statistically significant difference between the two methods when it comes to the incidence of wound complications or the recurrence rates.

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