

Original research article

Surgical management of small-sized paraumbilical hernia with herniorrhaphy alone versus hernioplasty: A Randomized clinical study

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Abstract

Background: Paraumbilical hernias are a common surgical problem constituting about 33% of all anterior abdominal wall hernias. Since Mayo popularized the simple suture repair, there has been a continuous evolution of different techniques for the repair of paraumbilical hernias owing to the high recurrence rate attendant to the simple suture repair. With the advent of mesh came significant wound complications that led surgeons to introduce the laparoscopic technique. However, there is as yet no consensus on the optimal repair technique for paraumbilical hernias.

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

Material and methods: A Prospective study was conducted in the Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India for 18 months. 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.

Keywords: Paraumbilical, Herniorrhaphy, Hernioplasty

Introduction

Para-umbilical hernia accounts for 33.9% of anterior abdominal wall hernia.¹ These hernias often occur in women and after periods of increased intra-abdominal pressure, such as new onset constipation, pregnancy, ascites, and COPD. The European Hernia Society classified paraumbilical hernias into small, medium and large corresponding $< 2\text{cm}$, $\geq 2\text{-}4\text{cm}$ and $\geq 4\text{cm}$ respectively.² Traditionally, the treatment of para-umbilical hernia was an open suture repair, as standardized in the Mayo repair. Most paraumbilical hernias are small or medium-sized and easily repaired with minor tension. However, even small para-umbilical hernias may have a high recurrence risk of about 30%³ following a suture repair.³ The introduction of mesh repair in the modern management of para-umbilical hernia has led to fewer complications.⁴ There are a number of techniques to place this mesh, but no prospective data have conclusively found clear advantages of one technique over another. Options for mesh implantation include bridging the defect, placing a preperitoneal underlay of mesh reinforced with suture repair, and placing it laparoscopically. In general, umbilical hernias are more common in women than men; however, there are series in which male patients are more frequent.⁵ Typically, a lump is observed around the umbilicus. Pain is the most common indication to visit a physician and undergo a repair.⁶ Recurrence may develop even in cases where a prosthetic mesh is used. Recurrent umbilical hernias often tend to enlarge faster than primary ones and may behave as incisional hernias. An umbilical hernia has a tendency to be associated with high morbidity and mortality in comparison with inguinal hernia because of the higher risk of incarceration and strangulation that require an emergency repair. Although the number of articles with the title word “umbilical hernia” increased 2.6-fold between the periods 1991–2000 and 2001–2010, there still appears to be a certain discrepancy between its importance and the attention it has received in the literature.⁷ Incidence of surgical site infection increases in patients with old age, obesity, diabetes mellitus, malnutrition, prolonged preoperative hospital stay and systemic immunocompromising drugs. Another significant risk factor for wound infection is prosthetic mesh repair which was found to be associated with higher rates of infection than simple suture repair only.⁸

Material and methods

A Prospective study was conducted in the Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India for 18 months, after taking the approval of the protocol review committee and institutional ethics committee. 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 (anatomical repair only).

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 to: 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					
		Hernioplasty (n=60)		Herniorrhaphy (n=60)		t-test	P value
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.	%	χ^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 χ^2 : 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

Abdominal wall hernias are one of the most common surgical problems. They are mainly caused by any condition that increases the pressure in the intra- abdominal cavity.⁹

Postoperative complications such as wound seroma occur in 5.6% to 42% of cases using the meshes for paraumbilical hernia repair. It can be the reason for postoperative wound infection, suppuration and hernia recurrence.¹⁰

We had all our patients operated on by a fixed team of surgeons divided into two groups; group 1 with mesh repair and group 2 with only anatomical repair without mesh. All patients completed a 6-month follow-up period with interval reviews for detection of any complications.

In our study 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 $p \leq 0.001$.

Our results regarding operation time was accurately resembling those of Kaufmann et al, who revealed that operation time in hernioplasty group averaged 44 minutes which is longer than the 33-minute average of operation time in herniorrhaphy group.¹¹

On the other hand, these results disagree with Malik et al, who showed that longer duration of operation was required in Suture repair patients than in Mesh repair patients.¹²

Regarding 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 $p \leq 0.001$.

Regarding wound complications, between both groups, it was found that seroma occurred in 4(6.67%) patients of group (1) and 2(3.33%) patient in group (2) $p=0.298$. Infection occurred in 6(10%) patients in group (1) while only 2(3.33%) patient in group (2) had wound infection $p=0.177$. Dehiscence occurred in only 2(3.33%) patient in group (1) with $p=0.336$

These data agreed with Anjum et al, whose results showed that suture repair group had two cases (8%) of wound infection, but group B (mesh repair) has recorded four cases (16%) of wound infection.¹³

Furthermore, our results coincide with Kensarah, 7% of patients in the group A (mesh repair) suffered from postoperative wound infection, while only 4% of group B patients suffered that.¹⁴

These results also agree with Kaufmann et al, that revealed a slightly higher incidence of wound infection in Mesh group than in non-mesh group.¹¹ This study also showed no statistically significant difference between both techniques regarding incidence of seroma formation postoperatively which is identical to our basic results.

Recurrence is another major item among our results along with wound complications. Our results showed that only 2 case of hernia recurrence occurred among suture repair group after 5 months of follow-up detected clinically and by ultrasound and which required re-operation compared with no recorded cases of recurrence among mesh group.

These results give no statistically significant differences between both groups, thus agree with Dalen back et al, who carried out a long-term follow-up after elective adult paraumbilical hernia repair and revealed that the difference in recurrence rates did not reach statistical significance.¹⁵

These findings are close to those of Sadiq et al, which showed that there was no recorded difference in recurrence rates after six months of follow-up.¹⁶ The only recorded recurrence cases were after one year of follow-up; two cases in suture repair technique group and one case in herniorrhaphy group which still gives no statistically significant difference.

They also coincide with Amin et al, whose records were almost identical to ours regarding recurrence after a 6-month follow-up period; one case in non-mesh group and none in hernioplasty group.¹⁷ Also, Anjum et al, found no significant difference between both

techniques in recurrence rates; 3/25 in suture repair group and 1/25 in mesh repair group with no relation to the type of anesthesia used.^{13,18} On the other hand, these results regarding recurrence rates disagree with those of Kaufmann et al, who recorded an incidence of 9% of recurrence among suture group compared with only 1% incidence in Meshgroup.¹¹

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. We also concluded that there is no significant difference between both techniques neither in wound complication incidence nor in recurrence rates.

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Received: 18-07-2020 || Revised: 09-07-2020 || Accepted: 16-08-2020