ORIGINAL ARTICLE

Laparoscopic versus open repair of para-umbilical hernia. Is it a good alternative?

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Abstract

Objective: To compare the experience of laparoscopic repair of para-umbilical hernia with conventional open repair in terms of operative time, pre- and post-operative complications, total hospital stay, post-operative pain, morbidity, mortality and cosmesis.

Methods: The prospective, randomized study was conducted at Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan, and two private hospitals from June 2011 to June 2013, and comprised patients who were admitted with para-umbilical hernias of different sizes during the study period. The patients were divided into two groups. Group A underwent laparoscopic surgery, while Group B had conventional mesh repair. Variables studied included duration of surgery, operative and post-operative complications, morbidity and mortality. SPSS 20 was used for statistical analysis.

Results: Of the 337 patients in the study, 200(59.34%) were at the Liaquat University Hospital, while remaining 137(40.65%) patients were operated in two private hospitals. The overall mean age of the study sample was 42.18±9.789 years (range: 23-73). There were 68(20.18%) males and 269(79.82%) females. There were 166(49.26%) patients in Group A and 171(50.74%) Group B. The operative time was comparatively longer in Group A ($p<0.001$) especially in the first 30 operations. The laparoscopic approach was associated with a comparatively low incidence of operative and post-operative complications, reduced duration of hospital stay and cosmetically better results ($p<0.05$). There was no mortality in this series.

Conclusion: Laparoscopic para-umbilical hernia repair, though a new technique, gave promising results compared to open conventional technique. However, there is a long way to go before coming to a consensus.

Keywords: Para-umbilical hernias, Laparoscopic ventral hernia repair, Open mesh repair, Morbidity, Mortality. (JPMA 65: 865; 2015)

Introduction

Para-umbilical hernias (PUHs) are among the common surgical problems and are among the most common surgical operations performed.[1] Traditionally the para-umbilical hernias were treated by tension-free suture repair of the defect. An unacceptable recurrence rate decreased its popularity. A real change in the outlook of these hernias came with the introduction of mesh repair.[2] An increased incidence of wound infection and wound-related complications in mesh repair paved the path for still further and continuing research into the optimal method of treatment of PUH. Recent introduction of laparoscopic repair of ventral abdominal hernias is gaining popularity and has been accepted by many surgeons all over the world.[3,4] There is an increasing evidence that laparoscopic approach for PUH is superior to open mesh repair in terms of duration of operation, operative and post-operative complications, pain and overall morbidity and mortality.[5-7] The study was conducted to compare the laparoscopic PUH repair with open techniques of repair in terms of operative time, pre- and post-operative complications, total hospital stay, post-operative pain, morbidity, mortality and cosmesis.

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Patients and Methods

The prospective, randomised study was conducted at Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan, and two private hospitals from June 2011 to June 2013, and comprised patients who were admitted with PUH of different sizes during the study period. The patients were divided into two groups. Group A underwent laparoscopic surgery, while Group B had conventional mesh repair.

The patients were briefed about both the techniques, their likely consequences in terms of advantages and disadvantages. Randomisation was done by picking up a chit bearing the mode of treatment offered to those who gave their written consent. The same technique was adopted for patients who reported at the two private hospitals and underwent surgical repair there.

Obstructed, incarcerated, recurrent or re-recurrent and big-sized hernias were excluded as it was the first experience of the author with laparoscopic PUH repairs.

All our patients were operated under general anaesthesia,

mostly in supine position. In Group A, the bladder and stomach were decompressed by way of catheters. Pneumoperitoneum was achieved by introducing verress needle at Palmer's point which is a point 3cm below the left costal margin in the left mid-clavicular line or by an open access technique. Generally three ports were made depending upon the actual site of the defect. The inside of the abdomen was inspected, the contents of the sac were reduced and adhesiolysis was done, with scissors or harmonic scalpel taking care of the bowel. Next the size of the defect was assessed for the placement of appropriate size of mesh. The mesh was 5-10 cm larger than the actual size of the defect in all directions in order to overlap a wider area than the actual defect in the abdominal wall. One suture was placed in each corner of the mesh and abdomen was marked for the position of mesh. The mesh was then rolled and introduced into the abdomen through a trocar of 10mm size. The corners of the mesh containing the sutures were identified and brought out on surface by a suture passer and the mesh was fixed at the corners by applying knots on each corner which was then buried in subcutaneous tissue. Additional fixation was done by using tacker all around the mesh so that the mesh snugly fitted over the defect covering a larger area than the actual defect.

The open repair of PUH was also done under general anaesthesia with a transverse skin incision over the bulge near the umbilicus. With blunt dissection the rectus sheath was cleared of fatty tissue and the defect containing the hernia contents was identified. With a small nick of knife the defect was opened along with sac and a small piece of omentum usually popped out. The circumferential incision was enlarged, the contents were removed and the margins of the defect were held by Ellis forceps. The sac was separated and contents were reduced into the abdominal cavity. A non-absorbable suture was used to close the defect in the lineaalba and a proline mesh of adequate size was placed in the pre-peritoneal space and fixed with few stitches. Homeostasis was secured and wound was closed over a drain placed in the depths of the wound to avoid haematoma.A dose of broad-spectrum antibiotic was given prior to anaesthesia. Two more shorts of antibiotic were given after the patients were shifted to the ward following surgery at the interval of 8 hours each.

All operations were performed by the same surgical team and data was collected upon arrival of the patient on a specially designed proforma. The patients were followed up every three months initially and then every six months afterwards for a period of two years in outpatient department (OPD).

Data was collected on individual basis and statistically analysed using SPSS 20.Variables studied included duration of surgery, operative and post-operative complications, morbidity and mortality.

Descriptive statistics were expressed as means and standard deviations, as well as frequencies and percentages. Fisher's exact and Pearson's tests of chi-square were applied for categorical variables. Independent Sample 2-tailed T Test was used to compare the means among the continuous variables. $P<0.05$ was considered statistically significant.

Results

Of the 337 patients in the study, 200(59.34%) were at the Liaquat University Hospital, while the remaining 137(40.65%) were operated in the two private hospitals. The overall mean age of the study sample was 42.18±9.789 years (range: 17-73). In Group A, it was 37.19±11.873 years (range: 17-68 years), and in Group B it was 41.23±8.941 years (range: 23-73 years).There were 166(49.26%) patients in Group A and 171(50.74%) Group B. Overall there were 68(20.18%) males and 269(79.82%) females. Group A had 38(22.89%) males and 128(77.10%) females, while Group B had 61(35.67%) males and 110(64.32%) females. The defect size ranged between 2.5cm and 4.5cm. Of the 166 laparoscopic repairs, there were 11(6.62%) conversions to open repair. These conversions occurred during the first 55 cases because of difficulty in adhesiolysis in 5(3%), bleeding in 5(3%) and intestinal perforations in 1(0.6%). These 11 patients were considered as open repair cases for statistical analysis.

The operative time in Group A was substantially longer in the initial 50 operations before it gradually improved, but even then the overall duration of open repair was shorter (Table-1). The overall incidence of complications was significantly higher in Group B compared to Group A (Table-2). The recurrence rate in both the groups was statistically significant ($p<0.05$).Recurrences in open surgery were mainly seen in patients who developed overwhelming post-operative wound infection. Most of the recurrences in laparoscopic group occurred in

Table-1: Comparison of duration of surgery in both groups.

Variable	Type of Repair (n = 337)	
	Laparoscopic repair N = 166 -11	Open Mesh Repair N = 171 + 11
Duration of Surgery:		
40-60 Minutes	22(14.19%)	82(45.05%)
61-90 Minutes	94(60.64%)	56(30.76%)
90 Minutes and above	39(25.16%)	44(24.17%)

Table-2: Comparison of complications.

	Laparoscopic Repair N=166	Open mesh Repair N=171	
Operative and early Post-operative Complications:			
Prolonged Ileus	09(7.25%)	48(32.43%)	P<0.001
Haematoma	02(1.61%)	35(23.64 %)	P<0.001
Intestinal injury	2(6.6%)	03(2.27%)	
Seroma	5(4.03%)	17(11.48 %)	P<0.001
Bleeding during adhesiolysis	07(5.64%)	11(7.43 %)	
Cellulitis of trocar site	04(3.22%)	00(00%)	
Late post-operative complications:			
Wound/Mesh infection	03(2.32%)	12 (8.39%)	P<0.001
Prolonged pain (>4months)	03(2.41%)	13(8.7%)	
Wound dehiscence	00(00%)	09(6.08%)	
Port herniation	01(0.08%)	00(00%)	
Recurrent hernia	11(6.62%)	16 (9.35%)	

All differences were highly significant. p<0.001.

Table-3: Mean length of hospital stay.

	Patients with complications	Patients without complications
Group A	4.38±0.903 days	2±623 days
Group B	11.5±4.57 days	5±1.237 days

patients who were operated early in the series and more so with huge hernias. The total duration of hospital stay was also significantly short in Group A compared to Group B (Table-3). The cosmetic results of surgery in Group A were very promising in patients who were operated for primary PUH. Cosmetically, the results of open surgery were not encouraging compared to Group A patients.

Discussion

Laparoscopic technique to repair ventral hernias started in 1993 keeping in view the various advantages of laparoscopic surgery over conventional open approach.[8] An adequate overlap of the defect by prosthetic mesh is considered to be the basis of success of this latest technique. Minimum tissue handling makes it a more favourable approach for this common problem. There is an increasing popularity of this technique due to its various advantages over open technique such as shorter hospital stay, decreased rate of wound problems, and a lower recurrence rate.[9-11] An additional benefit is the avoidance of long incisions which were the hallmark of open repair for ventral hernias.

We had to convert 6.62 patients to open technique which is comparatively higher. We attribute this high conversion rate to the learning curve as the rate was high in the initial operations, but became very low in subsequent operations. Total duration of surgery in laparoscopic repair was significantly longer compared to open technique in this series. This is consistent with the results of many similar reports.[9] Most of the time is consumed in handling the mesh intra-peritoneally, but with experience this difficulty is overcome as many techniques of mesh insertion and placement are being suggested.[12] The overall rate of complications was higher in open surgical repair compared to laparoscopic repair. We report bowel injury in 2(1.55%) patients undergoing laparoscopic repair. This occurred while adhesiolysis was performed to free the bowel from the sac. This complication was identified during operation and both the operations were converted to open repair. This finding is in line with earlier report[13] that calculated a risk of enterotomy in 2.1% of its patients. We converted these cases because of spillage of intestinal contents as suggested earlier.[14] There is, however, a recommendation that enterotomy may be dealt with at the same time but definitive repair process may be postponed for sometime.[15] Surprisingly, the incidence of seroma formation was low in our series compared to many other studies.[16,17] One study,[18] however, claimed a 100% seroma formation sonographically. Post-operative prolonged ileus occurred in 9(7.25%) patients in the laparoscopic group, while 48(32.43%) patients in the open surgery group suffered prolonged ileus. Our finding is consistent with the results of many reports claiming prolonged ileus in 1-8% of laparoscopic ventral hernia repairs.[11,19] The current study reports post-operative wound infection in 7(5.64%) patients operated by laparoscopic technique. This is significantly lower in comparison with open surgical technique where wound infection occurred in 28(18.91%) patients. Another study[20] confirms this observation and claimed a substantial reduction in the wound infection in laparoscopic ventral hernia repair. Longer incisions and tissue handling in open repair are the main reasons for an increased incidence of wound infection. Wound infection contributes significantly to the morbidity associated with open surgical repair of ventral hernias. The higher complication rate in open surgery were mainly contributed by wound infection (8.39%) and prolonged ileus (32%). Both of these complications were significantly lower in the laparoscopic group. This finding is in line with the observation of an earlier study.[21] Prolonged pain persisting even after 4 months was reported by 8.7% in the open repair group compared to 2.41% in the laparoscopic group. This is contrary to reports[22] that claimed more discomfort in laparoscopic repair in the short term. The recurrence rate in laparoscopic repair of PUH was 11(6.62%), while in open technique it was

16(9.48%). Most of the recurrences in laparoscopic repair occurred within 18 months and more so in the first 20 cases in the series. Five out of eleven of these recurrences occurred in laparoscopic hernias which developed post-operative wound infection. This is consistent with earlier findings[23] that reported recurrence in secondary hernias more frequently than in primary hernias. In the current study the mean hospital stay in Group A was reduced to 2 days in patients who did not develop any post-operative complications. This again is in line with results of other reports.[21]

Overall our results are encouraging and consistent with many similar reports on this topic of great interest.

Conclusion

Laparoscopic approach for PUH repair is a recent advancement gaining popularity among laparoscopic surgeons. We recommend this technique as a safe alternative to open repair of ventral hernias, but a substantial amount of work has to be done before a concrete conclusion can be drawn.

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