COMPLICATIONS IN LAPAROSCOPIC AND OPEN MESH REPAIR OF VENTRAL HERNIAS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Ventral hernias are defects in the abdominal wall. They are normally classified by aetiology and location. The main reason of ventral hernias can be prior surgery (incisional) or spontaneously (umbilical, epigastric, spigelian, or lumbar hernias). Ventral hernia repair is one of the most common operations performed by general surgeons. The purpose of this study was to compare the complications rate, post-operative pain, hospital stay and time to return to normal activity in laparoscopic and open mesh repair of ventral hernias. The study was conducted from October, 2010 to February, 2011 in surgery department Holy Family Hospital, Rawalpindi.

Patients and Methods: In this randomised clinical trial a total of 160 patients were selected by taking approval from hospital ethical committee and informed written consent from each patient. The admitted patients for elective surgical repair of ventral hernia were randomly allocated to Group A (laparoscopy) and B (open repair) including 80 patients in each group. Information regarding study parameters was recorded on a predesigned performa.

Results: The mean age in laparoscopic group was 41.20 ± 5.44 years and in open repair group it was 43.32 ± 4.31 years. In laparoscopic group there were 61 females (76.25%) and in open mesh repair group there were 63 (78.75%) females. The post-operative pain was significantly (p-value = 0.000) less in laparoscopic group (3.59 + 1.58) as compared to open repair group (5.49 ± 1.59). The mean hospital stay was also significantly greater in open mesh repair group (31± 5.8 vs. 39 ± 7.36, p-value = 0.001). The time to resume work activities for the laparoscopic group was significantly (p-value = 0.046) shorter (median, 21.0 days; inter-quartile range, 24 days) compared with that for the open repair group (32.5 days; 36 days). There was significantly greater complication rate in open mesh repair group (48.75% vs 33.4%, p-value = 0.032) as compared to laparoscopic group. Intra-operative complications were noted higher in laparoscopic group as compared to open mesh repair group.

Conclusion: The laparoscopic management of ventral hernia repair has less post-operative pain, less complications, shorter hospital stay and shorter time of return to normal activity work.

Key Words: Ventral hernia, Laparoscopy, Pain score, complication rate.

INTRODUCTION

Ventral hernias are defects in the abdominal wall. They are normally classified by aetiology and location. The main reason of ventral hernias can be prior surgery (incisional) or spontaneously (umbilical, epigastric, spigelian, or lumbar hernias). Ventral hernia repair is one of the most common operations performed by general surgeons.[1]

An important postoperative complication after laparotomy is the appearance of ventral incisional hernias. Advancements in anaesthesia techniques, adequate prevention and treatment of infection during surgery, and the use of new suture materials have reduced the incidence of incisional hernias.[2]

Repair of ventral hernia may be difficult and different surgical procedures have been developed for it. One of the key concepts in hernia surgery is tension free repair. The repair may be direct suturing or use of prosthetic mesh using the open or laparoscopic technique. Prosthetic mesh and tension free repair has revolutionized the repair of ventral hernias.[3]

Ventral hernia is often serious clinical problem and a lasting surgical correction remains a challenge. Laparoscopic ventral hernia repair is a popular technique with good results and a fast postoperative recovery. The mesh is placed directly under the peritoneum and anchored with trans-abdominal sutures and tacks.[4]

The laparoscopic ventral hernia repair makes use of the principles of the open technique, including using large mesh prosthesis, adequate overlap of the hernia defect and eliminating tension. The mesh is placed

intraperitoneally and extensive soft tissue dissection is eliminated. Various comparative studies have shown that with LVHR, wound complication rate patient discomfort, length of hospital stay and time to return the normal activities are all reduced.[5]

The systematic review performed under the auspices of the Royal Australasian College of Surgeons Australian Safety and Efficacy Register of New Interventional Procedures, Surgical and other recent studies demonstrated clear differences in the length of hospital stay and the total hospital cost between laparoscopic and open ventral hernia repair. They found that for the laparoscopic surgery groups, the hospital stay was significantly shorter, the instrument cost was significantly higher and the overall cost was significantly lower. The complication rate revealed large variation without a clear difference between the open and laparoscopic methods.[6]

This prospective study was planned to compare complications after laparoscopic and open ventral hernia repairs in our setup where most of the young surgeons are in their learning and experimental phase. The main outcome measures would be post-operative pain, hospital stay, postoperative complications rate and time to return to normal work.

PATIENTS AND METHODS

In this randomised controlled trial study a total of 80 patients each in the two study groups were selected from department of Surgery, Holy Family Hospital Rawalpindi. Approval of the study was taken from Hospital Ethical Committee and informed written consent was taken from each patient prior to include in the study. The patients were selected from admitted patients in the surgical wards for elective surgical repair of ventral hernia through outpatient department. These patients were selected by non-probability, consecutive sampling method and were allocated to two groups randomly by lottery method. The patients of age more than 18 years and of either gender with a clinical and ultrasonographic diagnosis of having incisional, umbilical / paraumbilical or epigastric hernia were included in the study. The patients who had previous history of operation repair of ventral hernias, presence of any amount of intra-abdominal free fluid / ascites on abdominal examination, known to have uncontrolled diabetes and / or hypertension and pregnant patients were excluded from the study.

Patients were randomly allocated to Group A (laparoscopy) and B (open repair). Both groups had allocated procedure under general anaesthesia with same drugs and their dosages on the next elective surgical list. All the procedures were performed by consultant surgeons, well experienced in the procedures, to avoid bias. The operative time for each case was calculated by the investigator using a standard stop watch. Postoperatively all patients were kept NPO for at least 8 hours and were given injection Augmentin 1.2 gm I/V TDS and injection Dicloran 75 mg I/M immediately after surgery and then after every 12 hours. Pain scores were measured at 24 hours after surgery. The time to return to normal activity work was also noted by following up the patients. All the findings were noted down on a predesigned proforma.

The data was analyzed by using SPSS version 16. Categorical variables were expressed as frequencies with percentages. Quantitative data was expressed as mean ± standard deviation. The independent samples t – test was used to compare operative time and pain scores between both groups. Mann Whitney U test was used to compare time to return to normal work in both groups. P value < 0.05 was considered statistically significant.

RESULTS

In this study a total of 160 patients underwent surgery 80 laparoscopic and 80 open mesh repairs. The patients were followed for 8 weeks for any complication and were recorded. Table 1 provides the baseline characteristics of the 160 patients included in the analysis according to treatment group. Demographic characteristics were similar in the both groups.

Table 1: *Demographic Characteristics of Patients.*

Variable	*Laparoscopic Repair Group*	*Open Repair Group*	*P-value*
Age of Patient			
Mean (SD)	41.20 (5.44)	43.32 (4.31)	0.324*
Gender of Patients: n (%)			
Male	19 (23.75)	17 (21.25)	0.705*
Female	61 (76.25)	63 (78.75)	
Body Mass Index (BMI)			
Mean (SD)	30.6 (4.4)	31.2 (5.9)	0.45*
Size of Defect			
Mean (SD)	5.081 (2.54)	5.24 (2.50)	0.684*

*P-value is insignificant at 5% level of significance

The mean age in laparoscopic group was 41.20 ± 5.44 years and in open repair group it was 43.32 ± 4.31 years. Majority of the patients in both groups were females. In laparoscopic group there were 61 (76.25%) and in open mesh repair group there were 63 (78.75%) females. The postoperative pain was significantly (p-value = 0.000) less in laparoscopic group (3.59 ± 1.58) as compared to open repair group (5.49 ± 1.59). The mean hospital stay was also significantly greater in open mesh repair group (31 ± 5.8 vs. 39 ± 7.96, p-

Table 2: *Comparison of different parameters in Laparoscopic and Open Repair groups.*

	Laparoscopic Repair	*Open Repair*	*P-value*	*Odds Ratio (95% Confidence Interval*
Post-operative Pain (after 24 hr)				
Mean (SD)	3.95 (1.58)	5.49 (1.59)	0.000**	
Post-operative hospital stay (hours)				
Mean (SD)	31 (5.8)	39 (7.36)	0.0001**	
Time to Resume Work Activities (days)				
Median (Inter-quartile range)	21 (24)	32.5 (36)	0.046**	
Primary outcome				
Overall complications through 8 weeks	27 (33.4)	39 (48.75)	0.032**	0.54 (0.3 – 0.92)
Intra-operative complications				
Injury to bowel	4 (5.0)	0		
Problem related to anesthesia	2 (2.5)	0		
Other	5 (6.25)	2 (2.5)		
Overall	11 (13.75)	2 (2.5)	0.043**	9.2 (1.0 – 56.9)
Short term postoperative complications				
Hernia site infection	6.25	19 (23.75)		
Wound hematoma	4 (5.0)	5 (6.25)		
Bleeding	2 (2.5)	2 (2.5)		
Intra-abdominal abscess	5 (6.25)	4 (5.0)		
Bowel obstruction	6 (7.5)	5 (6.25)		
Seroma	8 (10)	21 (26.25)		
Skin necrosis	3 (3.75)	4 (5.0)		
Other	5 (6.25)	3 (3.75)		
Long term (8 weeks) postoperative complications				
Hernia site infection	2 (2.5)	3 (3.75)		
Intra-abdominal abscess	1 (1.25)	0		
Bowel obstruction	1 (1.25)	0		
Seroma	0	0		
Skin necrosis	0	0		
Other	2 (2.5)	2 (2.5)		

*P-value is Significant at 5% level of Significance

value = 0.001). The time to resume work activities for the laparoscopic group was significantly (p-value – 0.046) shorter (median, 21.0 days; inter-quartile range, 24 days) compared with that for the open repair group (32.5 days; 36 days).

Results in table 2 shows the complications rate in both groups, which shows that there was significantly greater complication rate in open mesh repair group (48.75% vs. 33.4%, p-value = 0.032) as compared to laparoscopic group. Intra-operative complications we-

re noted higher in laparoscopic group as compared to open mesh repair group. The intra-operative complications noted were injury to bowel (5% vs. 0), problem related to anaesthesia (2.5% vs. 0) and other complications (6.25% vs. 2.25%) in laparoscopic and open repair groups respectively.

The short term postoperative complications were comparatively very high in open repair group as compared to laparoscopic group. The main short term complications recorded in both groups were hernia site infection (6.25% vs. 23.75%), wound hematoma (5% vs. 6.25%), intra-abdominal abscess (6.25% vs. 5%), bowel obstruction (7.5% vs. 6.25%), seroma (10% vs. 26.25%) in laparoscopic and open mesh repair groups respectively. All the patients in both groups were followed up to 8 weeks for any kind of infection or any other complication related to operation and it was noted that only hernia site infection was recorded in this follow-up in two patients in laparoscopic group and in three patients in open mesh repair group.

DISCUSSION

Ventral hernias are common clinical problems and controversy still exists as to the best method for surgery. There are no large randomized or multicenter trials completed till today. Data from smaller trials and cohort studies represent the available evidence. Laparoscopic repair of ventral incisional hernia is a technique in its relative infancy. The evidence base lacks large, multicentre randomized control trials. However meta analyses point towards the technique as offering improved outcome, particularly in the short term parameters. The technique has been demonstrated to be safe in all patient groups including the elderly and obese.[7,8] It may be performed under spinal anaesthetic in selected patients.[9]

In one meta-analysis of eight studies comparing open and laparoscopic ventral incisional hernia repair was associated with a 50% reduction in the rate of perioperative complications, conferring an equivalent reduction in the length of hospital stay.[10]

The results of the present study also support the reduction of complications and hospital stay in laparoscopic group in contrast to open repair group. According to the results the complications rate was significantly greater in open mesh repair group (48.75% vs. 33.4%, p-value = 0.032) as compared to laparoscopic group. The mean age in laparoscopic group was 41.20 ± 5.44 years and in open repair group it was 43.32 ± 4.31 years. Majority of the patients in both groups were females in laparoscopic group there were 61 (76.25%) and in open mesh repair group there were 63 (78.75%) females. The mean hospital stay was also significantly greater in open mesh repair group (31 ± 5.8 hr vs. 39 ± 7.36 hr, p-value = 0.001).

Another meta-analysis was conducted in USA in 2007 comparing open versus laparoscopic ventral hernia repairs. In this study postoperative inpatient hospital stay was more frequent after the open procedure than after the laparoscopic procedure ($p < .05$).[11]

Laparoscopic ventral hernia repair has gained popularity over the recent years ever since introduced by Karl Leblane in 1992. It has a number of advantages over traditional open hernia repair.[12] It continues to gain popularity because of its low rates of complications and hernia recurrence and short hospital stay and short recovery times.[13]

Abdominal wall hernias are a familiar surgical problem. Millions of patients are affected each year, presenting most commonly with primary ventral, incisional, and inguinal hernias. Whether symptomatic or asymptomatic, hernias commonly cause pain or are aesthetically distressing to patients. These concerns, coupled with the risk of incarceration, are the most common reasons patients seek surgical repair of hernias.[14]

This meta-analysis demonstrated that laparoscopic tension free mesh repair of recurrent inguinal hernia did not offer a significant benefit over open tension free mesh repair in the major outcome measures of preventing future recurrence and chronic pain. Laparoscopic surgery offered benefits in secondary outcome measures by reducing short term post-operative pain, shortening the time to return to work after operation.[15]

According to the results of our study the time to resume work activities for the laparoscopic group was significantly (p-value = 0.046) shorter (median, 21.0 days; inter-quartile range, 24 days) compared with that for the open repair group (32.5 days; 36 days). These results have also been supported by other studies that laparoscopic ventral hernia repair is associated with less severe complications and shorter hospital stays when compared with open repair. It further validates the use of the laparoscopic approach.[16-18]

Some studies have recorded that there is no difference in the times to resume normal activities (daily, work, recreational, social, and sexual activities) between the 2 groups. The median time to resume daily activities was 8 days for both groups. The time to resume work activities for the laparoscopic group was shorter (median, 23.0 days; inter-quartile range, 30 days) compared with that for the open repair group.[2]

In a multicenter randomized trial comparing laparoscopic repair to open repair overall of VIH, it was seen that the likelihood of developing complications up to 8 weeks postoperatively was approximately 50% lower in patients whose hernias were repaired by means of the laparoscopic technique, but serious complications, such as bowel injury, were more common in the laparoscopic group. Of all the complications, surgical site infections and seromas in the early post-operative period were significantly more common in the open repair group.[19,20]

In the present study short term postoperative co-

mplications were comparatively very high in open repair group as compared to laparoscopic group. The main short term complications recorded in both groups were hernia site infection (6.25% vs. 23.75%), wound hematoma (5% vs. 6.25%), intra-abdominal abscess (6.25% vs. 5%), bowel obstruction (7.5% vs. 6.25%), seroma (10% vs. 26.25%) in laparoscopic and open mesh repair groups respectively. All the patients in both groups were followed up to 8 weeks for any kind of infection or any other complication related to operation and it was noted that only hernia site infection was recorded in this follow-up in two patients in laparoscopic group and in three patients in open mesh repair group.

Bowel perforation occurred uniquely in the laparoscopic group as compare to the open repair technique which does not require entry into the peritoneal cavity. The rate of laparoscopic bowel injury is similar to that previously reported.[21,22]

It is ***concluded*** that the results of the present study elaborates that laparoscopic ventral hernia repair has advantages over open mesh repair, in terms of postoperative pain, complications rate, duration of hospital stay and duration of return to normal activity work. Which can further be improved by getting expertise in it.

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REFRENCES

1. Khan JS, Qureshi U, Farooq U, Hassa ZF, Hassan H. The comparison of open and laparoscopic ventral hernia repairs. J Postgrad Med Inst 2012; 26 (4): 397-401.
2. Itani KMF, Hur K, Kim LT, Anthony T, Berger DH, Reda D, et al. Comparison of Laparoscopic and Open Repair with Mesh for the Treatment of Ventral Incisional Hernia. Arch Surg. 2010; 145 (4): 322-328.
3. Gray SH, Hawn MT, Itani Kamal MF. Surgical progress in Inguinal and ventral incision Hernia repair. Surg. Clin. N. Am. 2008; 88: 17-26.
4. Smietanski M, Bigda J, Iwan K. Assessment of usefulness exhibited by different tacks in Laparoscopic ventral hernia repair. Surg. Endosc. 2007; 21 (6): 925-928.
5. Rooh-ul-Muqim, Qutb-e-Alam Jan, Zarin M, Gul F, Ahmed J, Iqbal J, Wazir A. Laparoscopic repair of ventral hernia an early experience at Khyber Teaching Hospital Peshawar. J Public Health Epidemiol. 2010; 1 (1): 07-10.
6. Bingener J, Buck L, Richards M, Michalek J, Schwesinger W, Sirinek K. Long – term Outcomes in Laparoscopic vs. Open Ventral Hernia Repair. Arch Surg. 2007; 142: 562-7.
7. Lee YK, Iqbal A, Vitamvas M, McBride C, Thompson J, Oleynikov D. Is it safe to perform laparoscopic ventral hernia repair with mesh in elderly patients? Hernia 2008; 12: 239-42.
8. Tsereeli Z, Pryor BA, Heniford BT, Park A, Voeller G, Ramshaw BJ. Laparoscopic ventral hernia repair in morbidly obese patients. Hernia 2008; 12: 233-8.
9. Tzovaras G, Zacharoulis D, Georgopoulou S, Pratsas K, Stamatiou G, Hatzitheofilou C. Laparoscopic ventral hernia repair under spinal anaesthesia: a feasibility study. Am Surg 2008; 196: 191-4.
10. Goodney PP, Birkmeyer CM, Birkmeyer JD. Short – term outcomes of laparoscopic and open ventral hernia repair: a meta-analysis. Arch Surg 2002; 137: 1161-5.
11. Bingener J, Bingener J, Buck L, Richards M, Michalek J, Schwesinger W, Sirinek K. Longterm outcomes in laparoscopic vs. open ventral hernia repair. Arch Surg 2007; 142: 562-7.
12. McGreevy JM. Goodney PP, Birkmeyer CM, Finlayson SRO, Laycock WS, Birkmeyer JD. A prospective study comparing the complication rates between laparoscopic and open ventral hernia repairs. Surg Enclose 2003; 17: 1778-80.
13. Sajid MS, Bokhari SA, Mallick AS, Cheek E, Baig MK. Laparoscopic versus open repair of incisional ventral hernia: A meta-analysis. Am J Surg 2008; 197: 64-72.
14. Turner PL, Park AE. Laparoscopic Repair of Ventral Incisional Hernias: Pros and Cons. Surg Clin N Am. 2008; (88): 85-100.
15. Karthikesalingam A, Markar SR, Holt PJE, Praseedom RK. Meta-analysis of randomized controlled trials comparing laparoscopic with open mesh repair of recurrent inguinal hernia. Brit J Surg 2010; 97: 4-11.
16. Kumar MD. Longterm Outcomes in Laparoscopic vs. Open Ventral Hernia Repair. World J Laparos Surg. 2008; 1 (2): 32-5.
17. DeMaria EJ, Moss JM, Sugerman HJ. Laparoscopic intra-peritoneal polytetrafluoroethylene (PTFE) prosthetic patch repair of ventral hernia. Prospective comparison to open prefascial polypropylene mesh repair. Surg Endosc. 2000; 14 (4): 326-9.
18. Heniford B, Park T, Ramshaw B.J., Voller G. Laparoscopic repair of ventral hernia: Nine Years experiences with 850 consecutive hernias. Ann Surg. 2003; 238 (3): 391-9.