

# THE COMPARISON OF OPEN AND LAPAROSCOPIC VENTRAL HERNIA REPAIRS

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## ABSTRACT

**Objective:** To compare the outcome of open versus laparoscopic ventral hernia repair in terms of duration of surgery, post operative pain and length of hospital stay.

**Methodology:** A comparative study was carried out at in-patients presenting at Surgical Departments of Benazir Bhutto Hospital, Holy Family Hospital and author's clinics. A total of 100 patients were included in the study and the patients were divided randomly in Group A and Group B, having 50 patients in each group, Group A representing open mesh repair group and Group B laparoscopic repair group. Patients of both groups were observed per-operatively for duration of surgery, postoperatively for length of hospital stay and intensity of postoperative pain.

**Results:** There was no statistically significant difference between two groups for duration of surgery ( $P > 0.05$ ). Pain was calculated at 2 and 24 hour, using visual analogue scale. Less pain was noted in Group B. Difference of pain score was statistically significant at 2h and 24h ( $P < .05$ ). Average duration of postoperative stay in hours was more in Group A (39.6 hrs) as compared to Group B (31.4 hrs) ( $P < 0.05$ ).

**Conclusion:** Laparoscopic ventral hernia repair is beneficial due to less post operative pain and short duration of post operative hospital stay but duration of surgery remained same in both the settings.

**Key Words:** Ventral hernia, Laparoscopy, Repair.

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## INTRODUCTION

Ventral hernias result from defects in the abdominal wall. They are typically classified by etiology and location. Ventral hernias can develop as a result of prior surgery (incisional) or spontaneously (umbilical, epigastric, Spigelian, or

lumbar hernias).

Ventral hernia repair remains one of the most common operations performed by general surgeons<sup>1</sup>. Approximately more than 90 000 ventral hernias are repaired yearly in the United States including incisional, epigastric, and Spigelian defects. Repair of incisional hernia by laparoscope was first reported in 1993<sup>2</sup>. There is continued debate regarding the role of laparoscopy in ventral hernia repair (LRVH). Although laparoscopic repair become increasingly popular, its outcome needs further evaluation regarding its benefits over conventional ventral hernial repair in countries of third world where recourses as well as trained surgeons are deficient.

It is believed that laparoscopic repair is beneficial in terms of less post-operative pain, shorter hospital stay, less wound infection, and less recurrence<sup>3</sup>.

It is even possible to reduce operative time because of standardized techniques, surgeons getting more skill, use of mesh fixation devices and new mesh implantation. So, laparoscopic repair is considered as first choice for ventral hernia repair.

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International studies are available about the outcome of laparoscopic ventral hernia repair as compared to open ventral hernia repair, but local data is lacking from countries like Pakistan. The structured training program for minimally invasive surgery are deficient in Pakistan. Laparoscopic surgery is being practiced throughout Pakistan for the last one and a half decade, but still the bulk is constituted by the laparoscopic cholecystectomy and diagnostic laparoscopy. Most of the surgeons, who are doing the laparoscopic surgery, are either trained in the developed countries at their own expenses or simply they observe the procedures and start doing it.

We performed this prospective study comparing early outcomes after laparoscopic and open ventral hernia repairs in Pakistan where most of surgeons are passing through their learning curve. The main early out come measures were operating time, hospital stay and intensity of postoperative pain.

This study was thus planned to compare the outcome of open versus laparoscopic ventral hernia repair in terms of duration of surgery, postoperative pain and length of hospital stay.

## METHODOLOGY

A comparative study was carried out in Surgical Department of Benazir Bhutto Hospital, Holy Family Hospital and author's clinics over a period of three years. A total of 100 patients with ventral abdominal hernia were selected on the bases of inclusion criteria and divided randomly by lottery method in Group A and Group B for hernia repair either with open mesh repair or laparoscopic approach respectively. Patients of both groups were observed per-operatively for duration of surgery, postoperatively for length of hospital stay and intensity of postoperative pain. Duration of surgery was calculated in minutes in Operation Theater by one of the house surgeon. Post operative pain was calculated by visual analogue scale at 2 and 24 hours by resident doctor. Finally postoperative hospital stay was calculated in hours at time of discharge.

Informed written consent was taken from all patients for study. Details of both techniques were explained to all patients. Patients, who refused randomization, were excluded from the study. Study protocol was approved by hospital ethical committee.

Data was recorded on a proforma and Statistical software SPSS-11 was used for statistical analysis. Chi-square and t-tests were used to find out statistical significant difference between the groups. P value of less than 0.05 was considered as statistically significant.

Any male or female patient (20 to 60 years) having un-complicated ventral abdominal hernia (umbilical hernia, paraumbilical hernia, epigastric hernia) with a defect less than 3 cm. (defect size assessed by ultrasonography) were included in the study. All patients were from ASA I or ASA II category.

Patients having recurrent abdominal hernia, incisional hernia, history of previous laparotomy or any other abdominal surgery, acute or subacute intestinal obstruction and unfit for anaesthesia were excluded from the study.

### *TECHNIQUE OF OPEN MESH REPAIR*

All surgeries were done under general anesthesia. After proper cleaning, painting and draping of abdomen the skin incision made according to site and size of defect, subcutaneous flap raised up to 3 to 5cm around the defect, the hernial sac found, contents reduced back. Peritoneum closed primarily with 2/0 poly-glaclin sutures. Anterior rectus sheath closed with 1 polypropylene. Then polypropylene mesh of suitable size is placed over anterior rectus sheath and fixed with continuous sutures of 2/0 Polypropylene. Then skin and fascia closed over with a suction drain.

### *TECHNIQUE FOR LAPAROSCOPIC*

After creating pneumoperitoneum ports were placed. Onlay technique was used for placement of mesh on defect. Omentum was also laid over the under lying bowel loops to prevent direct contact with the mesh.

As both are standard techniques only reference can be given instead of writing whole procedure.

## RESULTS

In Group A (n=50) 36 patients were female and 14 patients were male. Average age of patients was  $60 \pm SD9.2$  years. Twenty five patients were having paraumbilical hernia, 18 patients with epigastric hernia and 7 patients with umbilical heria. All patients in group A underwent open repair of ventral abdominal hernias.

In Group B (n=50) 33 patients were female and 17 patients were male. Average age of patients was  $59 \pm SD9.3$  years. Twenty two patients were having paraumbilical hernia, 20 patients with epigastric hernia and 8 patients with umbilical hernia. All patients in group B underwent laproscopic repair of ventral abdominal hernias. None of the patient needed conversion of procedure to open surgery.

Both groups were statistically similar in terms of gender, age and types of ventral

**Table 1: Comparison of results between two groups**

| Variables  | Group-A |       | Group-B |       | p-value |
|--|---------|-------|---------|-------|---------|
|  | Mean    | SD    | Mean    | SD    |         |
| Age (years)  | 60.7    | 9.2   | 59.7    | 9.3   | .56     |
| Duration of Surgery(minutes)   | 48.9    | 13.03 | 49.08   | 11.25 | .96     |
| Post-Operative Pain score at 2 Hours<br>(visual analogue score out of 10)  | 6       | .78   | 4.9     | .99   | .001    |
| Post-Operative Pain score at 24 Hours<br>(visual analogue score out of 10) | 3.6     | .6    | 2.4     | .49   | .001    |
| Post-Operative hospital stay (hours)                                       | 39      | 7.36  | 31      | 5.8   | .001    |

abdominal hernias, American Society of Anesthesiologists score and size of defect.

There was no statistically significant difference between two groups for duration of surgery ( $P>.96$ ).

Mean pain score was 6 and 4 for group A and Group B respectively at 2 hours of surgery. After 24 hours, pain score decreased to 3 and 2 for Group A and Group B respectively. This difference of pain score between two groups was statistically significant at 2 and 24 hours ( $p<.05$ )

Average duration of postoperative hospital stay was more in Group A (39.6 hrs) as compared to Group B (31.4 hrs). This difference was statistically significant ( $p<.05$ ).

There was no statistically significant difference between two groups for rate of postoperative infection and recurrence during immediate postoperative period. ( $p>.05$ )

There was no mortality in both groups

## DISCUSSION

Laparoscopic Repair of Ventral Hernia (LRVH) is being done at a time when laparoscopic appendectomy and cholecystectomy has shown definite benefit over open procedures. There are many controversies but laparoscopic surgery continues to evolve with regard to Laparoscopic Repair of Ventral Hernia and there is more data in the literatures available compared to the past due to increased popularity of this procedures. Long-term studies assessing hernia recurrence rates will be required to help determine the optimal approach to ventral hernia repair<sup>4</sup>.

Internationally Laparoscopic ventral hernia repair is a safe and effective alternative to

conventional open ventral hernia repair. The main advantage of this minimally invasive approach is a decrease in the rate of major wound complications and early return to work<sup>5</sup>.

In a meta analysis, Studies were selected on the basis of study design (comparison of laparoscopic and open ventral hernia repair). In conclusion no statistically significant difference in operative times was noted between laparoscopic and open repair (99 vs. 96 minutes;  $p=0.38$ ). Laparoscopic ventral hernia repair offers lower complication rates and shorter length of stay than open repair<sup>6</sup>.

In our study both group were statistically similar in terms of gender, age and types of ventral abdominal hernias, American Society of Anesthesiologists score and size of defect. There was no statistically significant difference between two groups for duration of surgery ( $p>.96$ ). Average duration of postoperative hospital stay was more in Group A (39.6 hrs) as compared to Group B (31.4 hrs). This difference was statistically significant ( $p<.05$ ).

Several large studies on laparoscopic ventral hernia repair have been reported<sup>7-11</sup>. This technique has proven to be a safe and feasible alternative to open mesh repair. Although many are retrospective series and a few comparative studies, only two completed randomized trials comparing open versus laparoscopic mesh repair have been published<sup>12-15</sup>. Based on these studies, LVHR has been found to have shorter operating time depending on the surgeon's experience, shorter hospital stay, lower complication rates especially wound and mesh infections and lower recurrence rate during the follow up period.

Our study shows no statistically significant

difference between two groups for rate of postoperative infection and recurrence during immediate postoperative period ( $p > .05$ ).

There was no mortality in both groups.

In another prospective study outcome parameters were assessed after open and laparoscopic ventral hernia repair. The patients in the two groups were comparable at baseline in terms of gendersex, presenting complaints, and comorbid conditions. The mean surgery durations were 90.6 min for the laparoscopic repair and 93.3 min for the open repair ( $p = 0.769$ , nonsignificant difference). The mean postoperative stay was shorter for the laparoscopic group than for the open hernia group (2.7 vs 4.7 days;  $p = 0.044$ ). The pain scores were similar in the two groups at 24 and 48 h, but significantly less at 72 h in the laparoscopic group (mean visual analog scale score, 2.9412 vs 4.1702;  $p = 0.001$ )<sup>16</sup>. In our study mean pain score was 6 and 4 for group A and Group B respectively at 2 hours of surgery. After 24 hours pain score decreased to 3 and 2 for Group A and Group B respectively. This difference of pain score between two groups was statistically significant at 2 and 24 hours ( $p < .05$ ).

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 ( $p < .05$ )<sup>17</sup>.

In our study we used onlay technique for placement of proline mesh. Initially there was lot of criticism regarding use of intra peritoneal prolene mesh due to risk of adhesion with abdominal viscera. But now literature is available to support onlay technique with omental interposition between mesh and the bowel.

Bingener et al<sup>18</sup> found no association of visceral adhesion when prolene was used with adequate omental interposition between it and the bowel. In another study involving 136 patients, Vrijland et al<sup>19</sup> concluded that enterocutaneous fistula appears to be very rare after prolene mesh repair regardless of intraperitoneal placement, omental coverage or closing the peritoneum.

## CONCLUSION

Despite local limitations regarding availability of instruments and expertise, laparoscopic ventral hernia repair is still beneficial when compared to open mesh repair, in terms of post operative pain and duration of hospital stay. Duration of surgery may be reduced by getting more experience.

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#### **CONTRIBUTORS**

JSK conceived the idea and planned the study. UQ, UF & ZFU did the data collection and analyzed the study. HH supervised the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.