



Research Article

OPEN VERSUS LAPAROSCOPIC REPAIR OF UMBILICAL AND PARAUMBILICAL HERNIA

Rajni Bhardwaj, Deepti Chanjotra* and Maryam Banoo

Department of General Surgery, Government Medical College, Jammu (J&K)

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ABSTRACT

Introduction: Umbilical and paraumbilical hernia are frequently encountered in surgical practice but there is still debate going on regarding the optimal surgical approach. There are very few prospective studies comparing the laparoscopic and open method of umbilical and paraumbilical hernia repair. This study compared the outcomes following laparoscopic and open mesh repair of the umbilical and paraumbilical hernia.

Aims and objectives: To assess and compare the outcomes of open and laparoscopic repair of umbilical and paraumbilical hernia with respect to duration of surgery, post-operative pain, post-operative complications, length of hospital stay, return to normal activity and recurrences of hernia.

Methods and materials: A prospective study of 40 patients above 18 years of age who presented to Postgraduate Department of Surgery, Government Medical College, Jammu for repair of umbilical and paraumbilical hernia from October 2021 to November 2022. Patients were placed in two groups each having 20 patients based on hernia defect size. Demographic data, hernia characteristics, and outcomes were compared

Results: Out of 40 patients, those with defect size more than 2cm underwent laparoscopic repair while patients with defect size less than 2cm underwent open repair using mesh. Most of the patients were females with high BMI. Laparoscopic repair technique led to lesser postoperative pain, early return to normal activity, shorter hospital stay and less recurrence of hernia as compared to open repair. Postoperative complications like wound infection, hematoma, seroma formation were fewer in the laparoscopic repair group.

Conclusion: Laparoscopic repair is safe and effective technique when compared to open repair technique as it showed better patient outcomes and lesser postoperative complications. Patients with larger hernias showed better results after laparoscopic repair.

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INTRODUCTION

The word “HERNIA” is derived from a Latin term meaning “rupture”. Hernia is defined as an abnormal protrusion of a viscus or a part of viscus through a defect in the cavity which contains it. Hence, hernia is a defect and when not treated early, it becomes a disease. The European Hernia Society classification for abdominal wall hernias defines the umbilical hernia as a hernia located from 3 cm above to 3 cm below the umbilicus¹. It is the second most common type of hernia in an adult following inguinal hernia². Paraumbilical hernia is the hernia located around the umbilicus. Umbilical hernias are typically small with a narrow neck, a configuration that increases the risk of strangulation and incarceration. Omentum, small bowel, and colon can be found within the sac. Umbilical or paraumbilical hernias present as a lump or soft bulge at or near the navel. An incarcerated or irreducible hernia may be associated with discoloration, severe pain, tenderness, nausea and vomiting and is considered an emergency requiring treatment.

Umbilical and paraumbilical hernia are frequently encountered in surgical practice & account for 10-12% of abdominal wall hernias³. Conventionally, smaller umbilical and paraumbilical hernia (<3 cm) have been repaired by open suture technique such as MAYO repair and its modifications but with a high recurrence rate of more than 20%⁴. The open repair using prosthetic mesh usually require adequate subcutaneous dissection, raising of flaps and drain insertion with increased incidence of wound complications such as infection which led to continuing research into the optimal method of treatment of these hernia which led the surgeons to adopt laparoscopic approach. The recent introduction of laparoscopic repair of ventral hernias is gaining popularity and is being practiced by many surgeons all over the world^{5,6}. There is an increasing evidence that laparoscopic repair is superior to open mesh repair regarding operative and postoperative complications, postoperative pain and overall morbidity and mortality⁷. The laparoscopic procedure helps the surgeon recognize the margins of the defect and identify any missed defects in clinical evaluation. The laparoscopic procedure enables the identification and management of occult hernia.

*Corresponding author: Deepti Chanjotra

Department of General Surgery, Government Medical College, Jammu (J&K)

MATERIALS AND METHODS

This was a prospective study comprising of 40 patients above 18 years of age who presented to the Postgraduate Department of Surgery, Government Medical College, Jammu for repair of umbilical and paraumbilical hernia from October 2021 to November 2022.

Patients were placed in two groups each having 20 patients.

Group A: Patients with defect size more than 2cm underwent laparoscopic repair.

Group B: Patients with defect size less than 2cm underwent open repair.

Patients were observed in the intra-operative and post-operative period as per the aims and objectives of the study. The inclusion criteria and the exclusion criteria of the study were as follows:

Inclusion criteria

- Patients above 18 years of age.
- Size of defect being 2 to 10 cm for laparoscopic repair.
- Size of defect less than 2cm for open repair.

Exclusion criteria

- Obstructed umbilical and paraumbilical hernia.
- Patients below 18 years of age.
- Strangulated hernia.
- Patients having other ventral wall hernia.
- Patients with renal disease, liver disease, coagulopathy, metastatic disease or cardiovascular disease.

All patients admitted with umbilical and paraumbilical hernia repair who fit the inclusion criteria were included in the study. The repair technique was based on the history and examination.

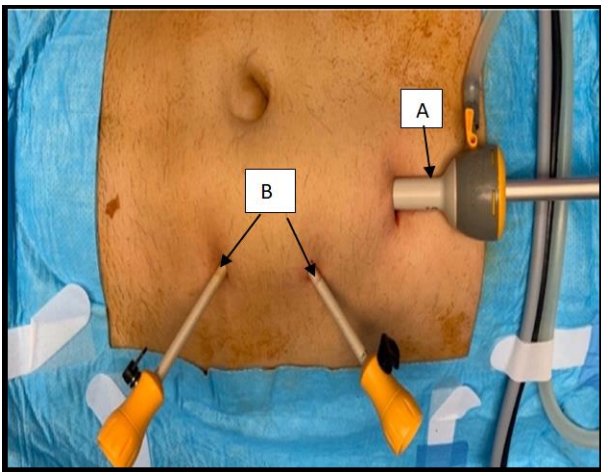


Figure 1 Port placement for laparoscopic repair of umbilical hernia
A -10mm port at Palmer's point B- 5mm ports

For laparoscopic repair, the defect was delineated and closed with non-absorbable sutures. The defect was reinforced with an e-PTFE or a composite mesh and the mesh anchored to the anterior abdominal wall by inner and outer crowning using tackers and transfascial sutures at the four corners of the mesh. For open repair, very small defects less than 2cm were repaired using sutures and mesh placed either within the peritoneal cavity or in retromuscular space. Compression dressing was applied over the area of the hernial defect to

prevent seroma formation. The patients were followed up at three months postoperatively, and at six months and one year. During the follow up visits, clinical examination and ultrasound examination were performed to exclude recurrence of hernia or seroma. Data was collected and subjected to statistical analysis.

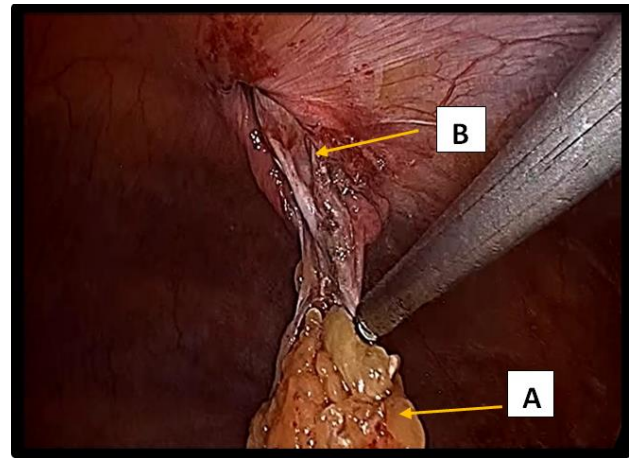


Figure 2 Reduction of hernial content
A-Omentum B-Hernia defect

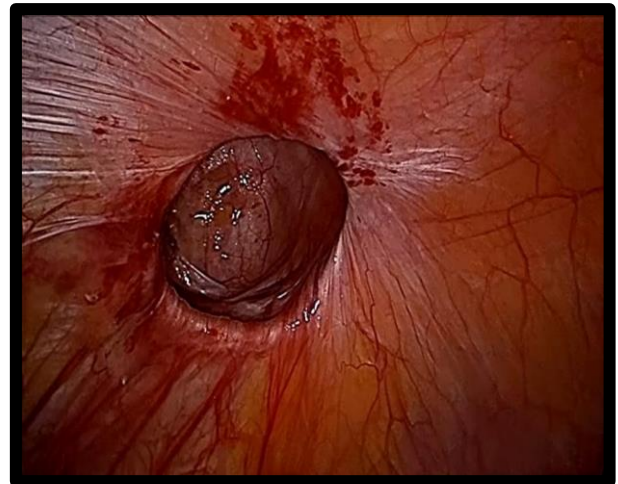


Figure 3 Umbilical hernia defect (arrow) after reduction of contents



Figure 4 Composite mesh fixed using tackers and sutures

Statistical Analysis

Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements for each group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using 't-test'

as well as 'chi-square test' and the level of significance was set at $p < 0.05$.

RESULTS

In both the groups, there were comparatively more females as compared to males. Maximum subjects were from the age group of 41-60 years followed by 18-40 years in open as well as laparoscopic group. Mean BMI in open as well as laparoscopic group was 29.69 ± 2.71 and 29.30 ± 2.48 kg/m^2 respectively. Hence, hernia was associated with obesity. Mean hernia size (in cm) in open and laparoscopic group was 1.92 ± 0.14 and 8.77 ± 1.97 respectively. Pain, nausea and vomiting was reported in 80%, 60%, 45% and 85%, 55%, 50% of the subjects in open and laparoscopic group preoperatively. Mean duration of surgery (in minutes) in open and laparoscopic group was 21.68 ± 4.69 and 41.09 ± 3.62 respectively. Hence, surgical time was required more in laparoscopic as compared to open group with statistically significant difference as $p < 0.01$. Mean post-operative pain in open and laparoscopic group was 2.80 ± 0.61 and 1.98 ± 0.59 respectively (VAS Score). Hence, pain was revealed to be more in open group as compared to laparoscopic group with statistically significant difference as $p < 0.01$. Mean post-operative hospital stay (in days) in open and laparoscopic group was 3.82 ± 0.70 and 2.27 ± 0.74 respectively. Hence, post-operative hospital stay (in days) was revealed to be more in open group as compared to laparoscopic group with statistically significant difference as $p < 0.01$. Mean return to normal activity (in weeks) in open and laparoscopic group was 3.97 ± 0.79 and 2.81 ± 0.72 respectively. Hence, return to normal activity (in weeks) was earlier in laparoscopic group as compared to open group with statistically significant difference as $p < 0.01$. Post operative complications, viz. hematoma, seroma, excision of umbilicus, SSI and FB granuloma were found more in open group as compared to laparoscopic group with statistically significant difference as $p < 0.01$. Recurrence was found in one patient and that too from open group. Hence, this study clearly favors laparoscopic umbilical and paraumbilical hernia repair over open repair in view of the following factors:

- No cut on the muscles as the holes are made in between the fibres.
- Minimum pain.
- Less hospital acquired infections.
- Early return to work.
- No residual weakness.
- Low incidence of recurrence.

Demographic data and Hernia characteristics

Variables	Open repair group (n=20)	Laparoscopic repair group (n=20)
Age (years)	46.65 ± 10.16	47.30 ± 11.77
Sex (M/F)	8/12	4/16
BMI (kg/m^2)	29.69 ± 2.71	29.30 ± 2.48
Hernia size (cm)	1.92 ± 0.14	8.77 ± 1.97

Operative results

Variables	Open repair group (n=20)	Laparoscopic repair group (n=20)
Operative time (minutes)	21.68 ± 4.69	41.09 ± 3.62
Post operative pain (VAS Score)	2.80 ± 0.61	1.98 ± 0.59
Post operative hospital stay (days)	3.82 ± 0.70	2.27 ± 0.74
Return to normal activity (weeks)	3.97 ± 0.79	2.81 ± 0.72
Recurrence of hernia (%)	5	0

DISCUSSION

Umbilical and paraumbilical hernia are frequently encountered in surgical practice accounting for 10-12% of abdominal wall hernias³. Obesity & multiparity are the most important predisposing factors⁸. It has known to occur since biblical times. Umbilical hernia repair has been reported by Celeus in the 1st century, William Cheselden in 1740. William Mayo in 1901 described the classical overlapping "vest over trousers" repair in 19 patients⁹. Umbilical and paraumbilical hernias have historically been repaired without mesh. The technique of overlapping abdominal wall fascia in a "vest-over-pants" manoeuvre as described by Mayo remained the most renowned surgical technique for a long time but is associated with high recurrence rates of up to 28%. On the other hand, suture hernioplasty without double-breasting of the fascia was commonly used by surgeons. However, the relatively high recurrence rates associated with these techniques increased the popularity of mesh repair. An increased incidence of wound infection and mesh-related complications in open mesh repair led to continuing research into the optimal method of treatment of umbilical/paraumbilical hernias which led the surgeons to adopt the laparoscopic approach.

Conventionally, smaller umbilical/paraumbilical hernia ($< 3\text{cm}$) have been repaired by open suture technique such as MAYO repair and its modifications but with a high recurrence rate of more than 20%. The open repair using prosthetic mesh usually requires adequate subcutaneous dissection, raising of flaps and drain insertion with increased incidence of complications such as mesh infection, mesh dislocation, foreign body sensation, seroma formation, etc. Hence, laparoscopic mesh repair is now being accepted as an effective alternative to open mesh repair of umbilical/paraumbilical hernia. For open repair, the mesh is placed either within the peritoneal cavity (intraperitoneal repair), in the pre-peritoneal space (underlay repair), in retro-muscular space (sublay repair), sutured to the margins of the aponeurosis (inlay repair) or in the subcutaneous plane (onlay repair). Laparoscopic repair includes IPOM and IPOM plus techniques.

Laparoscopic repair gained wide acceptance and has become the prime modality of choice in recent times, especially for surgeons well trained in laparoscopic techniques but is not being practiced regularly, probably because of requirement of superior skills for laparoscopic repair and the higher cost incurred for laparoscopic repair.

The use of a variety of mesh materials for the repair of these hernias has resulted in a decreased recurrence rate when compared with that in primary suture closure^{10,11}. The first meshes to be introduced into hernia repair were composed of monofilament polyethylene and polypropylene which demonstrated good incorporation into the abdominal wall, but substantial side effects like mesh migration, erosion, adhesions and fistulation were reported. The development of new meshes composed of polyester or expanded polytetrafluoroethylene (e-PTFE) have different pore size on the visceral and parietal side¹². In order to reduce the adhesive potential of monofilament intraperitoneal mesh even further without compromising incorporation into the abdominal wall, recent development has been the introduction of composite meshes¹³ which are characterized by a mono- or multifilament dual layer, having different properties on the parietal and visceral side. They are composed of polyester or polypropylene on the

parietal side, while the visceral side is either coated with an absorbable film or covered by e-PTFE to reduce formation of adhesions with the bowel.

The laparoscopic technique in ventral hernia repair, first proposed by Blanche in 1993^{9,14} has been progressively accepted and used because of the benefits associated with laparoscopy which include reduced postoperative pain, reduced hospital stay, faster recovery, early return to normal activity, lower recurrence rates, high Quality of Life (QOL) and reduced socioeconomic burden. Nonetheless, laparoscopy is not always possible, and it has limits associated with the patient's general condition, potential anaesthetic complications, number of previous surgical interventions and their likelihood of invoking sepsis and the characteristics of the hernia like size and reducibility of the sac. Complications include prolonged ileus, seroma formation, iatrogenic bowel injury and mesh infection which may further require mesh removal.

Laparoscopic hernia repair is a complex but very efficient method in experienced hands. To achieve the best possible results, it requires an acceptance of a learning curve, structured well-mentored training and high level of standardization of the operative procedure. Though the cost of bi-layered mesh and fixation device are high in laparoscopic repair, the patient benefits in terms of shorter hospital stay, less pain and early return to routine activity which make it superior to open repair. Laparoscopic umbilical/para-umbilical hernia repair is technically safe, effective and feasible, with a better clinical outcome in patients seeking treatment in a government hospital set-up. With increasing experience, and development of new meshes and fixation devices, it is now a widely accepted option in the management of umbilical and paraumbilical hernia, associated with few adverse effects.

CONCLUSION

Laparoscopic repair of umbilical and paraumbilical hernia is safe and effective with lesser complications as compared to open method. We found that hospital stay was longer in open repair as compared to laparoscopic repair. Wound infection and wound dehiscence rate was also high in open repair. Recurrence rate was significantly higher in open repair group as compared to laparoscopic repair group.

Conflict of Interest: Nil

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