

# Comparison between Effectiveness of Laparoscopic versus Open Repair of Umbilical and Paraumbilical Hernia

*Hamed Abosteit, MD, MRCS.*

*Department of General Surgery, Ain Shams University, Cairo, Egypt.*

**Background:** Laparoscopic repair of umbilical and paraumbilical hernia had largely replaced open mesh repair. The purpose of this study was to compare the effectiveness of laparoscopic versus open mesh repair in umbilical and paraumbilical hernia.

**Patients and methods:** It is a retrospective study of 55 patients admitted in Hai Al Jamea hospital (private hospital in Jeddah, Saudi Arabia) between January 2014 and December 2014. Twenty-five cases underwent laparoscopic hernia repair and 30 cases underwent open mesh repair.

**Results:** Postoperative pain by visual analogue scale (VAS) in 1<sup>st</sup> 24 hours was 3.5 in laparoscopic repair and 7.5 in open mesh repair. Operating time was longer in laparoscopic (74min) compared to open mesh repair (66min). While hospital stay and return to work were shorter in laparoscopic repair (1.3 and 10 days respectively versus 3 and 17 days in open mesh repair).

**Conclusion:** Laparoscopic hernia repair is a complex but efficient method in experienced hands with less postoperative pain, less hospital stay and early return to work.

**Key words:** Laparoscopic repair – open repair – umbilical and paraumbilical hernia.

## Introduction:

The anterior abdominal wall is the site of a variety of hernias due to erect posture which renders the anterior abdominal wall weak.<sup>1,2</sup> Umbilical and paraumbilical hernias are frequently encountered in surgical practice and account for 10-12% of abdominal wall hernias.<sup>3</sup> Obesity and multiparity are most important predisposing factors.<sup>3,4</sup> Problems with conventional umbilical and paraumbilical hernias repair include a relatively high rate of recurrence (greater than 10% in some series)<sup>5,6</sup> and potentially increased risk of infection relative to other incisions, particularly with the use of mesh, due to the location in and around the umbilical crease.<sup>7</sup> There is increasing evidence that laparoscopic approach for umbilical and paraumbilical hernia is superior to open mesh repair in terms of duration of operation, operative and postoperative complications, and overall morbidity and mortality.<sup>8,9</sup>

The purpose of this study is to compare

the effectiveness of laparoscopic versus open repair of umbilical and paraumbilical hernia.

## Patients and methods:

This is a retrospective study of 55 patients admitted in Hai Al Jamea hospital in Jeddah from January 2014 till December 2014 presented with umbilical and paraumbilical hernia. Twenty-five cases underwent laparoscopic hernia repair while thirty cases underwent open mesh repair.

- Patient selection criteria:

- Inclusion criteria: Patients above 18 years old.
- Exclusion criteria: Complicated umbilical/paraumbilical hernia, coagulopathy, severe cardiopulmonary disease, ascites and renal failure.

Patients were counseled to the potential risks, benefits and possibility of conversion to open surgery in their informed consent.

In our study, all patients received a single dose of 3<sup>rd</sup> generation cephalosporin at the

time of induction of anesthesia. Patients were administered spinal / general anesthesia.

#### Surgical technique:

##### A- Open mesh repair technique:

Appropriate skin incision was kept according to the size and site of the defect. After dissection, subcutaneous flaps were raised to 4-5 cm around the defect. The sac was found and excised, the hernia defect was closed with prolene no. 1 and prolene mesh was kept on rectus sheath and fixed with prolene 2.0. Lastly, skin and fascia were closed after keeping the negative suction drain.

##### B- Laparoscopic repair technique:

Insufflation of the abdomen, insertion of a camera port (12 mm) in the left hypochondrial region at the anterior axillary line for 30° camera and two manipulating ports (5 mm) about 10 cm on each side of the camera port. The contents of hernia sac were then reduced back to the peritoneal cavity **Figures (1,2)**. Adhesiolysis was done with scissors or harmonic scalpel taking care of the bowel. The size of the defect was assessed for placement of the 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 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 position of mesh.

The mesh was then rolled and introduced into the abdomen through trocar 12mm size **Figure (3)**.

The corners of the mesh containing the sutures were identified and brought out the surface by a suture passer and the mesh was fixed at the corners by applying knots on each corner which was then buried on subcutaneous tissue. Additional fixation was done by using tacker all around the mesh so that; the mesh was snugly fitted over the defect covering a larger area than the actual defect **Figure (4)**.

Postoperatively upon discharge from hospital, all patients were encouraged to

refrain from smoking and avoid strenuous labor for a period at least 6 weeks. All patients were seen in follow up in 1, 2, and 4 weeks postoperatively and then on needed basis. They were all evaluated by physical examination. Additional imaging (ultrasound or CT scan) was done in complicated cases to assess the integrity of their repair.

#### Statistical methodology:

Analysis of data was done by IBM computer using SPSS (statistical program for social science version 16) as follows

- Description of quantitative variables as mean, SD and range
- Description of qualitative variables as number and percentage
- Chi-square test was used to compare qualitative variables between groups.
- Unpaired t-test was used to compare quantitative variables, in parametric data (SD <50% mean)
- Fisher exact test was used instead of chi-square when one expected cell less than or equal 5.

P value >0.05 non-significant (NS)

P<0.05 significant (S)

P<0.001 highly significant (HS)

#### Results:

**Table (1)** shows no significant difference as regard general data by using chi-square test.

**Table (2)** shows significant difference between both groups as regard different variables.

**Table (3)** shows that no significant difference between both groups by using multiple chi-square test.

**Table (4)** shows that no significant difference between both groups by using multiple chi-square test.

#### Discussion:

Ventral hernia repair has been an area of debate for the consideration of the laparoscopic or the open approach for its repair.<sup>10,11</sup> Since laparoscopic technique to repair ventral hernias started in 1993 keeping in view various advantages of laparoscopic

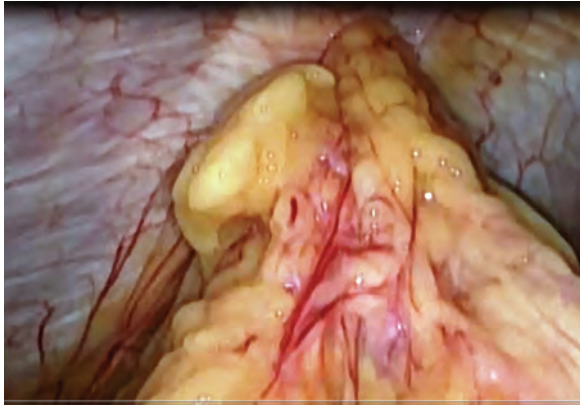


Figure (1): Hernia defect containing greater omentum.

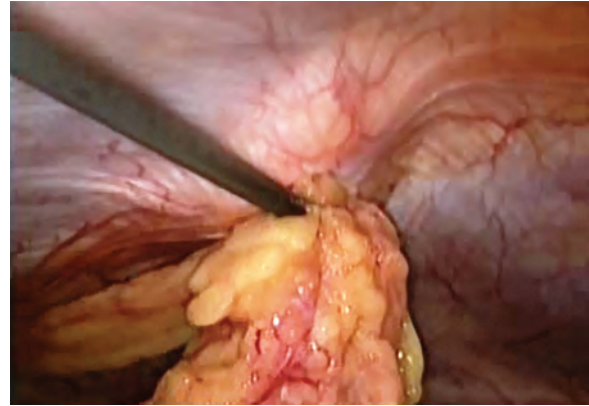


Figure (2): Content of the hernia reduced back to the peritoneal cavity.



Figure (3): Mesh rolled and introduced into the abdomen.



Figure (4): Mesh fixation by using tack.

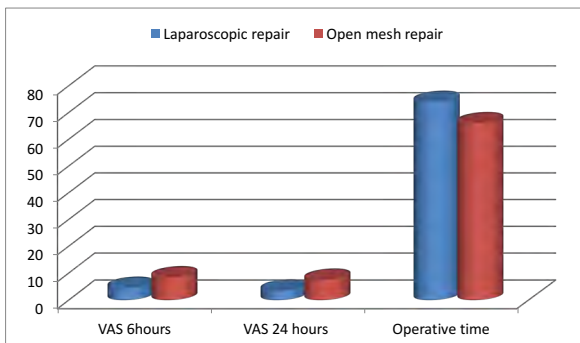


Figure (5): Impact of the study.

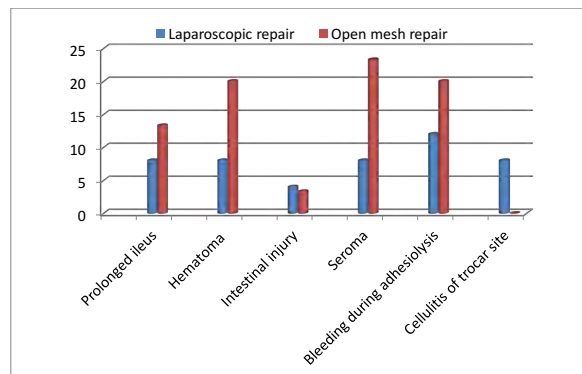


Figure (6): Early postoperative complications.

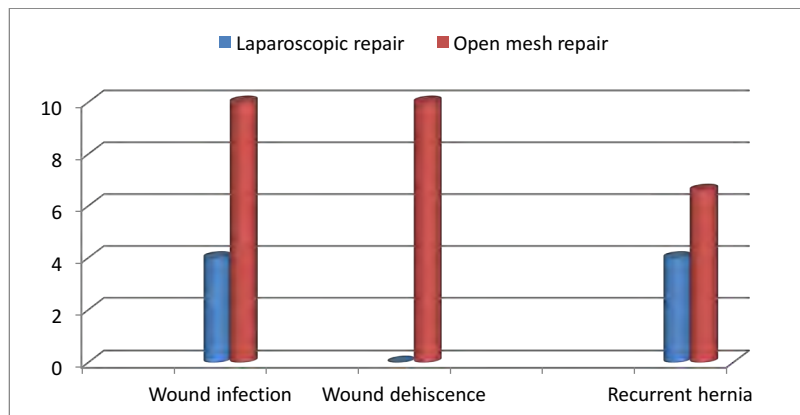


Figure (7): Late postoperative complications.

**Table (1): Socio-demographic data with comorbidities.**

	Laparoscopic repair (total= 25)	Open mesh repair (total= 30)	P
Age	18-50 y (42.6±4)	30-70 y (48.4±7)	0.22NS#
Sex ♀/♂	20(80%)/5(20%)	18(60%)/12(40%)	0.13NS
Steroid use	1(4%)	2(6.7%)	0.45NS
DM	2(8%)	3(10%)	0.56NS
Smoking	6(24%)	5(16.7%)	0.33NS

#unpaired t-test

**Table (2): Impact of the study.**

		Laparoscopic repair (total= 25)	Open mesh repair (total= 30)	P
Postoperative pain (by VAS scale 1:10)	6 hours	4-5 (4.5±2)	8-9 (8.4±3.2)	0.0001HS*
	24 hours	3-4 (3.5±1.2)	7-8 (7.5±2)	0.0001 HS
Operating time		60-80 min (74±20)	40-90 min (66±25.6)	0.02S**
Conversion to open		1(4%)	0	0.60NS
Hospital stay		1-2 days (1.3±0.6)	2-4 days (3±1.1)	0.002 S
Return to work		7-14 days (10±3.2)	14-21 days (17±4)	HS

#Fisher exact test

**Table (3): Early postoperative complications.**

	Laparoscopic repair (total= 25)	Open mesh repair (total= 30)	P
Prolonged ileus	2(8%)	4(13.3%)	0.31NS
Hematoma	2(8%)	6(20%)	
Intestinal injury	1(4%)	1(3.3%)	
Seroma	2(8%)	7(23.3%)	
Bleeding during adhesiolysis	3(12%)	6(20%)	
Cellulitis of trocar site	2(8%)	0	

**Table (4): Late postoperative complications.**

	Laparoscopic repair (total= 25)	Open mesh repair (total= 30)	P
Wound infection	1(4%)	3(10%)	0.14NS
Wound dehiscence	0	3(10%)	
Recurrent hernia	1(4%)	2(6.6%)	

surgery over conventional open approach.<sup>12</sup>

In our study as regard operating time, most of laparoscopic cases were completed within 74 min while open cases took 66 min. Total duration of surgery in laparoscopic repair was significantly longer compared to

open technique in this study. Most of the time was consumed in handling the mesh intra-peritoneal but with increased experience this difficulty was overcome as many techniques of mesh insertion and placement were being suggested.<sup>13</sup> Furthermore the fixation

technique of mesh can be time consuming.

These findings were consistent with other studies revealed that the operation time in laparoscopic hernia repair was longer compared to open surgery.<sup>3,14,15</sup> On the other hand there were some studies showed that no difference or even a shorter operation time in laparoscopic surgery.

As regard postoperative pain, it was assessed 6 hourly on day one and then daily during first week. Postoperative pain (VAS score) was greatest in the open group (8.4) in comparison to (4.5) in laparoscopic group in 6 hours and was 3.5 in laparoscopic group and 7.5 in open surgery group in 1<sup>st</sup> 24 hours. This postoperative pain after mesh fixation with transfascial sutures is likely due to nerve irritation or entrapment.<sup>17</sup> Compared to Lomantoet al.<sup>18</sup> showed there was no difference in the amount of pain comparing laparoscopic and open hernia repair at 24 hours and 48 hours postoperatively. But Parmaret al.<sup>19</sup> showed highly statistically significant difference between two groups as the mean VAS score at 24 hours was higher in open approach (5.86) in comparison to lower score (4.04) in laparoscopic approach.

As regard mean hospital stay, it was 1.3 day in laparoscopic repair and 3 days in in open mesh repair ( $p < 0.002$ ). The duration of hospital stay was significantly shorter in laparoscopic repair due to less pain and lower rate of surgical site infection that lead to earlier mobilization and so, the patient became candidate for earlier discharge.

Compared to Parmaret al.,<sup>19</sup> mean postoperative stay for laparoscopic and open approach was 2.6 and 4.6 days respectively. This statistically significant difference ( $p < 0.05$ ) revealed that the patients with laparoscopic approach became early mobile and became candidate for earlier discharge. Frobess et al.<sup>20</sup> found similar results in their meta-analysis as the duration of hospital stay was significantly shorter in laparoscopic hernia repair compared to open repair. This in turn decreased the hospital acquired infections and the hospital stay charges.

In our study, there was statistically significant difference as regard time to return

to work. It was 10 days in laparoscopic repair and 17 days in open mesh repair. Compared to Purushotham and Madhu,<sup>21</sup> 70.29% of patients of laparoscopic group resumed work on the 14<sup>th</sup> day whereas 54.45% of open surgery group resumed work on 16<sup>th</sup> day. While Parmaret al.<sup>19</sup> didn't find much statistical difference between the two groups (8.8 and 7.8 days for open surgery and laparoscopic groups respectively).

As regard early postoperative complications, prolonged ileus occurred in 2 cases (8%) in laparoscopic group and 4 cases (13.3%) in open mesh group. Our findings were consistent with results of many reports claiming prolonged ileus in (1-8%) of laparoscopic hernia repair.<sup>22,23</sup> Moreover, Malik 24 results showed postoperative prolonged ileus in 9 (7.25%) patients in the laparoscopic group, while 48 (32.43%) patients in open group.

In our study, seroma formation occurred in 2 cases (8%) in laparoscopic repair and 7 cases (23.3%) in open mesh repair compared to randomized trial of Olmiet al.<sup>16</sup> that found 7% incidence of seroma formation in laparoscopic hernia repair. Retained hernia sac without closure of central defect may play a role in seroma formation. Seroma formation is classified as a complication if it lasts more than 6 weeks after the operation. In most of cases, no intervention is necessary. Potentially compression dressing over a period of 7 days may prevent seroma formation.

Wound infection occurred in 1 case (4%) in laparoscopic repair and 3 cases (10%) in open mesh repair. It was higher in open mesh repair due to longer incisions and tissue handling. Compared to Malik<sup>24</sup> results, it was 5.64% in laparoscopic technique and (18.91%) in open surgical technique.

We reported one case (4%) of bowel injury during laparoscopic repair. This occurred while adhesiolysis was performed to free the bowel from the sac. This complication was identified during operation and repair laparoscopically by two intracorporeal stitches. This finding is in line with earlier report that calculated a risk of enterotomy 2.1% of its patients.<sup>25</sup>

Recurrent hernia occurred in 1 case (4%) of laparoscopic repair and 2 cases (6.6%) in open mesh repair with no significant statistical difference. Similarly, Malik<sup>24</sup> and Forbes et al.<sup>20</sup> found no difference in recurrence rate between laparoscopic and open hernia repair. Two technical details can minimize the recurrence rate. First, a sufficient overlap of the mesh and second, mesh fixation.

No mortality was recorded in our study.

### Conclusion:

Despite local limitations regarding availability of instruments and expertise, laparoscopic umbilical and paraumbilical hernia repair is still beneficial when compared to open mesh repair, in terms of postoperative pain, postoperative analgesia requirement, duration of hospital stay, and early return to work.

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