A comparative study between laparoscopic trans-abdominal retromuscular repair and intraperitoneal onlay mesh repair techniques in ventral hernia

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Background
A hernia is a projection of an organ or part of an organ through a defect in the body wall. When compared to open procedures, laparoscopic ventral hernia repair has consistently demonstrated lower overall complication rates, shorter hospital stays, and faster return to work.
Aim
To compare the efficacy and safety between laparoscopic transabdominal retromuscular mesh (TARM) repair and laparoscopic (IPOM) repair in the treatment of patients with ventral hernia in Zagazig University Hospitals as a single center experience.
Patients and methods
This study is a prospective randomized clinical trial carried out upon 48 patients who were randomized by closed envelope method into two groups: Group (A): had undergone Laparoscopic TARM repair. Group (B): had undergone Laparoscopic IPOM repair.
Results
There was statistically significant variation between groups concerning cost which was significantly lower in laparoscopic TARM repair. Group B was lower regard intra operative complication rate but not significantly, but regard postoperative complication Group A significantly associated with Seroma and Group B significantly associated with Bulge. Complicated cases were significantly younger and wider regarding hernia width.
Conclusion
TARM repair technique was more time consuming but with less cost in comparison to the IPOM technique. TARM has the advantage of defect closure and avoiding mesh contact with abdominal viscera.

Keywords:
IPOM, LVHR, TARM

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Introduction

A ventral hernia is a noninguinal, nonhiatal protrusion of abdominal viscera through a defect in the abdominal wall fascia. Every year, around 350,000 ventral hernia surgeries are performed worldwide. General surgeons are responsible for repairing these abdominal wall abnormalities [1].

Pain, swelling, or fullness at the site of incidence are common symptoms of abdominal wall hernia, which can vary with position or Valsalva. In most cases, a history and physical examination are sufficient to diagnose an abdominal hernia, although extreme obesity, a key risk factor, can limit the examination. Because hernias can vary with exercise or even standing, it is critical that the patient should be evaluated in a variety of situations. A variety of adjunct assessments, such as ultrasound or CT scan, can be done to aid in diagnosis [2].

Laparoscopic ventral hernia repair (LVHR) was created to be a less invasive alternative to the gold standard Rives-Stoppa surgery [3]. LeBlanc was the first to describe laparoscopic ventral hernioplasty in 1993 with an IPOM implant [4]. However, the technique was not popularized until after 2000 until the report of a large multicenter series of LVHR with a low rate of complication and recurrence rate of hernia with 3.4% [5].

Several adjustments were made to laparoscopic procedures, including the introduction of new fixation devices, coated meshes and, perhaps most critically, adjustments to surgical technique. The

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typical onlay and retromuscular/preperitoneal alternatives were dropped as part of these technical adjustments [6].

Increased cost, difficult learning curve and increased intraabdominal complications plateaued laparoscopic repairs at approximately 20% of all ventral hernia repairs [7].

Sublay mesh placement, such as open Rives-Stoppa surgery, has been preferred due to the risks associated with intraperitoneal onlay mesh repair for ventral hernias. A polypropylene mesh with sublay, midline closure, and the inclusion of posterior component separation via transversus abdominis release (TAR) was required for low-cost laparoscopic transabdominal repair. This method has been proven to be successful for treating some minor, medium-sized, and big hernias [8].

Surgery's understanding of the methods used to treat abdominal wall hernias is advancing quickly. There is an extensive collection of literature, frequently with scant evidence and contradictory findings. The best management techniques for ventral hernias are still debatable [9].

This study aimed to compare the safety and efficacy between laparoscopic TARM repair and laparoscopic IPOM repair in the treatment of patients with ventral hernia in Zagazig University Hospitals as a single-center experience.

Patients and methods

This study is a prospective randomized clinical trial performed in General Surgery Department, Zagazig University Hospitals between August 2020 and July 2022. 48 patients who were randomized by closed envelope method into two groups: Group (A): had undergone Lap. Transabdominal retromuscular mesh repair. Group (B): had undergone Lap. Intraperitoneal onlay mesh repair. These patients were admitted to the hospital as they had met the inclusion criteria for this study.

Inclusion criteria

(1) Age (18–60) years, both sexes.
(2) Fitness for surgery.
(3) Patients with uncomplicated ventral hernia

Exclusion criteria

(1) Patients don't fit for general anesthesia due to sever co-morbidity.
(2) Patients with complicated ventral hernia.
(3) Patient refusal of surgical intervention.
(4) History of bleeding disorders, platelet count less than100, 000 $*10^3/\mu L$ and/or prothrombin time more than 3 s. over control.
(5) Pregnancy
(6) Huge ventral hernias

Investigations

Routine laboratory investigations and imaging studies (Pelvi-abdominal ultrasound and CT abdomen if needed) were performed.

Patient preparation

The technique and possible complications were explained to the patient and informed consent was obtained. Preoperative subcutaneous injection of Enoxaparin (Clexane) 40 mg 12 h preoperative as a DVT prophylaxis. The patient was kept NPO for 6 h before the procedure. Diabetic patients on insulin received an intravenous drip. Prophylactic broad-spectrum antibiotic Ceftriaxone 1 gm. intravenous was given immediately before the procedure. General anesthesia with endotracheal tube by using Isotan® (Isofurane) which is known to be safe in such patients.

The operative interventions for group (A)

Patients randomized to group (A) were scheduled to undergo Lap. Transabdominal retromuscular mesh repair.

Operative steps

The monitor should be placed in opposition to the trocars. Depending on the size and location of the hernia, the standard supine posture is with both arms at the side or on the arm board with the leg split and table break at the level of the mid-abdomen. For big, recurring, or incisional hernias, use a Foleys catheter. Before entering the abdominal cavity, the hernia defect must be marked (Figs. 1 and 2).

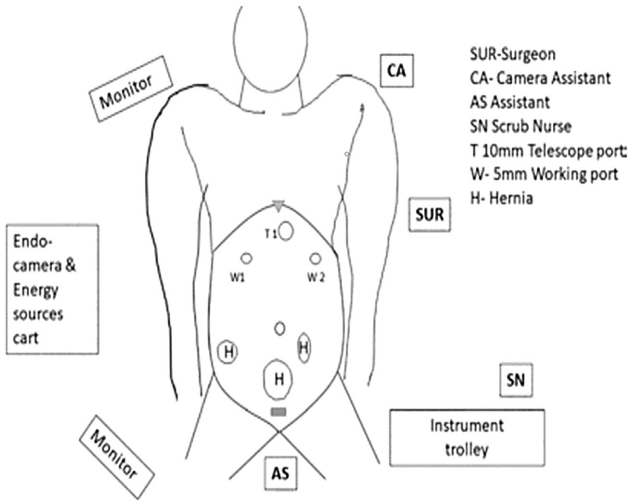
Preparing the defect: adhesiolysis

Before performing adhesiolysis, the defect's margins are cleared using diathermy or an ultrasonic dissector. A decrease of the hernia's contents is initiated with a gradual hand-over-hand removal of the sac contents following adhesiolysis. The assistant's external countertraction was used to aid in reducing the contents of the hernia sac.

Measurement of defect size

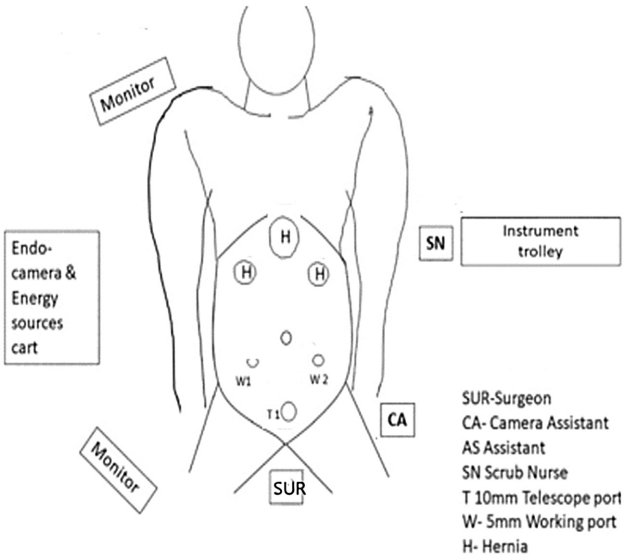
After the hernia's boundaries have been clearly demarcated and cleaned, the defect is assessed using

Figure 1



Position of trocars, surgeon, assistants, and instruments for lower abdominal hernias.

Figure 2



Position of trocars, surgeon, assistants, and instruments for upper abdominal hernias.

external palpation or a laparoscopic device. In order to obtain a precise size, it is best to reduce intraabdominal pressure to 6 mm Hg.

Developing the retromuscular space

Using electrosurgery or ultrasonic shears, a 6–8 cm long transverse incision is made in the peritoneum (P) and posterior rectus sheath (PRS), 6 cm from the defect. To achieve this, the P-PRS complex must be lysed away from the linea alba (LA) and rectus abdominis (RA) muscles (Fig. 3). The inferior limit continues at least 8 cm distal to the defect and laterally till the linea semilunaris (LS), with cautious preservation of the epigastric arteries, the neurovascular bundles at LS laterally, and LA in the middle.

Defect closure

Following that, the intraabdominal pressure is lowered to 8 mm Hg. A running suture of number 1 PDS is used to close the defect and the LA, travelling through the medial edges of the RA muscles, ARS, and LA (Fig. 4).

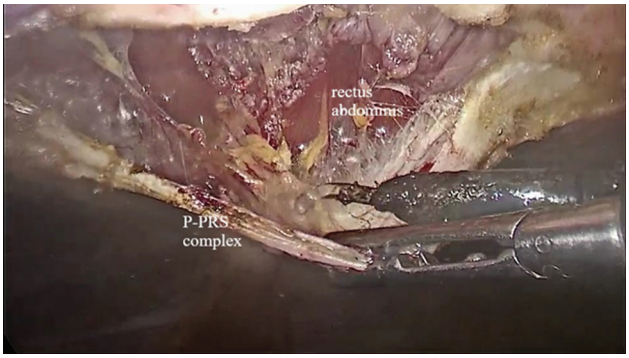
Mesh size and choice of mesh

The retromuscular area is lined with an adequate-sized, medium-weight polypropylene mesh that extends from one LS to the other and has a wide overlap of 5 cm beyond the defect.

Mesh insertion and fixation

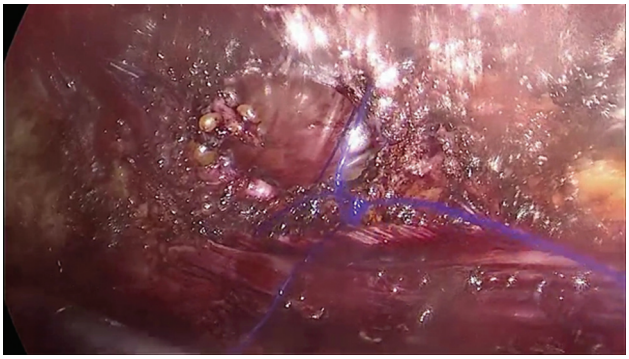
After that, the mesh is wrapped around a laparoscopic grasper and introduced through a 10 mm trocar. The mesh is unfurled and correctly positioned after it is introduced. Spiral tacks are used for fixation with care to prevent wrinkling of the mesh (Fig. 5).

Figure 3



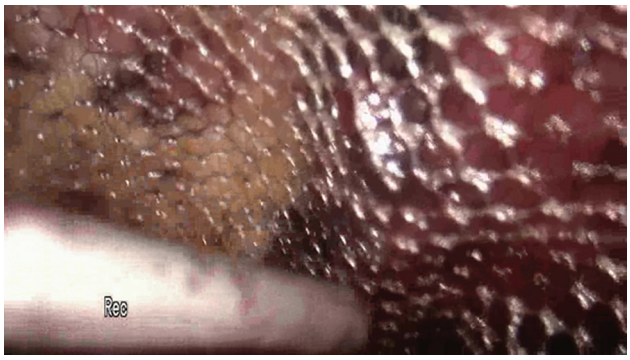
Creation of the retro muscular space.

Figure 4



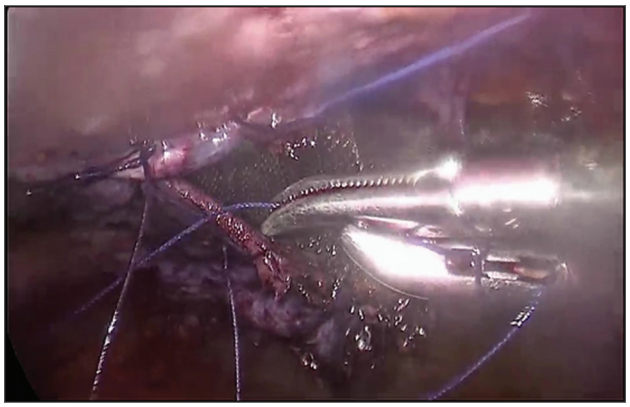
Defect closure.

Figure 5



Polypropylene mesh fixation using tacks.

Figure 6



Closure of peritoneum-posterior rectus sheath incision.

Closure

The abdominal cavity should be examined for any bleeding or damage after the fixation of mesh. Number (0) PDS is used to close the first transverse P-PRS incision (Fig. 6). All CO_2 should be permitted to depart the cavity, and the 10 mm trocar site should be closed with nonabsorbable suture or PDS. To avoid damage or taking abdominal content in sutures, extreme caution must be exercised. Before closing, a finger examination assures safety.

The operative interventions for group (B)

Patients randomized to group (B) were scheduled to undergo Lap. Intraperitoneal onlay mesh repair.

Operative steps

The monitor should be placed in opposition to the trocars. Depending on the size and location of the hernia, the standard supine posture is with both arms at the side Surgeon and Assistant stand on the side of the patient (Fig. 7). The hernia defect must be marked.

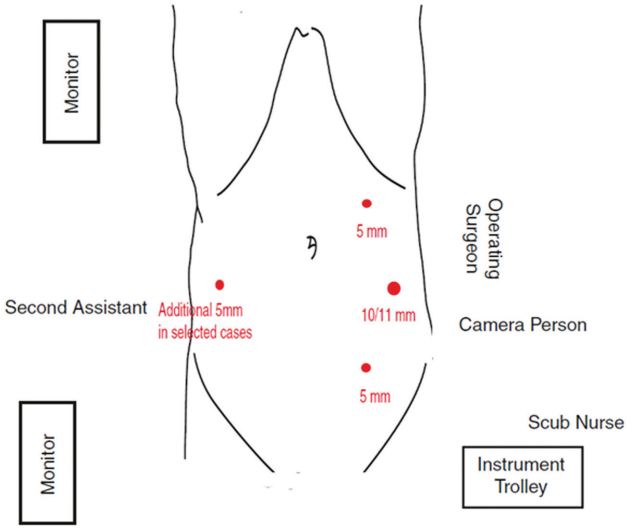
Mesh size and choice of mesh

The Ventralight mesh is then modified to guarantee that all defect margins overlap by at least 5 cm. To aid with intra-abdominal orientation, distinct "orienting" markers are placed on the mesh and on the skin, respectively.

Mesh fixation

Sutures are inserted into the mesh at four cardinal points. For larger prosthesis, additional sutures might be placed between these four stitches. The mesh is then wrapped around a laparoscopic grasper and inserted through a 10 mm trocar. After inserting the mesh, it is correctly unfurled and oriented, and the preplaced sutures are pulled transabdominally using a suture passer via the previously designated locations.

Figure 7



Position of trocars, surgeon, assistants, and instruments for IPOM.

Additional fixation is done using spiral tacks for mesh edges (Figs. 8 and 9).

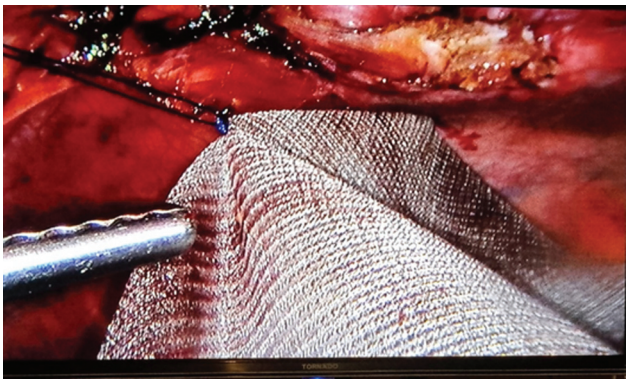
Closure

Following mesh fixation, the abdominal cavity must be examined for any bleeding or damage. The cavity should be allowed to expel all CO_2, and the 10 mm trocar site must be sealed with nonabsorbable suture or PDS. Before closing, a finger examination assures safety.

Postoperative care

Standard analgesia, a compressive bandage for 5 days after surgery, and an abdominal binder for 4–6 weeks. If antibiotics are required, they will be administered. Conservative seroma management, aspiration only if symptomatic (pain).

Figure 8



Cardinal sutures are pulled trans-abdominally.

Figure 9

Mesh fixation.

Follow up

All patients were followed up on outpatient basis. The interval of follow-up was 1 week, 2 weeks, 1 month, 2 months, and 6 months. This follow-up includes; questionnaire includes the presence of recurrent swelling, abdominal pain, fever, and rigors. Clinical examination. Patients were informed to report the hospital after discharge of any clinical symptoms, signs, laboratory or imaging data obtained as a result of the likelihood of postoperative problems.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS version 20.0) software was used to analyse the data. Qualitative data is represented as a number and a percentage, whereas quantitative data is represented as a mean±SD. To test for significance, the following tests were used: difference and association of qualitative variables using Chi-square test (X^2) or Fisher's exact test. Differences between quantitative independent groups determined using the *t* test and paired using the sign test. For significant results, the *P* value was set at <0.05.

Results

The number of female patients was bigger than the number of male patients in both groups. There was remarkable variation between groups respecting demographic data. Regarding BMI, it was distributed as 29.45±6.46 and 29.62±5.96, respectively with no significant variation between groups. There was no notable difference or association between groups regarding smoking distribution, however, non-smokers were majority. There was statistically non-significant variation between groups concerning comorbidities (Table 1).

Concerning type and width of hernia, there was no remarkable variation was detected between groups (Table 2).

Table 1 Comparison between the studied groups regarding demographic data, body mass index (BMI), and comorbidity

	Lap. transabdominal retro muscular mesh repair *N*=24 (%)	Lap. intraperitoneal on lay mesh repair *N*=24 (%)	χ^2	*P*
Gender:				
Female	18 (75%)	15 (62.5%)	**0.87**	**0.35**
Male	6 (25%)	9 (37.5%)		
	Mean±SD	**Mean±SD**	t	*P*
Age (year)	41.0±9.5	40.88±9.25	0.046	0.963
BMI:	29.45±6.46	29.62±5.96	0.093	0.926
Smoking:				
Smoker	2 (8.3%)	3 (12.5%)	0.22	0.63
Non-smoker	22 (91.7%)	21 (87.5%)		
Comorbidity:				
No	18 (75%)	17 (70.8%)		
COPD	1 (4.2%)	0 (0.0%)	6.17	0.18
Diabetes	3 (12.5%)	4 (16.7%)		
Hypertension	0 (0.0%)	3 (12.5%)		
Diabetes and Hypertension	2 (8.3%)	0 (0.0%)		

χ^2Chi square test t independent sample *t* test, MC Monte Carlo test.

Table 2 Comparison between the studied groups regarding type and size of hernia

	Lap. transabdominal retro muscular mesh repair *N*=24 (%)	Lap. intraperitoneal on lay mesh repair *N*=24 (%)	χ^2	*P*
Hernia type				
Primary:	16 (66.7%)	17 (70.8%)		
Epigastric	6 (25%)	7 (29.2%)	0.14	0.93
Umbilical	10 (41.7%)	10 (41.7%)		
Incisional:	8 (33%)	7 (29.2%)		
Post laparotomy exploration	4 (16.7%)	3 (12.5%)		
Post appendectomy	1 (4.2%)	3 (12.5%)		
Post cholecystectomy	1 (4.2%)	0 (0.0%)		
Post cesarian section	2 (8.3%)	1 (4.2%)		
	Mean±SD	**Mean±SD**	T	*P*
Width of hernia	3.95±1.47	4.21±1.59	0.280	0.781

χ^2Chi square test MC Monte Carlo test t independent sample *t* test.

Group B was significantly shorter regard operation time as operation time was distributed as 178.54 ±32.88 and 90.75±22.86 respectively between group A and B. There was no remarkable variance between groups regarding length of hospital stay, postoperative pain and return to normal activity. Length of hospital stay was distributed as 31.16±12.63 h and 30.37 ±10.84 h respectively. Postoperative pain was evaluated using Visual Analogue Scale (VAS) and was distributed as 4.16±1.47 and 3.79±1.23, respectively. Return to normal activity was within 10.08±3.75 days and 8.83±2.61 days, respectively. There was notable variation between the studied groups concerning cost that was remarkably lower in laparoscopic transabdominal retro muscular mesh repair (Table 3).

Group B was lower regard intraoperative complication rate but not significantly, but regard post-operative complication Group A significantly associated with Seroma and Group B significantly associated with Bulge (Table 4).

Complicated cases were significantly younger and wider regarding hernia width (Table 5).

Discussion

The sex distribution in our study revealed that ventral hernia was more common in females with a female-to-male ratio of 33:15. **Jadhav *et al.***, **Ndong *et al.*** and **Jaykar *et al.*** stated that the female percentage was more than the male percentage in their studies [10–12].

The most common decades of life for the development of ventral hernia in our study was the fifth decade. This agreed with **Ndong *et al.*, 2022** and **Masurkar** [8,11]. **Jaykar *et al.*,** stated that ventral hernias were more common in the fifth to sixth decades of life [12]. **Jadhav *et al.*,** stated that the most common decade of life for the development of ventral hernia was the sixth decade [10].

In our study there was no significant variation between both groups concerning age and sex distribution with female predominance in both groups and mean age 41.0±9.5 and 40.88±9.25 respectively.

Regarding BMI, it was distributed as 29.45±6.46 and 29.62±5.96 respectively with no significant difference between groups. **Masurkar** stated that mean BMI in

Table 3 Operative and post-operative data and cost distribution between studied groups

	Lap. transabdominal retro muscular mesh repair Mean±SD	Lap. intraperitoneal on lay mesh repair Mean±SD	t	*P*
Operative time (minutes)	**178.54**±32.88	**90.75**±22.86	10.738	0.001**
Length of hospital stay(hour)	31.16±12.63	30.37±10.84	0.195	0.846
Post-operative pain	4.16±1.47	3.79±1.23	0.587	0.560
Return to normal activity (day)	10.08±3.75	8.83±2.61	0.964	0.340
Cost (US Dollar)	230±1.47	850±6.59	−449.54	<0.001**

t independent sample *t* test **$P \leq 0.001$ is statistically highly significant.

Table 4 Complication distribution between studied groups

	Lap. transabdominal retro muscular mesh repair *N*=24 (%)	Lap. intraperitoneal on lay mesh repair *N*=24 (%)	χ^2	*P*
Intraoperative:				
Dense adhesions	2 (8.3%)	3 (12.5%)		
conversion to open	1 (4.2%)	0 (0%)		
Minor bleeding	3 (12.5%)	1 (4.2%)	**10.71**	**0.098**
Retro muscular hematoma	2 (8.3%)	0 (0%)		
peritoneal tear	2 (8.3%)	0 (0%)		
Umbilical skin injury	1 (4.2%)	0 (0%)		
postoperative:				
Mesh infection	1 (4.2%)	0 (0%)		
Ileus	1 (4.2%)	2 (8.3%)		
Mesh migration	1 (4.2%)	0 (0%)	**11.85**	**0.039***
Recurrence	2 (8.3%)	0 (0%)		
Seroma	7 (29.2%)	1 (4.2%)		
Bulge	2 (8.3%)	11 (45.8%)		

Table 5 Relation between complications and patient characters

	Not complicated	Complicated	t/ X^2	*P*
Age	43.25±8.86	37.70±9.07	2.118	0.040*
BMI	29.89±6.0	29.05±6.47	0.464	0.645
Width of hernia	3.46±1.35	4.85±1.67	2.437	0.019*
Sex				
Female *N* (%)	21 (75.0%)	12 (60.0%)		
Male *N* (%)	7 (25.0%)	8 (40.0%)	1.22	0.26
Smoking				
No *N* (%)	24 (85.7%)	19 (95.0%)		
Yes *N* (%)	4 (14.3%)	1 (5.0%)	1.07	0.29
Co morbidity				
No *N* (%)	19 (67.9%)	16 (80.0%)		
COPD *N* (%)	0 (0.0%)	1 (5.0%)		
DM *N* (%)	6 (21.4%)	1 (5.0%)	8.73	0.068
HTN *N* (%)	3 (10.7%)	0 (0.0%)		
HTN,DM *N* (%)	0 (0.0%)	2 (10.0%)		
Type of hernia				
Epigastric *N* (%)	10 (35.7%)	3 (15.0%)		
Incisional *N* (%)	8 (28.6%)	7 (35.0%)	2.57	0.27
Umbilical *N* (%)	10 (35.7%)	10 (50.0%)		
Total				
N (%)	28 (100.0%)	20 (100.0%)		

his study was 29.2 [8], while **Wang *et al.*,** stated that the mean BMI was 27.5 ± 0.6 [13].

In our study smokers were 5 patients 10.4% (2 in group A 8.3% and 3 in group B 12.5%). Co-morbidity distribution between both groups showed no significant difference. **Jaykar *et al.*,** stated that incidence of smoking in their study was 16% [12]. **Jadhav *et al.*,** stated that There were several patients who had co-morbidities, which could have been present alone or in combination. Among them, 4% of patients had only type 2 diabetes, 1% had chronic obstructive pulmonary disease (COPD), 10% also were hypertensive and diabetic, and 12% had hypertension alone. One patient had COPD, diabetes, and hypertension, which is consistent with the findings of our study [10].

Most of the patients in our study presented with primary ventral hernia of which umbilical hernia were more than epigastric hernia with no remarkable difference between both groups. Cases were classified according to EHS classification. Similar results were reported in the studies by **Megas *et al.*, Jadhav *et al.*, Ndong *et al.*,** and **Jaykar *et al.*** [10–12,14]. In our study, one patient presented with concomitant inguinal

hernia which was repaired at the same session. **Natarajan *et al.*,** reported 2 patients with concomitant inguinal hernia in their study [15].

Mean hernia width in our study was 3.95±1.47 and 4.21±1.59 Cm. in both groups respectively with no significant difference. Our results were consistent with **Ndong *et al.*,** and **Megas *et al.*,** [11,14], while **Jadhav *et al.*,** and **Jaykar *et al.*,** stated that most patients presented with defect size less than 2 Cm. in their studies [10,12].

Group B was significantly shorter regard operation time as operation time was distributed as 178.54 ±32.88 and 90.75±22.86 min respectively between group A and B. **Masurkar** reported that mean operative time was 192 min for Lap TARM [8]. **Megas *et al.*,** revealed that operative time was 65.33 ± 25.39 for Lap. IPOM [14]. **Wang *et al.*,** stated that operative time was 115.6 ± 6.1 for Lap. IPOM [13]. **Awad *et al.*,** showed that operative time was 115.83±29.17 and 82.17±20.61 min for TARM and IPOM respectively [16].

The hospital stay length in our study was 31.16 ±12.63 h and 30.37±10.84 h in both groups respectively. **Awad *et al.*,** reported that length of hospital stay was 28.0±9.2 and 26.0±6.93 h for TARM and IPOM respectively [16]. **Megas *et al.*,** reported similar results (2.87 ± 0.860 days) for Lap. IPOM [14], while **Masurkar** reported longer hospital stay duration (5 days) [8].

Pain was scored on the first postoperative day during rest and movement using VAS. Mean Postoperative pain was less in group B (3.79±1.23) than group A (4.16±1.47) but not statistically significant. Both the groups received nonsteroidal anti-inflammatory drugs for analgesia. Neither group required analgesic infusion. In line with our findings, **Awad *et al.*,** [16]. **Megas *et al.*,** reported VAS score mean 3.68 ± 1.42 for Lap. IPOM [14]. **Rege *et al.*,** reported mean postoperative pain 4.23, 8 h postoperative for Lap. TARM [17].

Return to normal activity was earlier in group B (8.83 ±2.61) than group A (10.08±3.75) but not statistically significant. The current results agreed with **Natarajan *et al.*,** [15]. Shorter durations were reported by **Awad *et al.*,** (3.39±1.61 and 3.08±1.0 days for TARM and IPOM respectively) [16].

Cost of the procedure was notably lower in group A (230±1.47) than group B (850±6.59). Similar results were reported by **Masurkar** who stated that the cost of TARM was 81 US Dollars and the cost of IPOM was 685 US Dollars [8]. **Prasad *et al.*,** stated that the cost of IPOM was 752.3±355.7 US Dollars [18].

There is no significant variation between groups regarding intra-operative complications. However, complications were little higher in group A. Dense adhesions were encountered in 2 cases in group A, one of them was converted to open, and 3 cases in group B where meticulous dissection was done using combination of bipolar diathermy, harmonic scalpel, and scissors.

Awad *et al.*, reported 3 (8.3%) cases of conversion to open surgery among the TARM group [16]. **Masurkar** converted 3 cases (3.4%) to open surgery due to dense adhesions [8].

Minor bleeding occurred in 3 cases in group A and one case in group B. It was controlled by compression and diathermy. Retro muscular hematoma occurred in 2 patients in group B which was managed by aspiration and control of the bleeder.

Awad *et al.*, stated that 3 (12.5%) cases suffered minor bleeding among IPOM group and 6 (16.7%) cases of minor bleeding and 2 (5.6%) cases of retro muscular hematoma among TARM group in his study [16]. **Ali *et al.*,** reported 2 (2%) cases of bleeding among IPOM group [19].

Peritoneal tear during dissection of retro muscular flap occurred in 2 cases in group A which was repaired with Vicryl sutures. Umbilical skin injury occurred in one case in group A due to the dissection of LA alba using monopolar diathermy. It was managed conservatively with repeated moist dressing.

In our study, no case suffered small intestinal serosal injury in both groups.

Awad *et al.*, reported 6 (16.7%) cases of peritoneal tear and 2 cases (5.6%) cases of small intestinal serosal tear among TARM group. **Wang *et al.*,** reported 2 cases of intraoperative intestinal injury [16].

Mesh infection occurred in one case in group A which suffered an intraoperative retro muscular hematoma. Mesh migration occurred in one case in group A. Both cases were managed by the removal of the mesh. They developed recurrence of the hernia later on and were repaired with open surgery within 6 months. No case developed recurrence in group B.

Awad *et al.*, reported 2 cases of recurrence in both groups and a single case of mesh infection in TARM group [16]. **Ali *et al.*,** reported 3 (3%) cases of recurrence among IPOM group. **Masurkar** reported a single cases of mesh infection following TARM which developed recurrence afterwards in addition to other 5 cases of late recurrence [19].

Postoperative ileus occurred in 1 case in group A and 2 cases in group B. They were managed conservatively and resolved within 3 days. Seroma occurred in 4 cases in group A and 5 cases in group B and were managed by compressive dressing and resolved within 7-10 days.2 cases in both groups developed wound infection, which were managed with antibiotics according to culture and sensitivity.

Rege at al., reported 3 cases of postoperative ileus among 35 patients who had TARM repair in his study [17]. **Awad *et al.*,** reported 2 (5.6%) cases of postoperative ileus among TARM group and 1 (4.25%) case among IPOM group [16].

The incidence of seroma was remarkably higher in group A. It occurred in 7 cases in group A and a single case in group B. It was managed conservatively.

Awad *et al.*, reported 15 (41.6%) cases of seroma among TARM group and 8(33.3%) cases among IPOM group. **Ali *et al.*,** reported 1 (1%) case of seroma among IPOM group [16].

Postoperative bulge was significantly higher in group B. It occurred in 2 cases in group A and 11 cases in group B which were managed by reassurance and abdominal binder after exclusion of recurrence by both clinical examination and ultrasonography.

Statistical analysis of the relation between complications and patient characters revealed that Complicated cases were significantly younger with wider hernias.

In our study, all cases had follow-up for 6 months with repeated evaluation of case's abdominal ultrasonography, physical examination, and symptomatic status.

Within the 48 patients we included in our analysis, 36 patients (or 75%) had been followed up at the time this study was submitted, whereas 12 cases (or 25%) had been lost to follow-up after two months. (Follow-up tends to be better for cases living in Zagzig City than elsewhere.

Conclusion

LVHR may be carried out safely and with little difficulties. Less postoperative discomfort, a shorter stay in the hospital, and a quicker return to regular daily activities were all benefits of IPOM or TARM repair procedures. The rate of surgical morbidity, the incidence of wound infection, ileus, and aesthetic appearance were all reduced with LVHR. Compared to the IPOM procedure, the TARM repair method took longer. TARM might be used as a less expensive substitute for IPOM mesh repair. TARM has the benefit of preventing mesh contact with abdominal viscera and closing defects.

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Conflicts of interest

Conflict of interest: No potential conflict of interest was reported by the authors

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