



COMPARISON OF EXTENDED TOTALLY EXTRA PERITONEAL (ETEP) VS INTRA PERITONEAL ONLY MESH (IPOM-PLUS) REPAIR FOR MANAGEMENT OF VENTRAL HERNIAS —A RANDOMIZED CONTROLLED TRIAL.

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ABSTRACT

Introduction- There is a need for randomized controlled trials comparing the two most commonly performed minimally invasive techniques of ventral hernia repair - eTEP with IPOM plus repair. **Aim and objective-** This study was designed to compare the two techniques in terms of early post operative pain, return to daily activities and quality of life after surgery. **Design-** This was a prospective randomized trial. **Methodology-** The primary outcome was immediate post-operative pain scores. Operative time, peri operative morbidity, hospital stay, return to daily activities and incremental cost effectiveness ratio were secondary outcomes. **Sample size- 60** **Results -** Early post-operative pain scores were significantly lower and with a significantly earlier return to activity in eTEP group (p value < 0.05). **Conclusion -** eTEP repair is better in terms of lesser early post-operative pain and earlier return to activities in small and medium size defects.

KEYWORDS :

INTRODUCTION-

Minimally invasive operations have become increasingly common since the introduction of laparoscopic surgery. Patients who undergo a laparoscopic procedure tend to recover faster, with an earlier resumption of activities, less pain, and fewer wound complications than those who receive an open procedure.

Minimally invasive surgery for ventral hernia repair has evolved rapidly in the last decade.

In (IPOM) plus, the defect is closed and a mesh is placed against the abdominal wall inside peritoneal cavity IPOM PLUS has all the advantages of laparoscopic surgery.

However, shortcomings of IPOM plus include erosion of the mesh, adhesion of the mesh to the bowel, and rarely an enterocutaneous fistula.

The e-TEP approach does not require placing a mesh in the abdominal cavity, it placed the mesh in the anterior peritoneal space thus avoiding many complications associated with the IPOM plus approach.

Notably, the mesh material requirements for e-TEP are much lower than for IPOM plus which lowers the surgery cost. The e-TEP technology has become popular these years, while the outcomes of e-TEP are encouraging, definitive studies are lacking.

The purpose of this study was to compare the short-term effects of the two surgical procedures about outcomes, complications, and hospital costs. The result of this study can be used as reference material for clinical decision- making.

MATERIALS AND METHODS-

Aim And Objective-- This study was designed to compare the two techniques in terms of early post operative pain, return to daily activities and quality of life after surgery.

Study Design- This prospective randomized study.

Period Of Study- June 2022 to May 2024.

Sample Size- 60 with 30 patients in each group- eTEP and IPOM plus.

Statistical Analysis- Data was analysed using

Inclusion Criteria-

Patients in age group of 18–65 years with midline primary

ventral hernias, with 2–5 cm defect size were included in the study.

Exclusion Criteria-

Patients with ventral hernia > 5 cm in size, recurrent, incisional hernias, complicated hernias, patients unfit for general anesthesia, and patients who did not give consent were excluded from the study.

Operative technique

eTEP technique

In majority of patients, retro rectus space is created after making a transverse incision just superolateral to the umbilicus in left paramedian region. Rectus muscle fibres are split to expose the posterior rectus sheath and initial space created by blunt dissection. Dissection is carried across the midline to create similar space on the opposite side. The hernia sac is dissected and opened and contents are reduced. The cranial limit of the dissection is the xiphisternum and the lateral border of the rectus is the lateral limit of the dissection. Once space is created, the midline is reconstructed using 2–0 (V-Loc) and the posterior rectus sheath along with the peritoneum is closed using a continuous 2–0 (V-Loc) suture. An appropriate size plain medium weight polypropylene mesh is placed in the space created. Proper haemostasis is ensured. Port incisions are closed.

IPOM plus technique

IPOM is performed using the standard three-port technique. Pneumoperitoneum is created either through the supraumbilical region or through Palmers's point. Contents are reduced using blunt dissection around the defect. A dual mesh is placed covering the defect with an overlap of at least 5 cm all around with tacks and with four transfascial sutures.

RESULTS

Table 1: Comparison of demographic characteristics

	eTEP (n=60)	IPOM (n=30)	p value
Age (years)	49 +/- 13.2	47.1 +/-10.9	0.8
Mean +/- SD (range)	(25-65)	(29-65)	
Male: Female	7:8	2:3	0.5
BMI (g/m ²)	27.9 +/- 15	28.0 +/-1.6	0.8
Mean +/- SD	(30.4- 26.1)	(30.4 – 24.)	
Duration of Hernia(months)	23.3 +/- 7.5	24.7 +/- 7.4	0.5

Table2: Intraoperative details

	eTEP	IPOM (n=30)	p value
Mean Defect Size (cm ²)	11.7 +/-5.7	9.5 +/-5.3	0.1
Content of sac			
Omentum	17(56.7%)	21(70%)	0.3
Omentum and Bowel	09(30%)	06(20%)	
Mean operative time (minutes)	99.6 +/- 22.6	57.1 +/-19.1	<0.001

Table 3: Post operative pain

VAS score Mean +/- SD (range)	eTEP	IPOM (n=30)	p value
Pre op (At rest)	1.9 +/-0.8 (1-3)	2.03 +/- 0.8	0.56
Pre op (At normal activity)	2.8 +/- 0.9 (2-4)	2.7 +/- 0.8 (1-4)	0.67
At 6 hours	4.9 +/- 0.7(4-6)	5.7 +/- 0.6 (5-7)	0.001
At 24 hours	4.5 +/- 0.8 (3-5)	5.5 +/- 0.6 (3-8)	0.001
At 1 week (at rest)	2.4 +/- 0.7 (2-7)	3.0 +/- 0.6 (2-4)	0.0017
At 1 week (At normal activity)	2.7 +/- 0.9 (2-7)	3.8 +/- 0.8 (3-5)	0.001
At 6 weeks (At rest)	1.23 +/- 0.8 (1-5)	1.4 +/- 0.5 (1-2)	0.36
At 6 weeks (At normal activity)	1.4 +/- 1.0 (1-6)	2.08 +/- 0.63 (1-3)	0.005
At 3 months (At rest)	1.0 +/- 0.6 (0-3)	1.08 +/-0.27	0.53
At 3 months (At normal activity)	1.2 +/- 0.8 (1-3)	1.2 +/- 0.4 (1-2)	1.0

Table 4: Quality of life

	Groups	Pre Op (Mean +/- SD)	3 months post op(Mean +/- SD)	p value
Physical	eTEP	50.3 +/- 5.6	56.8 +/- 6.7	0.0004
	IPOM	49.3 +/- 6.9	55.0 +/- 7.8	0.007
	p value	0.5	0.3	
Psychological	eTEP	67.2 +/-7.6	72.5 +/- 8.0	0.01
	IPOM	63.9 +/-5.1	69.4 +/- 5.1	0.0003
	p value	0.5	0.07	
Social	eTEP	82.6 +/- 7.5	89.5 +/- 7.0	0.0012
	IPOM	80.7 +/- 6.6	89.2 +/- 7.5	0.0001
	p value	0.3	0.8	
Environmental	eTEP	76.2 +/- 5.5	82.3 +/- 5.5	0.0002
	IPOM	75.1 +/- 6.5	82.3 +/-5.4	0.003
	p value	0.5	80.5 +/- 6.3	

Table 5: Return to daily activities

	eTEP	IPOM (n=30)	p value
Return to daily activity Mean +/-SD			
Walking short distances (hours)	6.1 +/- 0.7	6.8 +/- 0.7	0.31
Moving freely around the house(days)	6.3 +/- 1.8	7.9 +/-1.2	0.0005
Required help for dressing up (days)	1.5 +/- 0.6	1.9 +/- 0.9	0.06
Resumed usual activity(days)	8.8 +/- 1.4	10.4 +/- 1.4	0.0002
Climbing stairs (days)	13.2 +/- 1.7	13.5 +/- 0.9	0.44
Return to work (days)	10.8 +/- 2.0	11.3 +/- 1.1	0.27

PAIN- Pre-operative pain score both at rest and normal activity was similar between the two groups. The pain score on VAS at rest in the IPOM plus group was significantly higher at 6 h (p-value 0.002), 24 h (p-value 0.002), and at 1 week (p-value 0.002) as compared to eTEP group. The pain score at normal activity was also higher in IPOM plus group both at 1 week (p-value 0.001) and six weeks (p-value 0.006) as compared to eTEP group.

However, the pain scores were similar both at rest (p-value

0.63) and normal activity at 3 months (p-value 0.1) and 6 months between the two groups.

Quality Of Life- Pre operatively, both the groups had comparable mean scores among all the domains of Quality of life (p value > 0.05). Post surgery, at 3 months of follow up, quality of life improved in all the domains, physical, psychological, social, and environmental, in both the groups (p < 0.05). There was a significant improvement in how patients perceived their overall quality of life and overall health satisfaction at 3 months in both the groups (p < 0.05)

Return To Daily Activities-

The patients in the eTEP group returned to daily activities earlier than the IPOM group. Patients in eTEP group showed a significantly earlier return to activity in terms of moving about freely in their house (6.3 days).

DISCUSSION-

IPOM PLUS has been associated with certain drawbacks such as early severe post-operative pain, intraperitoneal location of mesh and its related complications (intestinal obstruction, fistula formation and enterocutaneous fistula) and cost of dual mesh.

In the last decade there have been efforts to find an alternative minimally invasive approach to overcome these shortcomings. Various studies have shown that the sublay position of mesh has the best results in terms of avoiding the majority of complications of IPOM repair.

The incidence of early postoperative pain following IPOM repair is high. The reported incidence ranges from 20 to 40% with this pain lasting for up to 6 weeks to 3 months and hampering patient recovery and early return to activity. The incidence of chronic pain (pain lasting for > 3 months) however becomes less and has been reported to be in the range of 2–4%. The major advantage of eTEP has been low pain scores because of the non-fixation of mesh. Our study has shown that the pain in the early post-operative period is significantly less in eTEP as compared to IPOM. However, this difference becomes insignificant at 3 months and 6 months follow up. There have been previous non-randomized comparative studies, which have similarly shown decreased pain following eTEP repair.

Recurrence is an important outcome of ventral hernia repair and the median duration to recurrence being 18–24 months after surgery . Laparoscopic IPOM plus repair has been reported to have a recurrence rate of < 5% and is a much easier procedure to perform. eTEP requires more technical expertise for the creation of space and thus has a longer learning curve.

The majority of the comparative studies on eTEP have had short follow up and have reported only on early recurrence. Kumar et al reported 2 recurrences in the eTEP group (46 patients) after a follow-up of 6 months.

In our study, there was no such recurrence after a mean follow-up of 10 months (9–18 months). Thus the majorities of the recurrences in the eTEP repair are in the early postoperative period and appear to be technical and can be improved with a better experience of the procedure. Longer follow-up is required to compare the true incidence of recurrence between eTEP and laparoscopic IPOM.

Quality of life is an important patient-reported outcome following any surgery. Belyansky et al showed significant improvement in quality of life post eTEP repair of ventral wall hernia (p 0.007) in their retrospective review of 79 patients. In our study, although there was a significant improvement from

pre-operative to post-operative at 3 months but on comparison between the two groups at 3 months, the quality of life was similar. However, return to activity was better in eTEP Patients undergoing eTEP repair returned earlier to activity in walking short distances, moving freely around the house, requiring help for dressing, resuming usual activity, climbing stairs, and return to work. The mean time to joining work in the study group was consistent with the previous reports.

The cost of the procedure is an important determinant of choice of hernia repair especially in a country with limited resources. The IPOM repair requires a dual mesh and fixation device that significantly increases the cost. The eTEP technique on the other hand uses a cheaper polypropylene mesh without requiring any fixation device. There is no previous study that has compared eTEP repair versus IPOM repair for ventral wall hernia in terms of cost effectiveness. In this study, the eTEP group was less costly than the IPOM group. However details regarding cost effectiveness need further studies.

CONCLUSION-

In conclusion, eTEP repair is better in terms of lesser early postoperative pain and earlier return to activities in small and medium size defects. It is a cost- effective repair as compared to IPOM repair. However, the QoL and long-term pain after 3 months are similar between the two groups. The above benefits of eTEP repair in comparison to IPOM repair in patients with larger defects need further study.

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