Section: General Surgery

Original Research Article

A COMPARATIVE STUDY ON LAPAROSCOPIC ETEP VS LAPAROSCOPIC IPOM PLUS FOR VENTRAL HERNIA

Narendranath Nagoti[1], Dwarakanath N[2], Prabhakar Varma P[3]

[1]*Assistant Professor, Department of General Surgery, NRI institute of Medical Sciences, Visakhapatnam, India.*
[2]*Professor, Department of General Surgery, Gayatri Medical College, Visakhapatnam, India.*
[3]*Associate Professor, Department of SPM, Maharaja institute of Medical Sciences, Vijayanagaram, India.*

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Corresponding Author:
Dr. Narendranath Nagoti,
Assistant Professor, Department of General Surgery, NRI institute of Medical Sciences, Visakhapatnam, India.
Email: narendranath87@gmail.com

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ABSTRACT

Background: Laparoscopic repair of ventral hernias has gained popularity in last few decades because of lower infection rate, shorter hospital stay and quicker return to work1. Previously, IPOM plus was widely considered the standard laparoscopic procedure for ventral hernias2 . This study is aimed at clinical results in terms of postoperative pain, hospital stay, return to daily activities and cost benefit analysis of new technique Extended Totally Extraperitoneal Repair (eTEP-RS) compared to IPOM Plus for midline ventral hernias. **Material and Methods:** Data from consecutive patients requiring minimally invasive hernia repair was collected from January 2022 to march 2024 in a tertiary care hospital in Visakhapatnam. A total of 50 patients presenting with ventral hernias were included in the study, of whom 25 underwent IPOM Plus and 25 underwent eTEP-RS repairs. Group selection was done by simple randomization using the lottery method. Postoperative pain levels were measured every day at rest during the entire hospital stay using the Visual Analog Scale (VAS). All patients received a follow-up after 15 days, 3months and 6 months postoperative. **Results:** Patient demographics showed no differences in terms of gender, age and comorbidity. Hernia size was similar for both groups. The mean intraoperative duration among the IPOM Plus and eTEP-RS groups was 66.4 ± 14.3 min and 168.4 ± 17.2 min respectively, with a significant statistical difference (<0.001). Pain severity on postoperative day 1, day 3 and day 7 is significantly less in e TEP group (<0.001). The eTEP group had a shorter hospital stay compared with the IPOM group(<0.001). There was no significant difference concerning the incidence of seroma, SSI's and postoperative ileus between the groups. Return to regular work was significantly faster in eTEP-RS group. Overall treatment cost is significantly lower in the e-TEP RS group. **Conclusion:** eTEP-RS shows significant lower postoperative pan, better functional recovery and is cost effective compared to IPOM plus technique. But it requires steep learning curve and longer operative time. **Keywords:** Extended View Total Extraperitoneal Repair- Rives-Stoppa (etep-rs); Intraperitoneal Onlay Mesh Repair (IPOM Plus); laparoscopic ventral hernia repair

INTRODUCTION

Laparoscopic repair for ventral hernias as compared to open surgery seems to be promising with reduced risk of infection, seromas and duration of hospital stay.[1] Intraperitoneal Onlay Mesh (IPOM Plus) repair and Extended-View Totally Extraperitoneal Rives-Stoppa (eTEP-RS) repair are the minimally invasive surgical techniques available.[2]

In laparoscopic IPOM Plus we close the hernia defect and reinforce it with a composite mesh. The mesh is fixed to anterior abdominal wall using trans-fascial sutures and tackers to prevent migration3. IPOM has been regarded as the gold standard for ventral hernia repair by the American Hernia

Society.[4] Though safe, several case reports of tacker related pain and complications due to the direct contact of the mesh with the abdominal viscera were reported.[5]

The eTEP-RS repair is a relatively newer technique which provides several advantages of completely excluding the mesh from the intraperitoneal domain. The mesh is placed in a retro-rectus space without any fixation.[6] But the steep learning curve and the prolonged intraoperative duration are matters of concern.[7]

This study was done to compare the outcomes of eTEP-RS repair versus IPOM Plus repair in the management of uncomplicated ventral hernias.

Aim

The aim of this study is to compare the advantages and disadvantages of eTEP-RS repair versus IPOM Plus repair in the management of uncomplicated ventral hernias. The primary outcome was immediate post-operative pain scores. Operative time, hospital stay, return to daily activities and cost analysis were secondary outcomes.

Inclusion Criteria

All patients over 18 years of age with ventral hernias (defect width less than 6 cm) and giving consent to the study are included.

Exclusion Criteria

Complex hernias like obstructed or strangulated hernias, recurrent incisional hernias with intraabdominal adhesions and those with enterocutaneous fistulas are excluded.

MATERIALS AND METHODS

This is a prospective comparative study between IPOM Plus and eTEP-RS which was conducted from January 2022 to march 2024 in a tertiary care hospital in Visakhapatnam. A total of 50 patients presenting with ventral hernias were included in the study, of whom 25 underwent IPOM Plus and 25 underwent eTEP-RS repairs. Group selection was done by simple randomization using the lottery method. Postoperative pain levels were measured every day at rest during the entire hospital stay using the Visual Analog Scale (VAS). All patients received a follow-up after 15 days, 3months and 6 months postoperative.

Technique

A single dose of the third-generation cephalosporin antibiotic was given intravenously at the time of induction.

IPOM Plus

Patient is in supine position. A10-mm epigastric camera port and two 5mm lateral ports are placed in the left flank. After hernial contents are reduced, polypropylene 1 suture was used to close the defect after reducing the insufflation pressure to 8 mmHg.

A composite mesh was tailored for a minimum 5-cm overlap in all directions. Trans-fascial sutures were tied in a subcutaneous plane after reducing the insufflation pressure. The mesh perimeter was secured with tacks placed at 1-cm intervals. A second row of tacks was applied at approximately 2-cm intervals. The omentum was splayed over the bowel and the abdomen was deflated under vision.

Figure 1: Showing hernial defect

Figure 2: Closure of hernial defect using no 1 prolene

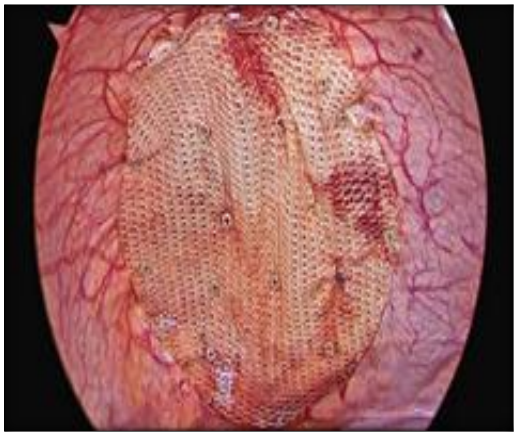

Figure 3: Dual (composite) mesh is placed and secured with transfixation sutures and tackers

eTEP-RS

We retroflex the operating table (around 300) to widen the abdominal space. A 10-mm port is placed in the left midclavicular line 3cm below the costal margin into left retro-rectus space. Once adequate space is created, two more 5-mm working ports are inserted under vision into right retrorectus space.

Retro rectal space is dissected medially upto medial margin of the rectus abdominis posterior sheath and laterally upto the neurovascular bundle at the semilunar line. By shifting the camera to 5mm lateral port, cranial cross-over was done by dividing the left posterior rectus sheath 0.5 cm below the linea alba using a hook to visualize the falciform fat. Falciform ligament is taken down. Right posterior rectus sheath was divided similarly to access the right retro-rectus space taking care to maintain the integrity of linea alba. The hernial sac is visualized and contents are reduced. The posterior rectus sheaths of both sides were further divided caudally till the pelvic pre-peritoneal spaces is reached forming one large box where the mesh can be deployed. The hernial defect was continuously closed using No 1 prolene suture. Rents in the peritoneum is closed using 2-0 vicryl suture. A medium-weight polypropylene mesh was placed in the retro-rectus box tailored to its measurements. The mesh is not fixed in any of the cases.

Figure 4: Showing left retrorectus space dissection

Figure 5: Left posterior rectus sheath is being incised 0.5 cm below linea alba using a hook and exposing falciform ligament

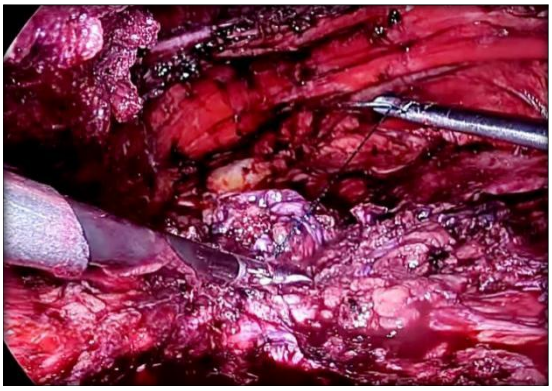

Figure 6: Closure of rectus sheath- peritoneum using barbed suture

Figure 6: placement of polypropolene mesh in retro-rectus space without fixation

RESULTS

All statistical data analysis was done using SPSS software and in MS-Excel 2007. Qualitative variables were expressed as frequencies and percentages whereas quantitative variables were expressed in means and standard deviations. Fisher's exact test was used for examining the categorial data. Student independent sample test was used for comparison of mean differences between two groups. For all statistical analysis $p<0.05$ was considered statistically significant.

A total of 50 patients were included in the study, 25 of each group laparoscopic IPOM plus and eTEP-RS repair respectively. Patient demographics showed no differences in terms of gender, age and comorbidity. Hernia size was similar for both groups. The mean intraoperative duration among the IPOM Plus and eTEP-RS groups was 66.4 ± 14.3 min and 168.4 ± 17.2 min respectively, with a significant statistical difference (<0.001). Pain severity on postoperative day 1, day 3 and day 7 is significantly less in e TEP group (<0.001). The eTEP group had a shorter hospital stay compared with the IPOM group (<0.001). There was no significant difference concerning the incidence of seroma, SSI's and postoperative ileus between the groups. Return to regular work was significantly faster in eTEP-RS group. Overall treatment cost is significantly lower in the e-TEP RS group.

Table 1: Demographic details

Parameters	IPOM Plus	eTEP-RS
Mean age (years)	46.7	44.5
Male	12	9
Female	13	16
Mean BMI (kg/m^2)	26± 1.36	24 ± 1.62
Hernial defect size (cm)		
Comorbidities		
Diabetes mellitus	2	5
Hypertension	6	3
Asthma	2	1

Table 2: Summary of postoperative parameters

Parameters	IPOM Plus	eTEP-RS	p-value
Mean intraoperative duration (min)	66.4 ± 14.3	168.4 ± 17.2	<0.001
Intraoperative complications	0	0	--
Conversion Rate	0	1	0.3125
Mean duration of hospital stay (days)	5.3 ± 1.2	3.1 ± 1.1	<0.001
postoperative pain			
Mean VAS score on postoperative day 1	8.2 ± 1.6	3.1 ± 0.8	<0.001
Mean VAS score on postoperative day3	5.4 ± 1.5	2.2 ± 0.7	<0.001
Mean VAS score on postoperative day 7	4.5± 1.5	1.8± 0.7	<0.001
Paralytic ileus	1	1	1
Postoperative SSIs	0	0	--
Seroma	2	1	0.3546
Recurrence	0	0	--
Chronic pain/discomfort(3 months)	6	1	<0.001
Return to work	16.3 ± 2.3 days	10.3 ± 2.8 days	<0.001
Cost of treatment (in lakhs)	1.5± 0.3	1± 0.2	<0.001

DISCUSSION

IPOM Plus and eTEP-RS repairs are the two most commonly performed surgeries in minimal access ventral hernia repairs. Though IPOM Plus is a comparatively simpler and quick procedure to perform, it has its drawbacks due to the placement of the mesh in the intraperitoneal region8. Fixing the mesh to the abdominal wall with tackers and trans-fascial sutures is associated with increased postoperative pain.[9] Entrapment of a nerve during trans-fascial suturing or tacking is known to be the cause of chronic pain. The incidence of chronic pain related to tacker ranges from 1.8% to 28%.[10]

On the other hand, eTEP-RS excludes entry into the intra-abdominal domain, where the mesh is placed in the retro-rectus plane, avoiding any contact with the bowel. This comes at the cost of a steep learning curve where the surgeon operates in a narrow space, leading to prolonged intraoperative duration.[11]

The eTEP technique in ventral and incisional hernia repair shows significantly lower acute postoperative pain and shorter hospital study but a longer operative time. In addition, there is no significant difference in terms of intraoperative or postoperative complications.

CONCLUSION

Despite being a technically easy procedure, IPOM Plus had several disadvantages such as increased postoperative pain, longer duration of hospital stays, higher cost and taking longer time to return to work. On the other hand, eTEP-RS is a more challenging procedure; however, it had several advantages: less postoperative pain, less duration of hospital stay, early return to work and is cost effective.

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