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Intraperitoneal Onlay Mesh Repair (IPOM) versus Intraperitoneal Onlay Mesh Repair with Closure of Fascia Defect (IPOM Plus) for Ventral Hernias: Retrospective Analysis of Postoperative Outcomes

Authors
Dr G. Gopalakrishnan, M.B.B.S., M.S., M.CH.[1], Dr V. Selvaraja, M.S.(Gen)., FICS.[2], Dr R. Krishnakumar, M.D (Anaes).[3]

[1]Consultant, Department of Gastroenterologist, HBP Surgeon, Dharan Hospital, Salem, Tamil Nadu, India
[2]Medical Director, General Surgeon, Department of General Surgery, Dharan Hospital, Salem, Tamil Nadu, India
[3]Senior Consultant, Department of Anesthesia & Intensive care, Dharan Hospital, Salem, Tamil Nadu, India

Abstract

Background: *Intra-peritoneal onlay mesh (IPOM) repair, a type of Laparoscopic Ventral Hernia Repair (LVHR), comprises bridging the defect from the peritoneal side with a composite mesh. Recently, IPOM-Plus has become the recommended type of LVHR in which the defect in the fascia is sutured before placing the mesh.*

Materials and Methods: *This study is a retrospective cohort study conducted at Dharan Hospital, Salem. Patients who had undergone IPOM-Plus or IPOM during January 2020 to June 2021 were selected. Data regarding demographics, intra-operative and post-operative outcomes were collected from medical record section. Patients were followed up for 6 months. Data analysis was performed using SPSS version 26.0 taking a p-value of <0.05 as statistically significant.*

Results: *A total of 74 patients were included in this study, out of which 34 patients had undergone IPOM (Group A) and 40 patients underwent IPOM-Plus (Group B). In both the groups, there was no statistical difference in demographic variables except more number of umbilical hernia in both the groups compared to epigastric and paraumbilical hernia. Hernia defect size and mean operative time were varied significantly (p-value < 0.05) in both groups. More number of seroma formation (p=0.021), pseudosac at first OPD visit (p=0.020) and pseudosac at 6 months (p=0.027) in Group A compared to Group B.*

Conclusions: *IPOM plus repair is safe with possible advantages over a standard IPOM repair in patients with ventral hernia in term of postoperative outcomes.*

Keywords: *Ventral hernia, IPOM, IPOM Plus, Laparoscopy.*

Introduction

Ventral hernia is a protrusion through the anterior abdominal wall fascia. These defects can be categorized as spontaneous or acquired. Acquired hernias typically occur after surgical incisions and are therefore termed as incisional hernias. Such hernias can occur after any type of abdominal wall incision, although the highest incidence is seen with midline and transverse incisions[1].

The laparoscopic repair of ventral hernias consisting of bridging the defect from the peritoneal side with a composite mesh, known as the intra-peritoneal onlay mesh (IPOM) repair was considered as a standard technique. However, such repair is associated with a significant incidence of post-operative bulging or eventration of mesh, seromas, recurrences, and non-restoration of abdominal muscle function[2]. To circumvent these problems, sutured closure of the defect in the fascia with intra-peritoneal mesh reinforcement has been described, termed as IPOM-Plus repair. This study aims to compare the outcomes among patients who had undergone laparoscopic onlay mesh repair with and without fascial defect closure.

Material and Methods

The data was collected from the prospectively maintained database of patients who underwent surgery for ventral hernia during January 2020 to June 2021 at Dharan Hospital, Salem. Patients who underwent IPOM and IPOM plus procedure during the study period and completed at least 6 months of follow-up were included in the analysis. The study was approved by the Institute scientific advisory and ethics committee.

The patients having irreducible hernias, Obstructed, strangulated or incarcerated hernias, Size of defect>5cm and <2cm, Complete loss of abdominal domain due to hernia, Patients not fit for general anaesthesia and the patients having recurrent ventral hernia after laparoscopic repair were excluded from the study. Diagnosis of a ventral hernia was typically made during the history and physical examination. Imaging studies including ultrasound, computed tomography (CT) were also used for diagnosis, defect size and content of hernia assessment. Demographic and perioperative variable were included for analysis.

Surgical Technique

1. IPOM group (Group A): The standard surgical technique is without closure of the gap before mesh □xation.

2. IPOM Plus group (Group B): The hernia gap is sutured .The hernia sac is incorporated into the sutures. All the layers of abdominal wall except the skin and subcutaneous layers were incorporated into the stitches.

Under general anesthesia, with patient placed in supine position. The abdominal cavity is insufflated to 12-15 mmHg by veress needle at palmer's point and a 5 mm trocar is placed at same site. Additionally, one 5mm trocar at left iliac fossa and one 10mm trocar at the level of umbilicus were placed along anterior axillary. Adhesiolysis is performed as needed. The gap area is cleared for fatty tissue, and the falciform ligament is partially detached from the abdominal wall if necessary. The maximum diameter of the gap is measured under a 6-8mmHg intraperitoneal pressure before fixation of the mesh and/or suturing of the gap. The gap size before closure is used to determine the size of mesh. The hernia content is reduced, without removal of hernia sac. A parietex composite mesh was placed with at least a 5cm over lap of the gap and fixed using preplaced sutures and tackers. The mesh fixation was performed under a 6-8 mmHg intraperitoneal pressure with 2cm distance between tacks in Group A. Patient in Group B had defect closure using 0 V-Loc sutures before the mesh placement and fixation. Fascial trocar site defects are closed with 2-0 Vicryl interrupted sutures. Skin is closed with stapler. The patients were instructed to wear the abdominal binder continuously for one month. The patients were first followed up on the seventh postoperative day for dressing and staple removal.

They were subsequently followed up on third month and sixth month post operatively. During follow up visits, a clinical examination and ultrasound examination were performed to exclude pseudo sac formation, recurrence of hernia or seromas.

Statistical Analysis

After retrospective data collection, the data was classified and coded. The coded data was entered and tabulated using Statistical Package for Social Science (SPSS) version 26.0. Descriptive statistics included mean and standard deviation (SD) for quantitative variable; number and percentage for categorical data. Inferential statistics were performed using Pearson's Chi-square test for categorical data and Mann Whitney *U* test for continuous data, as our data was not normally distributed. A p-value of <0.05 was considered to be statistically significant.

Results

Demographic profile and Intraoperative findings

A total of 74 patients were included in this study, out of which 34 patients had undergone IPOM (Group A) and rest 40 had undergone IPOM-Plus (Group B). Among them, there were 19 (55.9%) males and 15 (44.1%) females in Group A while 20 (50.0%) were male and 20 (50.0%) were female in Group B. In both the groups, there were no statistical difference in age, sex, body mass index (BMI), duration of symptoms, presenting complaints, hernia irreducibility and co-morbidity of the patients. More number of umbilical hernia in both groups compared to epigastric and paraumbilical hernia (p-0.009).

Patients undergoing IPOM surgery had significantly different size of hernia defect as compared to those undergoing IPOM-Plus type of repair (p-0.027). Since IPOM-Plus involves additional procedures, the mean operative time of Group B patients (53.25 ± 11.24) was significantly higher than Group A patients (47.50 ± 6.43) (p- 0.010) (Table 1).

Table 1: Demographic, Clinical and Intra-Operative Parameters of Patients Who Underwent IPOM and IPOM Plus Procedure

Parameter	Group A (n=34)	Group B (n=40)	p value
Age, mean (SD)	47.32 (13.29)	50.75 (13.03)	0.817
Sex, n (%) Male Female	 19 (55.9) 15 (44.1)	 20 (50.0) 20 (50.0)	0.613
BMI, mean (SD)	27.84 (2.79)	27.03 (3.21)	0.200
Duration of symptoms (day), mean (SD)	92.50 (63.62)	97.38 (59.17)	0.606
Presenting Symptoms, n (%) Swelling Pain	 30 (88.2) 4 (11.8)	 35 (87.5) 5 (12.5)	0.923
Irreducibility, n (%)	4 (11.8)	5 (12.5)	0.923
Co-morbidity, n (%)	7 (20.6)	8 (20.0)	0.950
Type of Hernia, n (%) Epigastric Paraumbilical Umbilical	 3 (8.8) 8 (23.5) 23 (67.6)	 3 (7.5) 8 (20.0) 29 (72.5)	0.009*
Defect size (cm), mean (SD)	3.61 (0.72)	3.60 (0.83)	0.027*
Operation time (min), mean (SD)	47.50 (6.43)	53.25 (11.24)	0.010*

Early postoperative outcome

Seroma formation was significantly higher in Group A patients as compared to Group B (23.5% vs 5%, p = 0.021).). Similarly, significant difference in pseudosac at first OPD visit was found among groups (29.4% in Group A vs 12.5% in Group B, p=0.02). In both the groups, there were no statistical difference in duration of opiod analgesia use, pain score at 24 hours, pain score at discharge, pain score at first OPD visit, wound infection and length of hospital stay of the patients (Table 2).

Table 2: Early Postoperative Outcomes of Patients Who Underwent IPOM and IPOM Plus Procedure

Parameter	Group A (n=34)	Group B (n=40)	p value
Duration of opiod use (hour), mean (SD)	26.82 (7.85)	26.10 (6.59)	0.366
Pain score at 24 hr, mean (SD)	6.29 (1.27)	6.58 (1.28)	0.733
Pain score at discharge, mean (SD)	3.79 (1.12)	3.60 (1.13)	0.920
Pain score at first OPD visit, mean (SD)	2.09 (0.29)	2.10 (0.30)	0.734
Seroma, n (%)	8 (23.5)	2 (5.0)	0.021*
Wound infection, n (%)	0 (0)	0 (0)	-
Pseudosac at first OPD visit, n (%)	12 (29.4)	5 (12.5)	0.020*
Length of hospital stay (day), mean (SD)	2.09 (0.29)	2.10 (0.30)	0.734

Late postoperative outcomes

Among the 74 patients, Only 7 patients had persistent pseudosac at six month, out of which 6 were from Group A. This observed difference between two surgical procedures regarding the persistent pseudosac at six month was significant (p = 0.027). No evidence of mesh infection, chronic pain and recurrence of hernia were observed in both the groups at 6 months (Table 3).

Table 3: Late Postoperative Outcomes of Patients Who Underwent IPOM and IPOM Plus Procedure

Parameter	Group A (n=34)	Group B (n=40)	p Value
Pseudosac at 6 months, n (%)	6 (17.6)	1 (2.5)	0.027*
Mesh Infection, n (%)	0 (0)	0 (0)	-
Chronic Pain, n (%)	0 (0)	0 (0)	-
Recurrence, n (%)	0 (0)	0 (0)	-

Discussion

Treatment for ventral abdominal wall hernias by laparoscopic approach is gaining popularity over the last few years and it is acknowledged by many operating surgeons and hospitals globally. Many studies have proven that laparoscopy is as efficacious and safe as open surgery for treating ventral hernias in various aspects like decrease in the length of hospital stay, lesser incidence of postoperative complications, a lower rate of surgical site infection and also recurrence[3].

Although the laparoscopic technique for repairing incisional hernias is well established, several issues related to laparoscopic repair of incisional hernia such as the high recurrence rate for hernias with large fascial defects and in extremely obese patients are yet to be resolved. Additional problems include seroma formation, mesh bulging/ eventration, and non-restoration of the abdominal wall rigidity/function with only bridging of the hernia orifice using standard laparoscopic intraperitoneal onlay mesh repair (IPOM). To solve these problems, laparoscopic fascial defect closure with IPOM reinforcement (IPOM plus) have been introduced[4].

The mean time taken to complete the surgery was 53.25 minutes for IPOM PLUS and 47.5 minutes for IPOM respectively as extra time was consumed in suturing the fascia defect/linea alba[5]. The most common complication after

LVHR is seroma formation, which causes discomfort, pain, infections and destroys the aesthetic outcome for patients[6]. A metanalysis including 16 studies concluded significantly higher rates of seroma formation after IPOM as compared to IPOM-Plus (12.2% versus 2.5%) with a combined relative risk of 0.37 (95% CI:0.23 to 0.57; P < 0.001) [7]. In our study, seroma was observed in eight IPOM patients (23.5%) and in two IPOM-Plus patients (5%) (p = 0.021**).**

Pseudosac was present in 17.6% of the patients who underwent IPOM procedure and one of the 40 patients (2.5%) who underwent IPOM plus developed pseudosac at the end of 6 months which was found to be statistically significant (p=0.027) which was similar to previously published study[8]. The limitations of this retrospective study are small number patients in each group with short term follow-up which cannot be used to determine the exact rate of recurrence because approximately 66% to 90% of ventral hernia recurrences develop within 2 years after operation[9].

Conclusion

IPOM plus repair is safe with possible advantages over a standard IPOM repair despite of prolonged operative time in patients with ventral hernia in term of postoperative outcomes.

Conflict of interest: The authors declare that they have no conflict of Interest.

Ethical Statement: Hereby, I Dr. G. Gopalakrishnan consciously assure that the for the manuscript submitted above where in accordance with the ethical standards and informed consent was obtained from all the patients being included in the study, Prior ethical approval was obtained from the Dharan Hospital Ethical Committee.

Informed Consent: Informed consent was obtained from all the patients for being included in the study.

References

1. Bucknall TE,Cox PJ,Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies. Br Med J. 1982; 284: 931.
2. L. Lee, B. Mappin-Kasirer, A. Sender Liberman, B. Stein, P. Charlebois, M. Vassiliou, G.M. Fried, L.S. Feldman, High incidence of symptomatic incisional hernia after midline extraction in laparoscopic colon resection, Surg. Endosc. 2012:26: 3180–3185, https://doi.org/10.1007/s00464-012-2311-7.
3. Clapp ML, Hicks SC, Awad SS, Liang MK. Trans-cutaneous closure of central defects (TCCD) in laparoscopic ventral hernia repairs (LVHR). World J Surg. 2013 37:42-51.
4. Sieda, Bassem M.; Khalil, Osama H. Short-term outcomes of laparoscopic intraperitoneal onlay mesh with facial repair (ipom-plus) for ventral hernia: a randomized controlled trial. The Egyptian Journal of Surgery.2020; 39(3):764-773. | DOI: 10.4103/ejs.ejs_73_20
5. Satish Kumar R *et al*. Comparative Study between Intraperitoneal Onlay Mesh Repair (IPOM) vs Intraperitoneal Onlay Mesh Repair with Closure of Fascial Defect (IPOM PLUS) for Ventral Hernias. SAS J Surg. 2021; 7(11): 708-718.
6. C. Edwards, J. Angstadt, O. Whipple, R. Grau. Laparoscopic ventral hernia repair: postoperative antibiotics decrease incidence of seroma-related cellulitis, Am. Surg.2005: 71: 931–936.
7. A. Tandon, S. Pathak, N.J.R. Lyons, Q.M. Nunes, I.R. Daniels, N.J. Smart. Meta-analysis of closure of the fascial defect

during laparoscopic incisional and ventral hernia repair, Br. J. Surg. 2016; 103:1598–1607, https://doi.org/10.1002/ bjs.10268.

8. Satish Kumar R, Dhruva HM, Tejasvi KC. Comparative Study between Intraperitoneal onlay Mesh Repair (ipom) vs. Intraperitoneal onlay Mesh Repair with Closure of Fascia Defect (ipom plus) for Ventral Hernias. J Med Imp Surg. 2022; 7: 129.
9. Rao ASN, Gupta A, Naik D, Gunasekaran G, Bhandari V, Rajput D. A comparative study between laparoscopic intraperitoneal onlay mesh hernioplasty and open underlay mesh hernioplasty for ventral hernias. Int Surg J. 2015;2: 352-60.