



## Surgery

## LAPAROSCOPIC MANAGEMENT OF VENTRAL HERNIA- CURRENT STATUS AND OUR INITIAL EXPERIENCE IN A NEWLY ESTABLISHED RURAL MEDICAL COLLEGE

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**ABSTRACT** **Introduction:** Ventral hernias are defined as the defect in the fascia of anterior abdominal wall with or without bulge. Clinical presentation can vary from small incidental defect to giant and complicated hernias with fistulas and viscera located outside the abdominal cavity covered only by peritoneum and skin (Loss of domain). Ventral hernias can be primary or secondary (incisional) following abdominal surgeries. Surgery is the primary modality of treatment for the repair of such hernias. Laparoscopic approaches include intraperitoneal On-lay mesh repair (IPOM) and Intra-peritoneal Olay Mesh repair with closure of defect (IPOM-PLUS) for small and medium size ventral hernias. For large complicated hernias with defect size >10 centimeters, the surgical procedures include component separation and transverse abdominis muscle release incisions like E-TEP with TAR. **Materials and Methods:** In this study, we retrospectively analyzed the data of patients that were operated for ventral hernia from March 2020 to March 2023 in the Department of General Surgery. Medical records were obtained by collecting the patient admission files from Medical Records Section of Govt. Medical College Anantnag associated Hospital. **Results:** Total number of patients studied was 104, out of which 61 had primary hernia whereas 43 had incisional hernias. Open repair with or without mesh was done in 71 patients whereas 33 patients underwent laparoscopic repair. **Conclusion:** Laparoscopic repair of ventral hernias is emerging as an effective treatment strategy for ventral hernia especially IPOM and IPOM Plus for small and medium sized defect in Ventral Hernias with better cosmesis, lesser wound infection, shorter hospital stays and other benefits of minimal access surgery.

**KEYWORDS :** Ventral hernia, incisional hernia IPOM, IPOM PLUS,

### INTRODUCTION

Ventral hernias comprise one of the most common problems confronting general surgeons with an overall incidence between 2% and 13%<sup>1,2</sup>. Ventral hernia repair has evolved with many techniques. It was initially performed by open technique to restore the anatomical layers without mesh insertion and the recurrence rate could range from 31% to 54%<sup>3</sup>. Laparoscopic ventral hernia repair was described first by Le Blanc et al. in 1993 for all types of hernia<sup>4</sup>. This surgical technique has improved over the last decade and has proven to be effective treatment option. With fewer wound complications, faster functional recovery and improved cosmesis it has become solution of choice in the treatment of small ventral hernias. However, there are still some unresolved issues like recurrences, choice of mesh, problems of mesh fixation, incidence of seromas etc. In our small initial experience of operating small to medium type of ventral hernias by Intra-Peritoneal On-lay Mesh repair (IPOM) and Intra-peritoneal On-lay Mesh repair with closure of defect (IPOM-PLUS), it was found that there were no cases of wound infection, better cosmetic results and shorter hospital stay and quicker recovery as compared to open repair. Till date, though a small series of patients and short follow up period, there is no incidence of recurrence so far.

### MATERIALS AND METHODS

We retrieved the data of patients that were operated for ventral hernia from March 2020 to March 2023 in the department of General Surgery from Medical Records Section. This study was approved by the Institutional Ethical Committee. The patients had consented for the laparoscopic and open procedures after getting detailed information about the type of approach employed. These patients were operated in the department by senior surgeons of fair expertise. The records were further analyzed for age, sex, and demographic profile, duration of surgery, post-operative complications, and hospital stay. The follow up was initially done every two weeks for two months, then monthly for three months and later on three monthly intervals. The follow up records were analyzed for any recurrence of these hernias and other late complications.

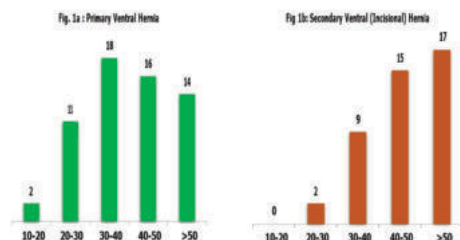
Data was analysed using descriptive statistics such as frequencies and percentages, as well as chi-square test. SPSS version 27 was used for the statistical analysis.

### RESULTS

Total number of cases operated was 104. Among them Primary Hernias were 61 and incisional hernias were 43. Primary ventral hernias graphically seemed evenly distributed but after calculating the chi square statistic it was found that the cases are not uniformly distributed across different age groups ( $\chi^2(3)_{df=30} = 12.85$ ;  $P_{sig} < 0.012$ ) across age groups where as in incisional hernias were predominant after the age 2 (4)

Age (in yrs)	Primary Ventral Hernia = 61 n(%)	p-value	Secondary Ventral (Incisional) Hernia = 43 n(%)	p-value
10-20	2=(3.30)		0=(0)	
20-30	11=(18.03)		2=(4.65)	
30-40	18=(29.50)	0.012*	9=(20.93)	0.005*
40-50	16=(26.22)		15=(34.89)	
>50	14=(22.95)		17=(39.53)	

N<sub>s</sub>, Differences are random  
\*p < 0.05 is taken as significant

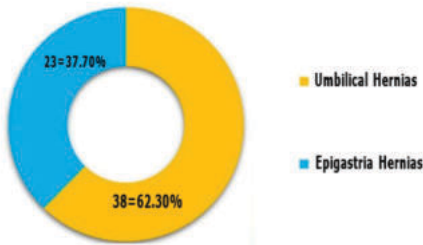


Among Primary Hernias, Umbilical Hernias were present in 38 patients and Epigastria Hernias in 23 patients (Table 2, Fig. 2) Incisional Hernias were detected in 43 patients. Among incisional hernias 29 were lower midline and 06 were lateral hernias, 05 subcostal and 03 post-appendectomy incisional hernia. (Table 3, Fig. 3)

**Table 2:**  
**Primary Ventral Hernia=61**

Type	n=(%)
Umbilical Hernia	38=(62.30)
Epigastric Hernia	23=(37.70)

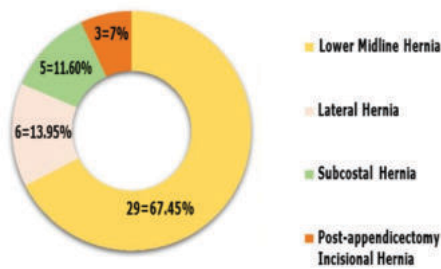
Fig. 2: Primary Ventral Hernia=61



**Table 3:**  
**Secondary Ventral (Incisional) Hernia=43**

Type	n=(%)
Lower Midline Hernia	29=(67.45)
Lateral Hernia	6=(13.95)
Subcostal Hernia	5=(11.60)
Post-appendectomy Incisional Hernia	3=(7.00)

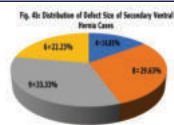
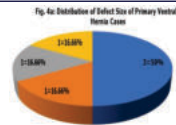
Fig. 3: Secondary Ventral (Incisional) Hernia=43



Out of total 104 patients 33 underwent laparoscopic repair while as 71 were operated by open method. Primary hernias had mostly less than 2 centimeters defect size whereas incisional hernias had an average defect of about 3 centimeters or more in the series of patients who underwent laparoscopic repair. (Table 4, Fig. 4a, Fig. 4b)

**Table 4:**

Defect size (cm)	Primary Ventral Hernia Cases n=(%)	Incisional Hernia Cases n=(%)
0.5-2.0	3=(50)	4=(14.81)
2.0-3.0	1=(16.66)	8=(29.63)
3.0-4.0	1=(16.66)	9=(33.33)
>4.0	1=(16.66)	6=(22.23)



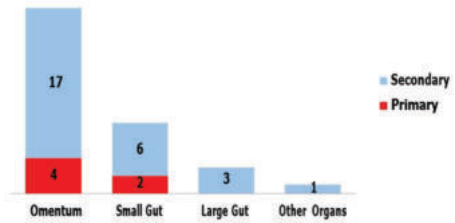
Contents of the Sac: Omentum was predominant content in 21 patients, Small gut was present in 8 patients, large gut in 3 and stomach in 1 patient in those patients operated laparoscopically. (Table 5, Fig. 5)

**Table 5:**

	Omentum (21) n=(%)	Small Gut (8) n=(%)	Large Gut (3) n=(%)	Other Organs (1) n=(%)
Primary	4=(19.04)	2=(25)	0=(0)	0=(0)
Secondary	17=(80.95)	6=(75)	3=(100)	1*(100)

\*Stomach and part of liver

Fig. 5: Distribution of Contents of Sac

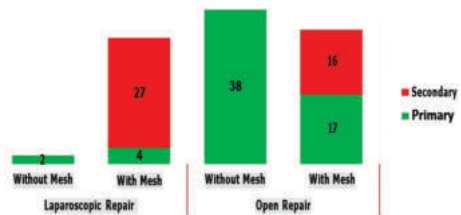


Open Repair without or with Mesh was carried in 71 patients, 55 with primary hernias and 16 patients with Incisional hernias. Laparoscopic Repair without or with Mesh was done in 33 patients. Among them 6 patients had Primary Hernias and 27 patient had incisional Hernias. (Table 6, Fig. 6)

**Table 6:**

	Laparoscopic Repair(33)		Open Repair(71)	
	Without Mesh n=(%)	With Mesh n=(%)	Without Mesh n=(%)	With Mesh n=(%)
Primary	2=(6.06)	4=(12.12)	38=(53.52)	17=(23.95)
Secondary	0=(0)	27=(81.82)	0=(0)	16=(22.53)

Fig. 6: Distribution of Open and Laparoscopic Repair Between Primary and Secondary Cases

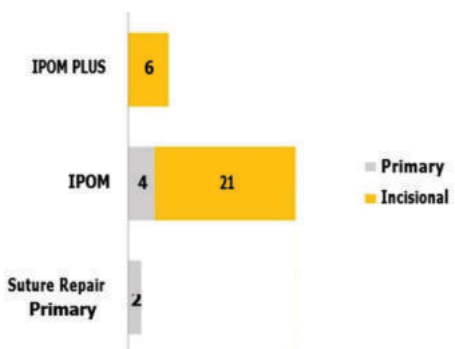


Laparoscopically primary repair was done in 2 patients with Primary Ventral Hernia and IPOM in 4 patients while as in case of incisional hernias IPOM was done in 21 and IPOM-PLUS in 6 patients. (Table 7, Fig. 7)

**Table 7:**

Type of Procedure	Suture Repair Primary n=(%)	IPOM n=(%)	IPOM PLUS n=(%)
Primary(6)	2=(33.33)	4=(66.67)	0=(0)
Incisional(27)	0=(0)	21=(77.77)	6=(22.23)

Fig. 7



Operating time was under 70 minutes for laparoscopic primary repair of hernias, and 70-120 minutes for IPOM and 120 -150 minutes for IPOM PLUS. The operating time was lesser in open repair of ventral hernias with primary repair and almost at par with open repair with mesh, however, the operating time reduced significantly once the number of cases crossed to more than twenty in laparoscopic group. Hospital stay was 2 days for primary repair of hernias and between 2 to 4 days for IPOM and 3-6 days for IPOM PLUS.

## DISCUSSION

Laparoscopic procedures are rapidly gaining momentum since its inception in early nineties for the surgical management of ventral hernias. Procedures like IPOM and IPOM PLUS is now routinely carried out with good outcomes. Closure of primary fascial defect during laparoscopic approach of hernia repair (IPOM PLUS) has improved outcomes-citing lower recurrence rates, lower rates of seroma formation and improved patient satisfaction<sup>5-7</sup>. In our small series of 33 patients, we could not find much difference between IPOM and IPOM Plus repairs. However IPOM Plus was done in patients with 4 centimeter or more bigger defect and it was only done in 6 patients. We used dual Mesh in all 33 patients provided by the hospital free of cost under Ayushman Bharat Scheme (PMJAY). We could not encounter any mesh infection or adhesion in the follow up period so far. Uncontrolled fistula and necrotizing fasciitis of the abdominal wall has been found with extended polytetrafluoroethylene and polyester meshes<sup>8,9</sup>. Total mesh infection rate has been less than 1% in most of the studies in case of dual meshes<sup>10</sup>. Similarly polypropylene mesh has been used in many series with negligible incidences of enterocutaneous fistula or bowel obstruction<sup>11-16</sup>.

There is lack of randomized studies comparing the outcomes of the variety of meshes. However, in a meta-analysis by Ramakrishna and Laxman<sup>17</sup>, they concluded that the complications can occur with both polypropylene mesh and newer mesh when used intraperitoneally and there was no statistically significant difference in the incidence of complications among various meshes.

The type of mesh used and mesh location play an important factor with regards to recurrence. Of which sub-layer and intra-peritoneal repairs had the least recurrence rates<sup>18,19</sup>. It is noted that 5- centimeter mesh overlap overall from the defect generally accepted as an ideal and to prevent recurrence<sup>20-22</sup>. In our series we ensured the 5 cm overlap in all the cases. Also, Carbajo et al claimed low recurrence rates of 1.4% and 4.4% of for tacks and trans fascial sutures respectively<sup>23</sup>. In our series we used four corner and one central transfascial sutures for mesh orientation and fixation besides absorbable tacks in the form of inner and outer crowning in all case of laparoscopic meshrepair both IPOM and IPOM PLUS. As per literature the recurrence rate is approximately 4% with the use of suture and 1.8% with the use of tackers<sup>24</sup>. As we combined sutures and tackers for mesh fixation the recurrence rate is nil so far in our 33 cases. The major limitation in our study was the smaller number of cases performed by surgeons with recent start of advanced laparoscopic surgeries and short follow up to draw final conclusions. However, our observations do favour a significant advantage of laparoscopic repair with all benefits of minimal access surgery documented in the literature.

## CONCLUSION

Laparoscopic repair of ventral hernias has gained strong popularity in the late nineties with some of the early enthusiasm lost later in time. While reviewing the current status one has to specifically look at the patient and hernia defect factors, technical considerations that have contributed to the successes and some of the failures of laparoscopic ventral hernia repair (LVHR). The patients best suited for laparoscopic repair are those who are obese and diabetic with a total defect size not to exceed 10cm in width or a "Swiss cheese" defect. The overlap of mesh to healthy fascia of at least 5 cm in every direction, with closure of the defect, is essential to prevent recurrence or bulging over time. Complications specifically related to the surgical site occurrence favour the laparoscopic approach. Recurrence rates, satisfaction, and health related quality of life results are like open repairs, but long-term data are lacking. There is still conflicting data regarding ways of fixing the mesh. The science of prosthetic material appropriate for intraperitoneal placement continues to evolve. The field continues to be plagued by single author, single institution, and small nonrandomized observational studies with short term follow up. The recent development of large prospective data bases might allow for pragmatic and point-of-care studies with long term follow up. We conclude that LVHR has evolved since its inception, has overcome many challenges

but still needs long term studies to evaluate evolving practices.

## REFERENCES

- Lomanto D, Iyer S, Shabbir A, Cheah WK. Laparoscopic versus open ventral hernia mesh repair: a prospective study. *Surgical Endoscopy and Other Interventional Techniques*. 2006;20:1030-1035.
- Hussain A, Mahmood H, Nicholls J, El-Hasani S. Laparoscopic ventral hernia repair. Our experience of 61 consecutive series: prospective study. *International journal of surgery*. 2008;6(1):15-19.
- Luijendijk RW, Lemmen MH, Hop WC, Wereldsma JC. Incisional hernia recurrence following "vest-over-pants" or vertical Mayo repair of primary hernias of the midline. *World journal of surgery*. 1997;21:62-66.
- LeBlanc KA, Booth WV. Laparoscopic repair of incisional abdominal hernias using expanded polytetrafluoroethylene: preliminary findings. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*. 1993;3(1):39-41.
- Zeichen MS, Lujan HJ, Mata WN, et al. Closure versus non-closure of hernia defect during laparoscopic ventral hernia repair with mesh. *Hernia*. 2013;17(5):589-596. doi:10.1007/s10029-013-1115-6
- Nguyen DH, Nguyen MT, Askenasy EP, Kao LS, Liang MK. Primary fascial closure with laparoscopic ventral hernia repair: systematic review. *World journal of surgery*. 2014;38:3097-3104.
- Wennergren JE, Askenasy EP, Greenberg JA, et al. Laparoscopic ventral hernia repair with primary fascial closure versus bridged repair: a risk-adjusted comparative study. *Surgical endoscopy*. 2016;30:3231-3238.
- Foda M, Carlson MA. Enterocutaneous fistula associated with ePTFE mesh: case report and review of the literature. *Hernia*. 2009;13:323-326.
- Moussi A, Daldoul S, Bourguiba B, Othmani D, Zaouche A. Gas gangrene of the abdominal wall due to late-onset enteric fistula after polyester mesh repair of an incisional hernia. *Hernia*. 2012;16(2):215-217.
- Dietz U, Spor L, Germer CT. Management of mesh-related infections. *Der Chirurg*. 2011;82:208-217.
- Chand M, On J, Bevan K, Mostafid H, Venkatsubramanian A. Mesh erosion following laparoscopic incisional hernia repair. *Hernia*. 2012;16(2):223-226.
- Riaz A, Ismail M, Barsam A, Bunce C. Mesh erosion into the bladder: a late complication of incisional hernia repair. A case report and review of the literature. *Hernia*. 2004;8:158-159.
- Tandon A, Shahzad K, Pathak S, Oommen C, Nunes Q, Smart N. Parietex<sup>TM</sup> Composite mesh versus DynaMesh®-IPOM for laparoscopic incisional and ventral hernia repair: a retrospective cohort study. *The Annals of The Royal College of Surgeons of England*. 2016;98(8):568-573.
- Chowbey PK, Sharma A, Khullar R, Soni V, Bajjal M. Laparoscopic ventral hernia repair with extraperitoneal mesh: surgical technique and early results. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*. 2003;13(2):101-105.
- Alkhoury F, Helton S, Ippolito RJ. Cost and clinical outcomes of laparoscopic ventral hernia repair using intraperitoneal nonheavyweight polypropylene mesh. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*. 2011;21(2):82-85.
- Prasad P, Tandia O, Patle NM, Khanna S, Sen B. Laparoscopic transabdominal preperitoneal repair of ventral hernia: a step towards physiological repair. *Indian Journal of Surgery*. 2011;73(6):403-408.
- Ramakrishna H, Lakshman K. Intra peritoneal polypropylene mesh and newer meshes in ventral hernia repair: what EBM says? *Indian Journal of Surgery*. 2013;75(5):346-351.
- Awad ZT, Puri V, LeBlanc K, et al. Mechanisms of ventral hernia recurrence after mesh repair and a new proposed classification. *Journal of the American College of Surgeons*. 2005;201(1):132-140.
- Holihan J, Bondre I, Askenasy EP, et al. Sublay versus underlay in open ventral hernia repair. *Journal of Surgical Research*. 2016;202(1):26-32.
- Conze J, Klinge U, Schumpelick V, Narbenhormen. *Der Chirurg*. 2005;9(76):897-910.
- Binnebösel M, Rosch R, Junge K, et al. Biomechanical analyses of overlap and mesh dislocation in an incisional hernia model in vitro. *Surgery*. 2007;142(3):365-371.
- Lambrecht J. Overlap-coefficient for the relationship between mesh size and defect size in laparoscopic ventral hernia surgery. *Hernia*. 2011;15(4):473-474.