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Role of laparoscopy in the management of ventral hernia repair: A comparative study

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Abstract--Objectives: The aim of our study is to compare the usefulness of laparoscopic ventral hernia repair with conventional open ventral hernia repair. Methodology: The comparative type of study was conducted on 60 patients with incisional hernia of which 30 patients were included in the Laparoscopy group while the other 30 were included in the open surgery group. Results: The peak incidence of hernia in our study was in the 31-50 years of age group. The mean operation time of Laparoscopic ventral hernia was 142.1 minutes with an SD of ± 24.69 as compared to open repair which was 100.7 minutes. Postoperative complications were less in the laparoscopic repair group in comparison with the open repair group. In the open group, the majority of patients were discharged on 5-7 days as compared to the laparoscopic group in which the majority of patients were discharged on days 3-5. Conclusion: Laparoscopic ventral hernia repair is a novel technique, various benefits found in the current study include lesser postoperative pain, lesser postoperative hospital stay, decreased incidence of postoperative complications, and obviously better cosmesis.

Keywords--incisional hernia, open incisional, hernia repair, laparoscopic surgery.

Introduction

A Hernia is defined as a "protrusion or project organ or part of an organ through the wall of the cavity that normally contains it".¹ Ventral hernia occurs through the anterior abdominal wall at any site other than the groin.² They are classified into incisional, paraumbilical, umbilical, epigastric, and Spigelian hernias.^{3,4} Incisional hernia represents an important element of morbidity after abdominal surgery. 20% of patients undergoing a laparotomy will develop a fascial defect in their abdominal scar.⁵ Repair of incisional hernia is recommended to avoid complications such as incarceration and strangulation of intestines and improve severe disability due to loss of abdominal wall domain.⁶

The ventral hernia repair is based on the principle of Rives-stoppa open retro rectus tension-free mesh repair. In the laparoscopic technique, the mesh is placed in an intraperitoneal location and where the rise in the intraabdominal pressures is totally diffused along each square inch of the mesh and not along a tenuous suture line, as happens in conventional suture repairs. An increase in the intra-abdominal pressures thus helps to keep the mesh in place rather than displace it, as is the case in conventional overlay repairs.⁷ Laparoscopic ventral hernia repair (LVHR) was introduced into surgical practice by LeBlanc and Booth in 1991.⁸ Nowadays laparoscopic repair of ventral hernia is being accepted by most surgeons and patients. It is believed that laparoscopic repair is associated with less postoperative pain, shorter hospital stay, less wound infection, and less reoccurrence. (Figure1)

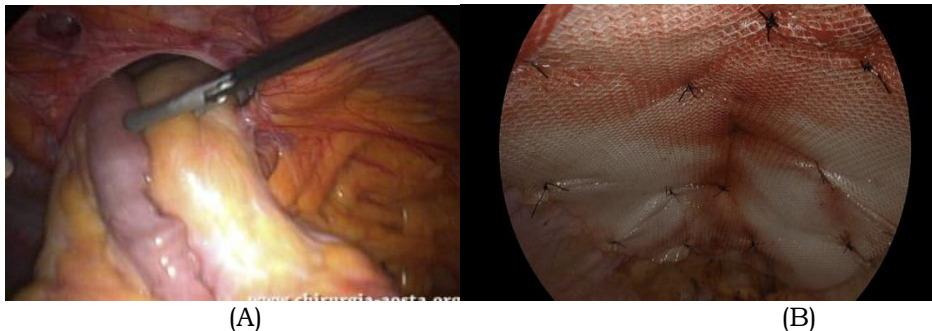


Figure 1. (A) Large Ventral defect having small bowel and omentum as contents, (B) Placement and tucking of prolene mesh with prolene sutur

The aim of our study is to compare the usefulness of laparoscopic ventral hernia repair with conventional open ventral hernia repair.

Materials and Methods

The study was conducted on patients presenting with an incisional hernia to L.L.R.M. Medical College Meerut, from August 2018 to October 2019. It is a prospective study conducted on 60 patients.

Inclusion Criteria

Patients with Incisional Hernia who are fit for surgery

Exclusion Criteria

- Patients not fit for surgery, for various reasons.
- Patients who underwent emergency surgery for complications like strangulation, obstruction, and incarceration.
- Patients, who underwent repairs without Mesh are also excluded from the study.
- Compromised cardio-pulmonary status.
- Portal hypertension.
- Patients having large amount of abdominal fat and redundant skin.

Methods of study

The workup of the patient was divided into preoperative, operative and, postoperative assessment and follow-up. Statistical analysis was done by software IBM SPSS STATISTICS 21.

Preoperative evaluation

- Informed consent was taken, from all patients for Laparoscopic or Open surgery by their choice, in this way 30 patients were selected in each group.
- All patients were worked up for General Anesthesia in each group.
- All patients were instructed regarding nil by mouth, skin incisions, stitches, catheterization and pain.

For pain Visual Analog Scale was explained and discussed, which has a score of 0 – 10 according to severity.

- 0 – No Pain
- 0 -3: mild pain
- 4- 5: moderate pain
- 6-7: severe pain
- >7: very severe pain

Postoperative Period

This was assessed for pain, early feeding, ambulation, and duration of hospital stay.

Complications

Haematoma, Seroma, and surgical site infections were assessed.

Operative Procedure**Open Repair**

- After giving the skin incision, the hernia sac is found and separated from its surroundings.
- Contents were reduced back to the abdominal cavity.

- A space is created between post rectus sheath and peritoneum, this defect is repaired with Vicryl 2-0 suture.
- A suitable size polypropylene mesh, with a minimum of 5 cm overlap beyond the margins of the defect was placed over post rectus sheath/peritoneum in the hernia.
- We fix the mesh in four to six corners with 2-0 propylene sutures and take it out through the abdominal muscle on the anterior rectus sheath. A suction drain was placed over the mesh.
- The anterior rectus muscle and the sheath is approximated over the mesh with interrupted PDS suture. The skin was repaired using sutures/Skin Staples.

Laparoscopic Repair of Ventral Hernia

Pneumoperitoneum was created using the Palmers point, 2- 3cm below the left costal margins in mid clavicle line. Following this 10mm port is placed below the xiphoid process, a 5mm port is placed in the left flank inferiorly in the anterior axillary line, and another 5mm port is placed in the right flank in the anterior axillary line. After reducing the content whether bowel or omentum, we select the appropriate size mesh that covers the whole defect and overlaps up to 5cm from the edge of the defect. Mesh was spread, positioned, and tuck with a tackler. Finally, we spread the omentum over the underlying bowel to avoid direct contact with the mesh. Ports were withdrawn under vision, skin secured with prolene, and aseptic dressing done.

Results

This study was carried out at L.L.R.M. Medical College Meerut from August 2018 to October 2019. A total of 60 patients with the clinical diagnosis of ventral hernia were included in the study of which 30 patients were included in the Laparoscopy group while the other 30 were included in the open surgery group. (Figure 2) The peak incidence of hernia in our study was in the 31-50 years of age group. (Figure 3).

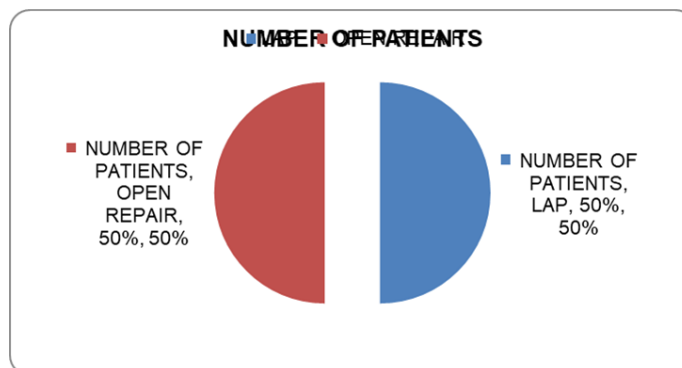


Figure 2. Patients divided in two groups according to surgery

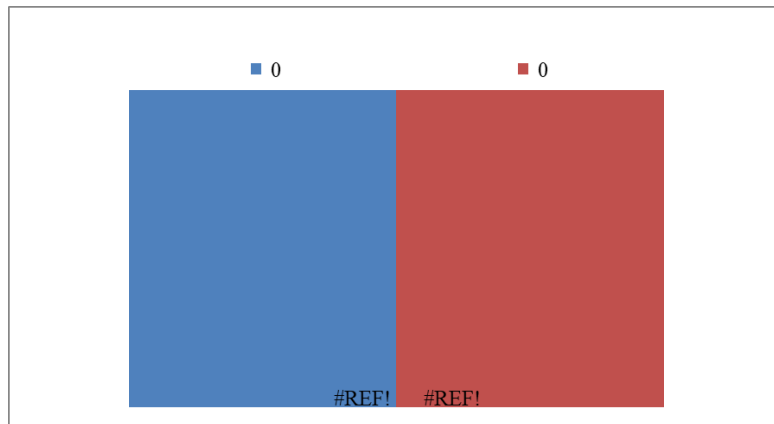


Figure 3. Distribution of incidence according to patient Age Groups

In our study, among 12 male patients, 7 patients underwent lap and 9 patients underwent open repair. Among 48 female patients, 23 patients underwent lap and 25 underwent open repair, as shown (Figure 4). The male to female ratio was 1:4 in laparoscopic surgery but more in open surgery.

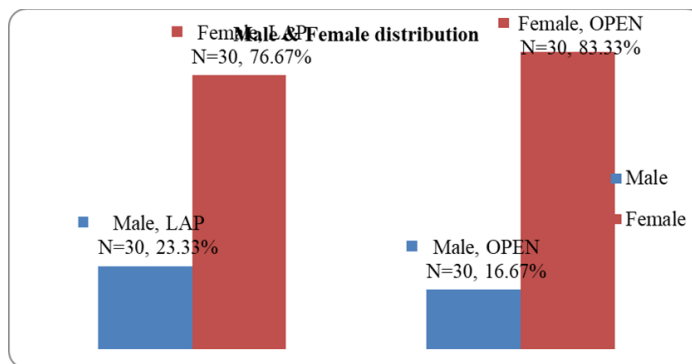


Figure 4. Distribution of Surgery according to gender

The majority of patients have incisional hernia shown in (Table 1).

Table 1
Type of Hernia

S. NO	Hernia Type	Lap (N=30) (%)	Open (N=30) (%)
1.	Incisional	20 (66.6 %)	23 (76.6 %)
2.	Epigastria	9 (30 %)	5 (16.6 %)
3.	Umbilical	1 (3.3 %)	2 (6.6 %)

The mean operation time of Laparoscopic ventral hernia was 142.1 minutes with an SD of ± 24.69 as compared to open repair which was 100.7 minutes with S.D. ± 9.1 . The postoperative pain was recorded at 0 hrs, 6 hrs, 12hrs, 24 hrs, 48 hrs, and 7 days after operation by using the Visual Analog Scale (VAS) pain scoring system. (Table 2)

Table 2
Visual Analogue Scale (Vas) Pain Score, Mean Time after Operation

S. NO.	Time After Operation	LAP	OPEN	P Value
1.	0 Hours	3.34	3.5	0.084
2.	6 Hours	2.36	2.7	0.128
3.	12 Hours	1.36	1.66	0.015
4.	24 Hours	1.23	1.46	0.025
5.	48 Hours	0.73	1.16	0.012
6.	7 th Day	0.21	0.36	0.129

There were no intraoperative complications in each group like bowel injury or bleeding. There were 7 patients in the laparoscopic group who were converted to open surgery. (Table 3)

Table 3
Showing Conversion to Open Surgery

S. NO.	Reason For Conversion	No. of Patients
1.	Inadequate Dissection of Lateral Extent of Sac	2 (28.57%)
2.	Major Intraoperative Bleed	0 (0%)
3.	Dense Adhesions	2 (28.57%)
4.	Inability To Reduce Incarcerated Intestine	3 (42.9%)
5.	Visceral Injury	0 (0%)
	Total	7 (100%)

There was one case of postop. Fever in the open group was managed conservatively. Seroma and post-op. the pain was also present as a post-op complication in both groups. (Table 4)

Table 4
Postoperative Complications

S. NO.	Complications	LAP (N=30) (%)	OPEN (N=30) (%)
1.	Seroma	1(3.3 %)	1(3.3 %)
2.	Hematoma	0 (0 %)	0 (0 %)
3.	Wound Infection	0 (0 %)	2(6.6 %)
4.	Ileus	0 (0 %)	1(3.3 %)
5.	Urinary Retention	0 (0 %)	0 (0 %)
6.	Missed/Delayed Bowel Injury	0 (0 %)	0 (0 %)
7.	Fever	0 (0 %)	1(3.3 %)
8.	Suture Site Pain	1(3.3 %)	1(3.3 %)
9.	Total	2(6.6 %)	7 (23.3 %)

In the open group, the majority of patients were discharged on 5-7 days as compared to the laparoscopic group in which the majority of patients were discharged on days 3-5. (Table 5)

Table 5
Postoperative Time of Discharge

S. No.	Postoperative Time Of Discharge	LAP (N=30)	OPEN (N=30)
1.	<1 Day	0	0
2.	2 Days	1	0
3.	3 Days	6	2
4.	4 Days	8	3
5.	5 Days	10	8
6.	6 Days	3	11
7.	7 Days	1	3
8.	>7 Days	1	3

Discussion

Incisional hernia is one of the most common long-term complications of abdominal incisions, with an overall incidence of 3-20%.⁹ As compared to the conventional open technique of hernia repair laparoscopy surgery is getting a better response due to short hospital stay and lesser complications. The first laparoscopic ventral hernia surgery by LeBlanc KA & Booth WV NCin 1993,¹⁰ the procedure faced many challenges and underwent many modifications. Many trials are done since then to compare both conventional open techniques of hernia repair with laparoscopy surgery. Our study consists of 60 patients (30 patients in the open repair group and 30 patients in the laparoscopic repair group). In this study, the incidence of incisional hernia was found to be maximum in the age range of 31-40 years (38.33%) followed by 51-60 years (28.33%). The majority of the patients were females with male to female ratio of 1:4, similar results are also shown by Qadri SJ et al.¹¹ and Umamaheswaran S et al¹² In our study incisional hernia is the most common type of hernia operated similar to Uma Umamaheswaran Set al¹² on contrary umbilical hernia is most common in the study by Badiger S et al.¹³ The results of our study were comparable to other studies done by Badiger S et al, Park Aet al, and many more, as shown in the (Table 6).¹³⁻¹⁷

Table 6
Comparison of Present Study with Other Similar Studies

S. NO.	Observation	Park ¹⁴		Carbaja ¹⁵		Rameshaw ¹⁶		Badiger S ¹³		Thota ¹⁷		Our study	
		Lap	Open	Lap	Open	Lap	Open	Lap	Open	Lap	Open	Lap	Open
1.	Operating time (min)	95	78	87	112	56	82	55	130	94.3	92.65	142.1	100.7
2.	Length of stay	3,4	6.5	2.2	9.1	1.7	2.8	2.6	6.8	4.64	15.17	4.6	6.8
3.	Infection rate	00	02	00	18	00	03	00	02	3.2	17.6	00	02
4.	Seroma rate	04	02	13	67	00	00	03	08	16	2	01	01
5.	Patients	56	49	30	30	79	174	50	50	31	51	30	30

Conclusion

Laparoscopic ventral hernia repair is a novel technique, various benefits found in the current study include lesser postoperative pain, lesser postoperative hospital

stay, decreased incidence of postoperative complications, and obviously better cosmesis. Limitations of the above technique include – the need for General anesthesia for surgery, longer operative time, longer learning curve, and higher conversion rate to open surgery. We recommend that surgeons should use the laparoscopic technique for ventral hernia repair as a safe and better alternative to open repair.

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Conflicts of interest: There are no conflicts of interest.

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