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A COMPARITIVE STUDY ON INTRA PERITONEAL ONLAY MESH REPAIR(IPOM) VS OPEN ONLAY MESH REPAIR FOR VENTRAL HERNIA

General Surgery

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ABSTRACT

Hernia is defined as abnormal protrusion of viscus through a normal or abnormal weakness in the wall of its containing cavity. Ventral Hernias are second most common type of hernias accounting for 21 to 35% of all verities of hernias. The main danger of all forms of hernia is strangulation and hence need surgical intervention. Repair of ventral hernias can be technically challenging and a myriad of methods have been described. The most important distinctions in describing surgical management of ventral hernias are primary vs mesh repair and open vs laparoscopic repair. Mesh repair became the gold standard in elective management of most ventral hernias.

In the recent era of Minimal invasive surgeries, laparoscopic ventral hernia repair is being favoured by patients as well as the surgeons when compared to open repair. There is need to evaluate and compare quality of life and pain scoring postoperatively between open repair and laparoscopic repair of ventral hernias.

AIMS & OBJECTIVES- TO COMPARE SURGICAL OUTCOMES OF INTRA PERITONEAL ONLAY MESH REPAIR(IPOM) VS OPEN ONLAY MESH REPAIR FOR VENTRAL HERNIA ON VARIOUS PARAMETERS

MATERIAL & METHODS-This study was conducted on 60 pts which were divided in 2 groups (30 Intra peritoneal onlay mesh repair- 30 open onlay mesh repair)

CONCLUSION- Laparoscopic ventral hernia repair provides lesser post-operative pain, lesser complications, shorter hospital stay and lesser economic impact as they returned to returned to work early. Thus patients have less morbidity and improved quality of life.

LVHR may be considered a primary approach for most ventral and incisional hernias unless contraindicated for laparoscopy.

KEYWORDS

INTRODUCTION

Sir Astely Paston Cooper (1804) quoted "No disease of the human body belonging to the province of the Surgeon, requires in its treatment, a better combination of the accurate anatomical knowledge with the surgical skill than Hernia in all its varieties".

Hernia as a term can be explained as an abnormal protrusion of a viscous or a part of a viscous through an opening which can either be artificial or natural with a sac covering it.

Abdominal wall hernia is the protrusion of intraabdominal organs or tissue through a defect in the abdominal wall. Abdominal wall hernias can be classified into primary ventral and incisional hernia. There are four different main types of primary ventral hernia: para umbilical hernias, umbilical hernia, epigastric hernias and spigelian hernias respectively. Incisional hernia develops at the site of a prior surgery, where the abdominal wall failed to heal.

Continuous research and advances made in the basic and clinical sciences have allowed for the better understanding of pathophysiology of hernia formation.

An increased intra- abdominal pressure will result in weakness of the musculofascial layer of anterior abdominal wall which will exert pressure on the portion of the wall that is thinnest, the wall thins at this point, and the diameter increases virtually results in continued progression of hernia.

As surgical innovations are taking place, hernia surgeries have also improved and evolved and has been benefited significantly from technologic improvements. The tension-free repair of hernia is one of the key concepts in revolutionizing the hernia surgery. The use of prosthetic mesh to repair the fascial defect has decreased in the recurrence rates of ventral and incisional hernias.

In these modern times most of the importance is given on reducing the hospital stay of the patient and postoperative morbidity and importance is given to cosmesis. That's why Laparoscopic approaches gained importance because of its minimally invasive technique, which decreases hospital stay and also in maintaining cosmesis of patients.

An increasing interest in laparoscopic surgery and the availability of new materials and the trend towards minimal access surgery (MAS) have encouraged general surgeons to adopt laparoscopic techniques.

Consequently, ventral hernia is one of the frequent complains presenting to the surgeon, so there is a requirement to research the disease in respect to its various presentations and treatment modalities. This also helps determine the best modality of treatment in our set-up.

In this thesis I have made an attempt to study 60 cases of ventral hernias (30 case of Intra peritoneal onlay mesh repair - 30 open onlay mesh repair) selected randomly from cases admitted to our hospital during the year Jan 2019 to June 2020 and compare quality of life between open and laparoscopic repair group during the post-operative period.

AIM AND OBJECTIVES

TO COMPARE SURGICAL OUTCOMES OF INTRA PERITONEAL ONLAY MESH REPAIR(IPOM) VS OPEN ONLAY MESH REPAIR FOR VENTRAL HERNIA ON VARIOUS PARAMETERS

1. Duration of surgery
2. Acute pain (Visual Analog Score)
3. Local seroma or hematoma
4. Wound Infection
5. Length of hospital stay
6. Chronic pain
7. Recurrence (3 months-6 months)
8. Time until return to normal work

MATERIALS AND METHODS

Type of study: Prospective

Place of study: Department of Surgery, Mahatma Gandhi Medical College and Hospital, Jaipur

Period of study: Jan 2019 to June 2020

Institute Ethics Clearance Committee will be obtained before start of study.

Written and informed consent of all the patients will be taken prior to their enrolment in the study (Appendix A1)

Sample size: 60 (30 Intra peritoneal onlay mesh repair- 30 open onlay mesh repair)

Plan of study: Patients presenting to surgical Opd with hernia on the ventral aspect of the abdomen excluding inguinal hernia was evaluated

INCLUSIONAL CRITERIA
1. Age 18-70 yrs
2. Defect size 2-10 cm
3. Primary ventral hernia
4. Incisional hernia

EXCLUSIONAL CRITERIA
1. Existing severe heart disease (by evidence of 2D ECHO and ECG)
2. Chronic kidney disease
3. Patients with obstructed or strangulated hernia
4. Local or systemic infection
5. Psychiatric problem
6. Patients unfit for general anaesthesia

- All the findings-clinical examination, investigations will be recorded in the study pro forma (Appendix B).

METHODOLOGY:

Preoperative evaluation:
All the patients are evaluated by proper history and detailed physical examination. Data collected by proforma. All the patients underwent the routine blood investigations and in our study we got ultrasound abdomen done for all our patients to know the size, number of defects, contents and any other abdominal pathology.

Preoperative preparation:
Patients were kept NPO for about 10-12 hrs. All patients received antibiotic prophylaxis half an hour before surgery.

Procedure for open surgery:
Almost all the patients were operated under general anaesthesia. Foleys catheterization and nasogastric tube were occasionally used. Patients were placed in supine position. Skin incision was made according to the site and size of the defect and type of hernia. The hernia sac was dissected out and reduced and the defect assessed. When there were adhesions, sac was opened and contents were reduced. In onlay repair, polypropylene mesh is sutured over the anterior rectus sheath, while in inlay technique, the mesh is placed in the preperitoneal space. The mesh is fixed at its four corners with non-absorbable sutures. Anterior rectus sheath was closed over the mesh by non-absorbable sutures. Suction drain was placed in few cases based on the surgeon 's choice. Skin and subcutaneous tissue closed in layers.

Procedure for laparoscopic surgery:
All the patients were operated under general anaesthesia. Nasogastric tube was placed for upper abdominal hernia and a Foleys catheter for lower abdominal hernias. Both are removed after the procedure on the operating table.

Patient position :
Patient is in supine position without any tilt.

Position of surgical team:
The operating surgeon stands to the left of the patient with the camera man on his right or left depending on the location of hernia.

Operative technique :
Pneumoperitoneum established by veres needle in palmers point, 2 to 3cm below the left costal margin in the midclavicular line. A 10 mm camera port is place at this point and the intra-abdominal pressure is maintained at 12 mm Hg. Two additional 5mm ports are placed depending on the type of hernia under direct vision. Adhesiolysis was done using sharp dissection or monopolar diathermy. Defect is delineated. A thread was passed through the 5mm port and the defect size measured intra corporeally. The size of the mesh required is assessed. The area to be covered by the mesh is marked after the pneumoperitoneum is released and the sites for transfacial sutures marked with the defect at its centre. The mesh is prepared, 2 non-absorbable ethilon sutures on either side at the upper end and two polypropolene sutures at the opposite end. This is mainly done for the easy dentification based on color difference. The mesh is rolled around the grasper and inserted through the 10 mm port. Mesh is opened intraperitoneally and with the use of a spinal needle or cobbler and mesh is anchored to the anterior abdominal wall. In some cases, we also used tackers in a double crown fashion. At the completion of the procedure, the ports are withdrawn under vision. 10 mm port is closed with 2-0 polyglactin. Skin closed with ethilon 3-0. A compression dressing is placed in the area of defect to reduce the incidence of post-operative seroma.

Mesh used:
In most of the cases we used a Composite mesh. It is composed of three-dimensional multifilament polyester on the parietal side enhancing tissue integration. On the visceral side the mesh is covered by an absorbable collagen film composed of porcine collagen, polythene glycol and glycerol, in order to minimize visceral adhesions. In a few of the cases we used light weighted Titanized proline mesh.

Fixation devices:
The meshes were anchored to the inside of the abdominal wall by tacker. Two types of tackers were used. One is a non-absorbable titanium tack, with a spiral helix shape. Each fixation device consists of 30 non-absorbable tacks titanium tacks. Second is a absorbale vicryl tacker. Each fixation device consists of 30 absorbable tacks. The trocar diameter of the fixation device is 5mm.

INSTRUMENTS:
All the instruments used were reusable after adequate sterilisation technique except for the polypropylene mesh and tacker used for mesh fixation. Tacker used is PROFOUND –N non-absorbable mesh fixation device (code: MFD30N) and the polypropylene mesh used is FILAPROP polypropylene mesh manufactured by MERIL Life sciences, Meril Park, Survey no 135/2/B Muktanand Marg, Chala, Vapi, Gujrat PIN:396191.

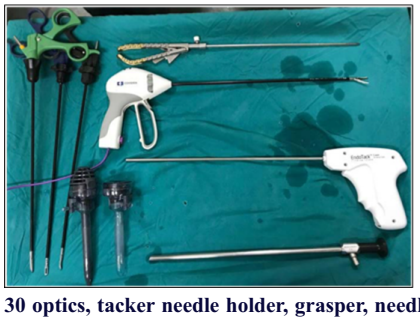


Figure 3: 30 optics, tacker needle holder, grasper, needle holder, maryland and harmonic and disposable ports

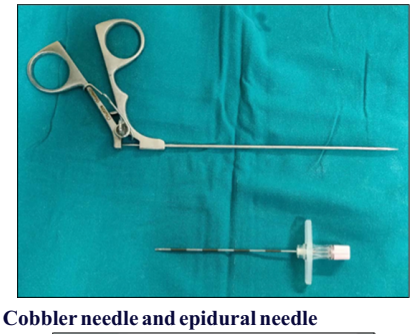


Figure 4: Cobbler needle and epidural needle

Figure 5: 15*15cm absorbable polypropylene mesh

Post-operative management:
During post-operative period all patients received intravenous aqueous diclofenac injections 12thhrly for 1 day unless contraindicated and there after oral analgesics are given on the patient demand. All the patients are ambulated with in 12 hrs of surgrey and are encouraged for oral feeds. Initially the feeds were sips of liquids followed by normal diet after the resolution of post-operative ileus (indicated by passing of flatus and normal bowel sounds on auscultation and return of apetite). In patients with persistent ileus, they were kept NPO and whenever required a nasogastric tube is passed only to be removed once the resolution of the ileus. The wounds were inspected for any seroma, hematoma or any infection. In open group drains were removed when the collection was less than 30 ml for 2 consecutive days. Patients were discharged after complete ambulation and tolerating normal diet.

Follow up evaluation:
After discharge, patients were encouraged to take normal diet and return to their normal activities as early as possible. After the discharge, patients were followed up at 1 week, 1 month, 3-month, 6 month intervals. In the initial follow up, the patients were evaluated for short term complications like seroma or hematoma, wound infection and wound dehiscence. During subsequent visits, chronic pain at the operated site, return to normal activity and recurrence were noted.

Post-operative assessment of pain:
The pain experienced by the patients in the post-operative period has been graded according to the Visual Analogue Scale (VAS) which ranges from no pain to the worst possible pain on the scale of 0 to 10.

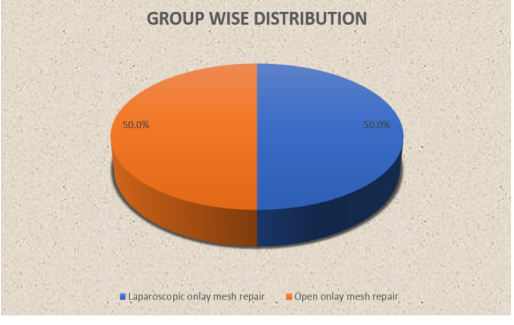
End points of the study:
The end points measured in both the groups are duration of surgery, intra operative complications, incidence of post-operative complications like seroma formation, wound infection, postoperative ileus etc, duration of post-operative pain using the visual analogue scale, length of hospital stay, return to normal activity, and recurrence rates during the follow up.

OBSERVATIONS AND RESULTS

Table No. 1 Distribution according to group

Group	Number	Percentage
Laparoscopic onlay mesh repair (Group 1)	30	50.0
Open onlay mesh repair (Group 2)	30	50.0
Total	60	100.0

The above table shows the distribution of patients according to group. There were 30 (50.0%) patients each in laparoscopic onlay mesh repair group and open onlay mesh repair group.



Graph: Distribution of patients according to group

Table No. 2 Distribution of patients according to age

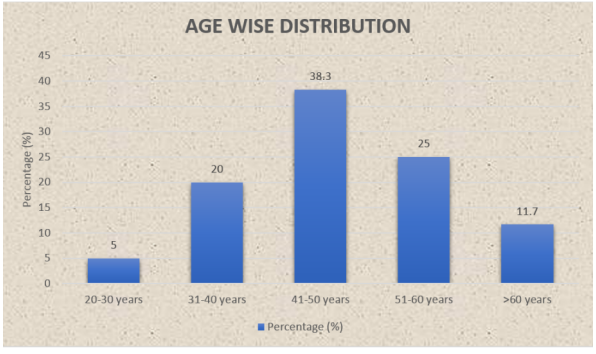
Age	Number	Percentage
20-30 years	3	5.0
31-40 years	12	20.0
41-50 years	23	38.3
51-60 years	15	25.0
>60 years	7	11.7
Total	60	100.0

The above table shows the distribution of patients according to age.

There were 3 (5.0%) patients in the age group 20-30 years, 12 (20.0%) in the age group 31-40 years, 23 (38.3%) in the age group 41-50 years, 15 (25.0%) in the age group 51-60 years and 7 (11.7%) in the age group more than 60 years.

Majority of the patients were in the age group 41-50 years, followed by 51-60 years.

The mean age of the patient was 48.73 ± 10.58 years, with a range between 25 years to 75 years.

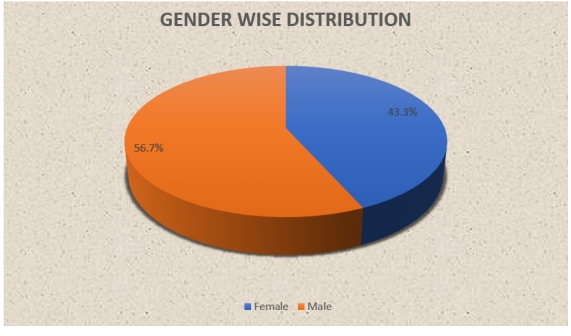


Graph : Bar diagram showing age wise distribution

Table No. 3 Distribution of patients according to gender

Gender	Number	Percentage
Female	26	43.3
Male	34	56.7
Total	60	100.0

The above table shows the distribution of patients according to gender. There were 26 (43.3%) females and 34 (56.7%) males in the present study, showing a male predominance.



Graph : Distribution of patients according to gender

Table No.4 Group wise distribution of age

Age	Group 1		Group 2	
	No.	%	No.	%
20-30 years	1	3.3	2	6.7
31-40 years	4	13.3	8	26.7
41-50 years	16	53.3	7	23.3
51-60 years	7	23.3	8	26.7
>60 years	2	6.7	5	16.7
Total	30	100.0	30	100.0
Mean (±SD)	48.17 ± 10.08		49.30 ± 11.20	
't' value, df	-0.412, df=58			
P value	0.682, NS			

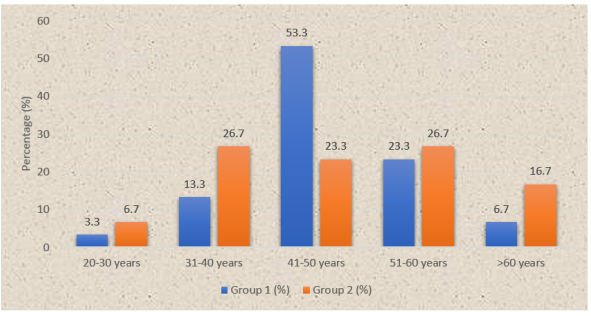
Unpaired 't' test applied. P value = 0.682, Not significant

The above table shows the distribution of age in relation to group.
In **Group 1,** 1 (3.3%) patient was in the age group 20-30 years, 4 (13.3%) were in the age group 31-40 years, 16 (53.3%) were in the age group 41-50 years, 7 (23.3%) were in the age group 51-60 years and 2 (6.7%) were in the age group more than 60 years.

In **Group 2,** 2 (6.7%) patients were in the age group 20-30 years, 8 (26.7%) were in the age group 31-40 years, 7 (23.3%) were in the age group 41-50 years, 8 (26.7%) were in the age group 51-60 years and 5 (16.7%) were in the age group more than 60 years.

In Group 1, majority of the patients were in the age group 41-50 years, followed by 51-60 years. In Group 2, majority of the patients were in the age group 31-40 years and 51-60 years.

The mean age in Group 1 was 48.17 ± 10.08 years and in Group 2 was 49.30 ± 11.20 years. The difference was found to be statistically not significant (p=0.682), showing a comparable mean age between the Group 1 and Group 2.



Graph : Bar diagram showing group wise distribution of age

Table No.5 Group wise distribution of sex

Sex	Group 1		Group 2	
	No.	%	No.	%
Female	12	40.0	14	46.7
Male	18	60.0	16	53.3
Total	30	100.0	30	100.0

Pearson chi-square value = 0.271, df=1, P value = 0.602, Not significant

The above table shows the group wise distribution of sex.

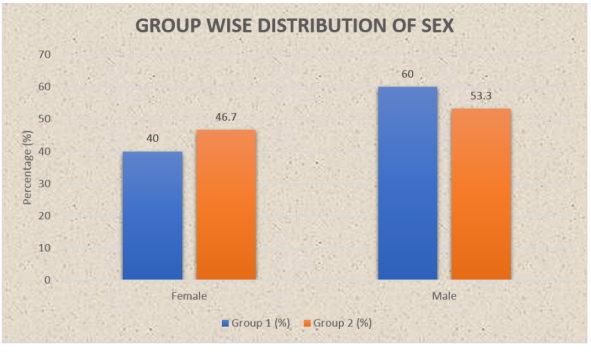
In **Group 1,** 12 (40.0%) patients were female and 18 (60.0%) patients were male.

In **Group 2,** 14 (46.7%) patients were female and 16 (53.3%) patients were male.

In both the groups, there was a male preponderance.

There was no statistically significant association seen between sex and the groups (p=0.602), showing that the groups are independent of the sex of the patients.

There was a comparable distribution of males and females in both the groups.



Graph : Bar diagram showing group wise distribution of sex

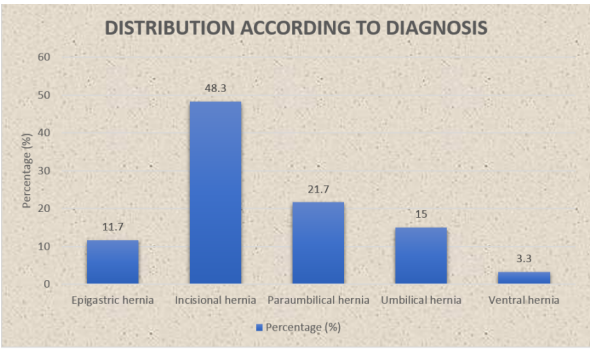
Table No. 6 Distribution according to diagnosis

Diagnosis	Number	Percentage
Epigastric hernia	7	11.7
Incisional hernia	29	48.3
Paraumbilical hernia	13	21.7
Umbilical hernia	9	15.0
Ventral hernia	2	3.3
Total	60	100.0

The above table shows the distribution of patients according to diagnosis.

7 (11.7%) patients had epigastric hernia, 29 (48.3%) patients had incisional hernia, 13 (21.7%) patients had paraumbilical hernia, 9 (15.0%) patients had umbilical hernia and 2 (3.3%) patients had ventral hernia.

Incisional hernia and paraumbilical hernia were the most common diagnosis in these patients underlying hernia repair.



Graph : Bar diagram showing distribution according to diagnosis

Table No. 7 Group wise distribution of diagnosis

Diagnosis	Group 1		Group 2	
	No.	%	No.	%
Epigastric hernia	4	13.3	3	10.0
Incisional hernia	11	36.7	18	60.0
Paraumbilical hernia	10	33.3	3	10.0
Umbilical hernia	4	13.3	5	16.7
Ventral hernia	1	3.3	1	3.3
Total	30	100.0	30	100.0

Pearson chi-square value = 5.713, df=4, P value = 0.222, Not significant

The above table shows the group wise distribution of diagnosis.

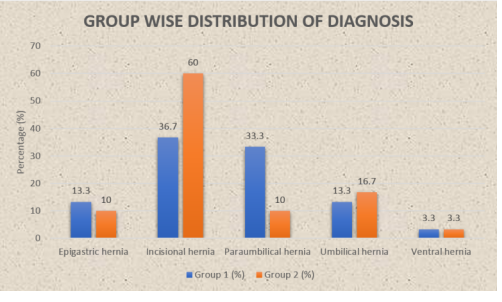
In **Group 1,** 4 (13.3%) patients had epigastric hernia, 11 (36.7%) patients had incisional hernia, 10 (33.3%) patients had paraumbilical hernia, 4 (13.3%) patients had umbilical hernia and 1 (3.3%) patient had ventral hernia.

In **Group 2,** 3 (10.0%) patients had epigastric hernia, 18 (60.0%) patients had incisional hernia, 3 (10.0%) patients had paraumbilical hernia, 5 (16.7%) patients had umbilical hernia and 1 (3.3%) patient had ventral hernia.

In both the groups incisional hernia was the common diagnosis.

There was no statistically significant association seen between diagnosis and the groups (p=0.222), showing that the groups are not dependent on the diagnosis.

There was a comparable distribution of diagnosis between the two groups.



Graph : Bar diagram showing group wise distribution of diagnosis

Table No. 8 Comparison of mean defect size between the groups

Group	Number	Mean ± SD	't' Value	P value
Group 1	30	4.49 ± 1.25	-2.824, df=58	0.006*
Group 2	30	5.59 ± 1.72		

Unpaired 't' test applied. P value = 0.006, Significant

The above table shows the comparison of mean defect size between the two groups.

The mean defect size in Group 1 was 4.49 ± 1.25 mm and in Group 2 was 5.59 ± 1.72 mm. The difference was found to be statistically significant (p=0.006).

The mean defect size was significantly larger in the Group 2 patients in comparison to Group 1.

Graph : Bar diagram showing comparison of defect size comparison

Table No. 9 Comparison of mean duration of surgery (min) between the groups

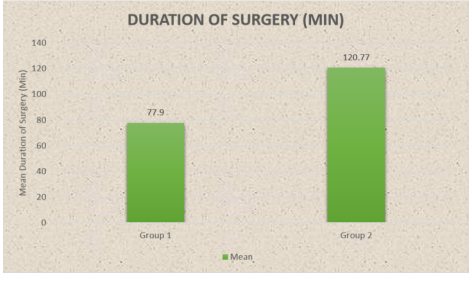
Group	Number	Mean ± SD	't' Value	P value
Group 1	30	77.90 ± 11.12	-9.531, df=58	0.001*
Group 2	30	120.77 ± 21.98		

Unpaired 't' test applied. P value = 0.001, Significant

The above table shows the comparison of mean duration of surgery between the two groups.

The mean duration of surgery in Group 1 was 77.90 ± 11.12 min and in Group 2 was 120.77 ± 21.98 min. The difference was found to be statistically significant (p=0.001).

The mean duration of surgery was significantly higher in the Group 2 patients in comparison to Group 1.



Graph : Bar diagram showing comparison of duration of surgery (min)

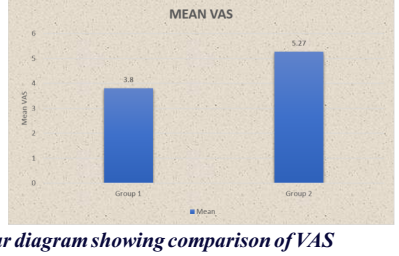
Table No. 10 Comparison of mean VAS between the groups

Group	Number	Mean ± SD	't' Value	P value
Group 1	30	3.80 ± 1.06	-6.201, df=58	0.001*
Group 2	30	5.27 ± 0.74		

Unpaired 't' test applied. P value = 0.001, Significant

The above table shows the comparison of mean VAS between the two groups.

The mean VAS in Group 1 was 3.80 ± 1.06 and in Group 2 was 5.27 ± 0.74. The difference was found to be statistically significant (p=0.001). The mean VAS was significantly higher in the Group 2 patients in comparison to Group 1.



Graph : Bar diagram showing comparison of VAS

Table No. 11 Group wise distribution of hospital stay

Hospital Stay	Group 1		Group 2	
	No.	%	No.	%
<=5 days	8	26.7	1	3.3
6-10 days	17	56.7	9	30.0
>10 days	5	16.7	20	66.7
Total	30	100.0	30	100.0
Mean (±SD)	7.03 ± 2.29		11.03 ± 1.77	
't' value, df	-7.554, df=58			
P value	0.001*			

Unpaired 't' test applied. P value = 0.001, Significant

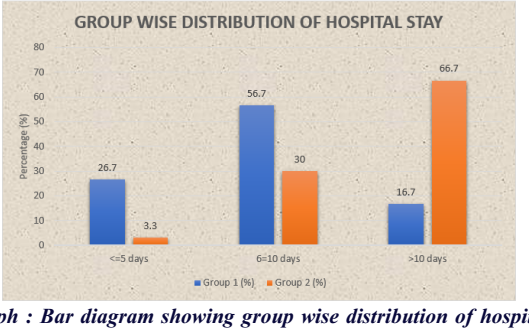
The above table shows the distribution of patients according to hospital stay in relation to the groups.

In **Group 1,** 8 (26.7%) patients had a hospital stay of less than or equal to 5 days, 17 (56.7%) patients had hospital stay between 6-10 days and 5 (16.7%) patients had hospital stay of more than 10 days. The range of hospital stay was 5 to 12 days. Majority of the patients had hospital stay between 6-10 days.

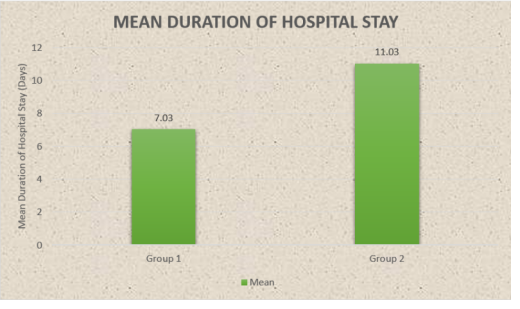
In **Group 2,** 1 (3.3%) patients had a hospital stay of less than or equal to 5 days, 9 (30.0%) patients had hospital stay between 6-10 days and 20 (66.7%) patients had hospital stay of more than 10 days. The range of hospital stay was 5 to 14 days. Majority of the patients had hospital stay of more than 10 days.

The mean hospital stay in Group 1 was 7.03 ± 2.29 days and in Group 2 it was 11.03 ± 1.77 days. The difference was found to be statistically significant (p=0.001).

The mean duration of hospital stay was significantly longer in Group 2 patients in comparison to the Group 1 patients.



Graph : Bar diagram showing group wise distribution of hospital stay



Graph : Bar diagram showing comparison of mean duration of hospital stay

Table No. 12 Group wise distribution according to time to return to normal activity

Return to Normal Activity	Group 1		Group 2	
	No.	%	No.	%
1-2 days	20	66.7	0	0.0
3-4 days	9	30.0	16	53.3
>5 days	1	3.3	14	46.7
Total	30	100.0	30	100.0
Mean (±SD)	2.53 ± 0.94		4.27 ± 0.87	
't' value, df	-7.431, df=58			
P value	0.001*			

Unpaired 't' test applied. P value = 0.001, Significant

The above table shows the distribution according to time to return to normal activities in relation to the groups.

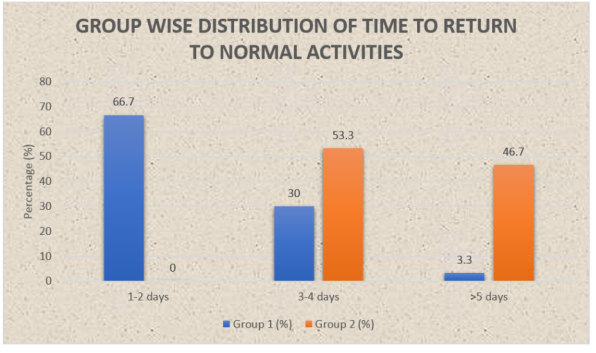
In **Group 1,** 20 (66.7%) patients were able to return to normal activities within 1-2 days, 9 (30.0%) within 3-4 days and only 1 (3.3%) patient required more than 5 days for return to normal activities. The time to return to normal activities ranged from 1 to 5 days.

In **Group 2,** 16 (53.3%) were able to return to normal activities within 3-4 days and 14 (46.7%) patients required more than 5 days for return to normal activities. The time to return to normal activities ranged from 3 to 6 days.

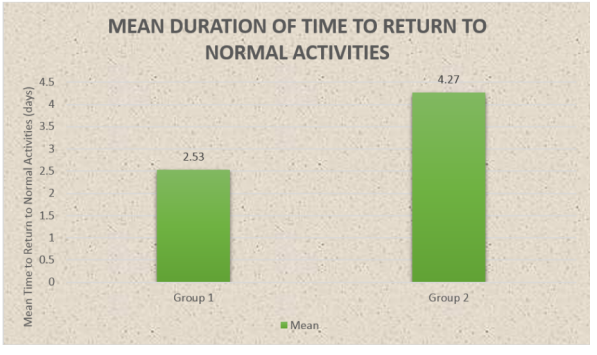
In Group 1, majority of the patients were able to return to normal activities within 1-2 days, while in Group 2, majority of them required 3-4 days.

The mean time to return to normal activities in Group 1 was 2.53 ± 0.94 days and in Group 2 was 4.27 ± 0.87 days. The difference was found to be statistically significant (p=0.001).

The mean time to return to normal activities was significantly lower in the Group 1 in comparison to the Group 2.



Graph : Bar diagram showing group wise distribution of time to return to normal activities



Graph : Bar diagram showing comparison of mean time to return to normal activities

Table No. 13 Group wise distribution of complications

Complications	Group 1		Group 2		Fisher's Exact Test P Value
	No.	%	No.	%	
Wound infection	5	16.7	12	40.0	0.084, NS
Seroma	12	40.0	14	46.7	0.795, NS
Recurrence	0	0.0	0	0.0	

Fisher's Exact Test applied. P value < 0.05 was taken as statistically significant

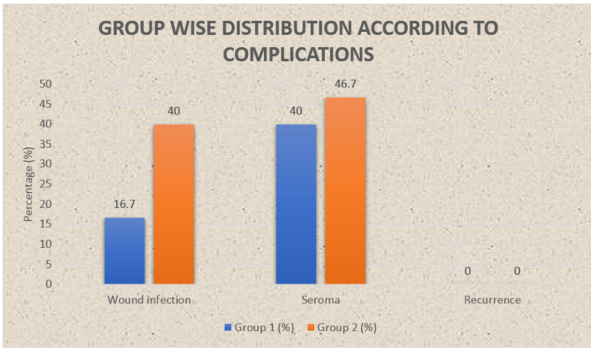
The above table shows the group wise distribution according to complications.

In **Group 1,** 5 (16.7%) patients had wound infection and 12 (40.0%) patients had seroma.

In **Group 2,** 12 (40.0%) patients had wound infection and 14 (46.7%) patients had seroma.

In both the groups, recurrence was not seen.

The percentage of complications was comparable between the two groups (p>0.05).



Graph: Bar diagram showing group wise distribution according to complications

DISCUSSION

Laparoscopic ventral hernia repair was started by LEBLANC in 1993 year, after that researches were done to make laparoscopic surgery easier and safest for ventral hernia repair, with the help of laparoscopic approach large incisions and drain placement can be avoided.

The results of our prospective study revealed that as compared to open repair, laparoscopic repair is associated with shorter duration of surgery, reduced post-operative analgesic requirement and antibiotic requirement.

Duration of hospital stay and return to the normal activity are significantly shorter for laparoscopic repair, then for open hernia repair. The reason for this is because of extensive subcutaneous dissection to have 5 cm mesh cover beyond the hernia defect, which causes more pain, longer duration of surgery, requirement of suction drain for longer period of time, and late return of normal daily activity. The complication rate for laparoscopic repair was very low.

The occurrence of wound infection with seroma formation is less in laparoscopic procedure compared to open repair. Recent analysis also suggested minimal postoperative morbidity, a shorter convalescence period and an acceptable recurrence rate.

The results of our study are quite comparable with studies done by Park et al, Carbaja et al , and Rameshaw et al and the following points were analyzed

TABLE – 1

Observation	Park11		Carbaja12		Rameshaw13		Our study	
	Lap	Open	Lap	Open	Lap	Open	Lap	Open
Operating time (min)	95	78	87	112	56	82	77.90	120.77
Length of stay (day)	3,4	6.5	2.2	9.1	1.7	2.8	7.03	11.03
Infection rate (%)	0	2	0	18	0	3	16.7	40
Seroma rate (%)	4	2	13	67	0	0	40	46.7
Patients	56	49	30	30	79	174	30	30

1. Mean duration of surgery (minutes)

Park et-al Lap-95, open – 78
Carbaja et al. Lap– 87, open – 112
Rameshaw et al Lap – 56, open – 82
Our study Lap – 77.90, open – 120.77
with SD VALUE for lap – 11.12 and for open – 21.98 with p value < 0.001, which is significant.

2. Mean length of stay (days)

Park et al Lap – 3.4, open - 6.5
Carbaja et al. Lap– 2.2, open – 9.1
Rameshaw et al. Lap – 1.7, open – 2.8
In our study. Lap - 7.03, open – 11.03

3. Mean infection rate (%)

Park et al Lap – 00, open - 02

Carbaja et al	Lap – 00, open – 18
Rameshaw etal	Lap–00, open–03
In our study.	Lap- 16, open–40

4. Mean seroma rate (%)

Park et al	Lap – 04, open - 02
Carbaja et al	Lap – 13, open – 67
Rameshaw etal	Lap–00, open–00
In our study	Lap- 40, open–46.7

The results of our study strongly recommend that laparoscopic ventral hernia repair is the procedure of choice in a trained laparoscopic surgeon's hands.

CONCLUSION

The present analytical study of comparative analysis on advantages of laparoscopic ventral hernia repair (IPOM) versus open ventral hernia repair was carried out at Mahatma Gandhi Medical college and Hospital, Jaipur during the period of Jan 2019 to June 2020 Based on the data and results obtained in the present study the following parameters were drawn

1. The average total duration of surgery is less by using laparoscopic intraperitoneal mesh placement
2. The post-operative drainage is nil in laparoscopic approach
3. The post-operative pain is less in laparoscopic approach
4. The postoperative complications are less in laparoscopic approach (seroma, wound infection, recurrence)
5. The shorter hospital stays in laparoscopic approach.
6. Early return to normal work
7. Early mobilization
8. It is even possible to reduce postoperative time, because of standardised techniques, surgeons getting more skill, and use of mesh fixation devices and newer mesh implantation.

So, laparoscopic ventral hernia repair is considered as first line of choice in ventral hernia repair.

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