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Comparative Study between Open and Laparoscopic Ventral Hernia Repair

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ABSTRACT: Patients of symptomatic ventral hernias are classified in two groups based on the treatment modality they received .First group underwent open hernia surgery and second group underwent laparoscopic surgery.Both the groups are evaluated and compared for duration of surgery, intra operative complications, post operative pain using the visual analog score (VAS), post operativecomplications like seroma, hematoma, mesh infection, post operative ileus, length of hospital stay, return to normal activity, reoperation, recurrence and cosmesis.

Intra operative complications, post operative pain using the visual analog score (VAS), post operativecomplications like seroma, hematoma, mesh infection, post operative ileus, length of hospital stay, return to normal activity, reoperation, recurrence and cosmesis ,all these values are in favour of laparoscopic repair of hernias and are statically significant however duration of surgery is less in open repair.

Laparoscopic ventral hernia repair has shown promising results and a clear advantage over repair in regard with reduced post operative pain, decreased post operative complications, reduced length of hospital stay, and less time for return to normal activity and better cosmesis rates. Hence,laparoscopic ventral hernia repair is a safe and feasible alternative to open repair. The drawbackin the study is the time period for the assessment of recurrence rates is short.

I. INTRODUCTION

Abnormal protrusion of a viscous or a part of a viscous lined by a sac through a normal or abnormal opening in the abdominal wall.[1]The advantage of the human being to walk erect, undoubtedly led to cases of vulnerability between the abdominal muscle wall (ability for the expansion) and the hard pelvic bones. They are classified into 2 types based on their visibility: 1. External hernias are those which are visible from outside like epigastric hernia, inguinal hernia etc. 2. Internal hernias are those which are present between two adjacent body cavities like diaphragmatic hernia. Ventral Hernia is a protrusion of an abdominal viscous or part of a viscous through the anterior abdominal wall occurring at any site other than groin. It includes incisional hernias, paraumbilical hernias, umbilical hernia, epigastric hernias and spigelian hernias respectively.[2]For many years, the repair of incisional hernia was associated with a high recurrence rate. In more recent years, the introduction of synthetic prosthetic materials has provided the opportunity to perform a tension free repair, thereby reducing the rate of recurrence.Midline hernia occurring through linea alba abutting superiorly or inferiorly on the umbilicus is called as ―PARAUMBILICAL HERNIA. They are generally acquired lesions. If the defect is small it can be repaired surgically. But large hernias with wide openings are difficult to repair surgically and should be treated with synthetic mesh repair. Epigastric hernia protrude through linea alba above the umbilicus. Approximately 5% of the populations have epigastric hernias. After diagnosis of an epigastric hernia, there is no reason to wait for repair, the chances for incarcerations are high and surgery remains the only permanent cure. Most of the spigelian hernias are acquired and requires surgery as the chances of intestinal obstruction is high.In this modern era of surgery, most of the emphasis is made on decreasing the hospital stay of the patient and also decreasing the post operative morbidity and importance is given to cosmesis. Hence Laparoscopic surgery has gained paramount importance due to its minimally invasive technique, decreased hospital stay and also better cosmesis.

II. MATERIAL AND METHODS

Patients admitted with ventral hernia during July 2019 to June 2020 at Indira Gandhi

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Medical College,Shimla are taken up for study with the help of relevant history, clinical examination and appropriate investigations. Inclusion criteria for our study were: patients presenting with midline ventral hernias who are managed in our hospital with mesh repair are included after taking a written consent.

EXCLUSION CRITERIA: Non mid line hernias like: • Hernia after caesarean section. • Hernia after open appendicectomy. • Spigelian hernia. • Lumbar hernia. • Obstructed hernia.

OBJECTIVES OF STUDY: Compare open ventral hernia repair with laparoscopic ventral hernia with regard to the following factors: • Duration of surgery. • Post operative pain. • Post operative complications. • Post operative hospital stay. • Return to normal activity. • Recurrence. • Cosmesis.

PROCEDURE-

FOR OPEN SURGERY-

Almost all the patients were operated under spinal 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. Themesh 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.

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 veress 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 intraabdominal 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 intracorporeally. 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 transfascial 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 polypropylene sutures at the opposite end. This is mainly done for the easy identification 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.

Outcomes of surgery 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, reoperation and recurrence rates during the follow up. Cosmesis is assessed by a patient satisfaction score on a scale of 1 to 10, where 1 is the best possible result and 10 is the worst possible result.

III. RESULTS

In the present study the patients are grouped into two groups. Group 1: Patients undergoing open mesh repair for ventral hernia. Group 2: Patients undergoing laparoscopic intra peritoneal mesh repair for ventral hernia. The total number of subjects are 50. 25 patients underwent open mesh repair. Among the 25 patients 2 patients underwent abdominoplasty. 25 patients underwent laparoscopic intra peritoneal mesh repair. 1 patient converted to open surgery due to dense adhesions.In the open group, of the 25 patients, 3 (12%) had epigastric hernia, 5 (20%) had umbilical hernia, 6 (24%) had paraumbilical hernia and 11 patients (44%) had incisional hernia. In the laparoscopy group,of the 25 patients, 2 (8%) had epigastric hernia, 8(40%) had umbilical hernia, 7 (28%) had paraumbilical hernia and 4 (24%) patients had incisional hernia.

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In open group maximum number of patients i.e18 (72%) had defect size less than 3x3 cms whereas in laparoscopy group 8 (32%) patients and 10 (40%) patients had defect size less than 3x3 cms and 4x4 cms respectively. P value is 0.212 not significant statistically.

Duration of surgery- In open group, most of the surgeries i.e 16 (51%) patients the duration of surgery was 61 – 100 minutes, while in laparoscopy group 10 (51.6%) patients the duration of surgery was 81 – 100 minutes. The mean duration of surgery in open group is 92.65 minutes while in laparoscopy group it is 94.35 minutes. The P value is 0.443, which is statistically not significant.

INTRAOPERATIVE COMPLICATIONS- In open group, 1 (4%) patient had enterotomy. There was no spillage and hence a mesh was placed. In laparoscopy group, 1 (4%) patient had an accidental injury to the inferior epigastric artery. It was controlled by a transfascial suture. Drain was placed which was removed on post operative day 2.

DISTRIBUTION OF POST OPERATIVE COMPLICATIONS

Complication	**Open group (n=25)**		**Laparoscopy group (n=25)**		**P value**
	Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**	
Overall complications	11	**44**	**5**	**20**	**0.018***
Seroma	10	40	2	8	0.001**
Wound Infection	4	16	1	4	0.053+
Post operative ileus	2	8	3	12	0.454
Mesh Infection	-	-	-	-	-
Deep Vein Thrombosis	1	4	-	-	0.433
Chronic Pain	2	8	1	4	0.588

POST OPERATIVE PAIN- The mean duration of pain was 6.9 days in open group while it is 2.35 days in laparoscopy group. The P value is<0.001 , which is statically significant.

POST OPERATIVE COMPLICATIONS- The overall complication rate in open group was 44%, while in laparoscopy group it is 20%. P value of 0.018, which is significant statistically.

LENGTH OF HOSPITAL STAY- The mean duration of stay for open group is 15.17 days, while in laparoscopy group is 4.64 days. P value is <0.001, which is statistically significant.

RETUN TO NORMAL ACTIVITY- The mean duration for return to normal activity in open group is 29.7 days, and in laparoscopy group is 3.61 days. P value is <0.001 , which is statically significant.

COSMESIS-In the open group the mean score is 4.99 while in laparoscopy group it is 1.71. The statistical analysis is significant.

IV. DISCUSSION

COMPARISION WITH OTHER SIMILAR STUDIES[3-9]

Reference	Patients (n)		Operating time (min)		Length of stay (days)		Post operative complications (%)		Infection (%)		Seroma (%)		Follow up (months)		Recurrence (%)	
Team	Open	Lap	Open	Lap	Open	Lap	Open	Lap	Open	Lap	Open	Lap	Open	Lap	Open	Lap
Holzman et al	16	20	98	128	5	1.6	31	23	6	5	0	5	19	10	13	10
Ramshaw et al	174	79	82	58	2.8	1.7	26	15	3	0	-	-	21	21	7	0
Misra et al	33	33	75	86	1.47	3.43	42.4	21.2	33.3	6.06	3.03	12.1	12.17	13.73	3.3	6.2
Pring et	30	24	43.5	42.5	1.47	1.33	54.17	36.6	16.67	3.3	33.3	16.6	27.5	27.5	4.16	3.3

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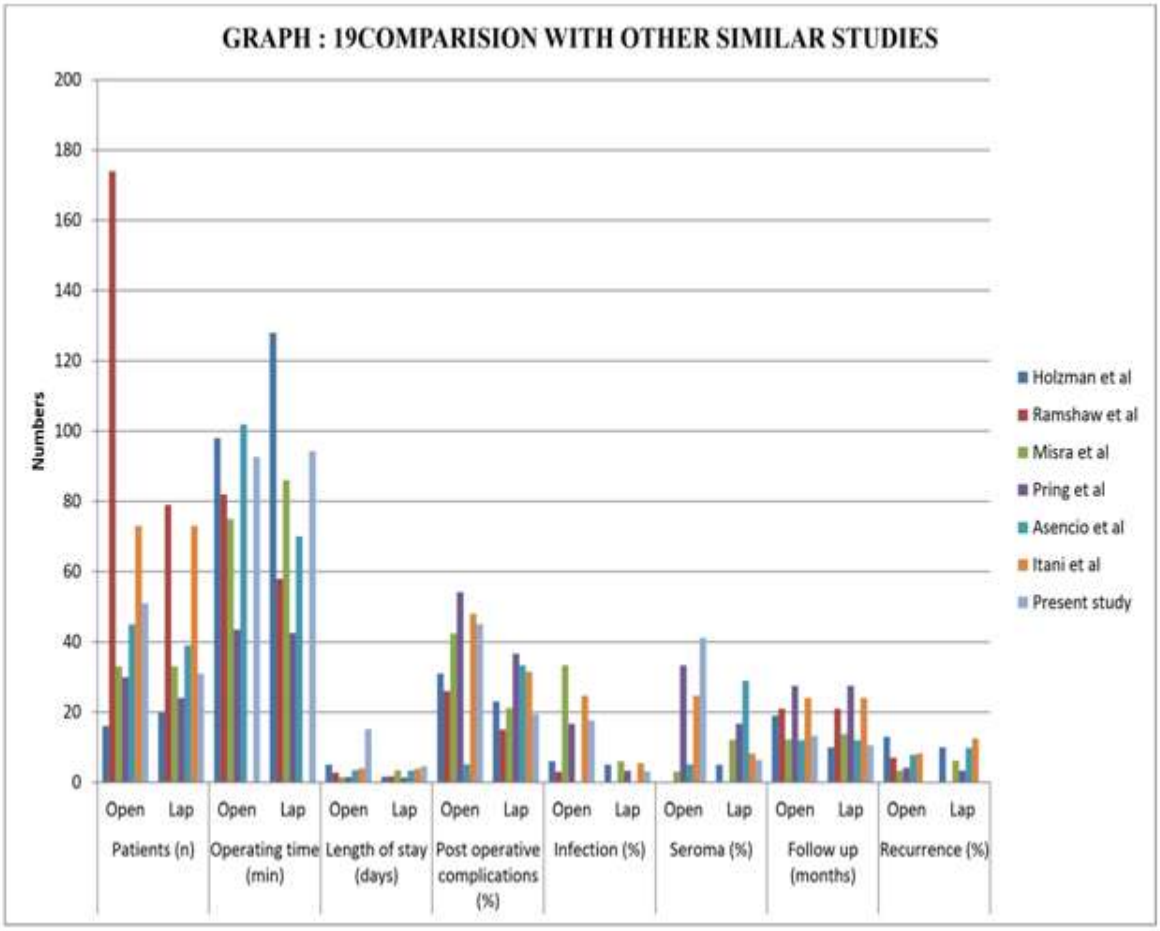
Asencio et Al	45	39	101.88	70	3.46	3.33	5.12	33.3	0	0	5.12	28.89	12	12	7.9	9.8
Itani et al	73	73	-	-	4	3.9	47.95	31.5	24.66	5.47	24.66	8.2	24	24	8.2	12.5
Present study	25	25	92.65	94.35	15.17	4.64	45.09	19.4	17.6	3.2	41.1	6.4	-	-	0	0



The present study is a prospective non randomized study comparing the results of open versus laparoscopic ventral hernia repair in a short term. The present study includes a total of 50 patients, 25 in the open group and 25 in the laparoscopy group. In one of the largest studies conducted by Ramshaw et al there were a total of 253 patients, 174 in open group and 79 in laparoscopy group[4]. In one of the recent RCT conducted by Itani et al in 2010, a total of 146 patients are randomized such that 73 patients underwent conventional repair and 73 underwent laparoscopic repair.[8] In the present study, the mean age is comparable between the two groups: 45.66 yrs in open group and 44.3 yrs in laparoscopy group. In the study conducted by Misra et al in 2006 the mean age of the patients in open group is 45.2 yrs and laparoscopy group is 45.96 yrs.[5] In the present study, majority of patients i.e18 (72%) had defect size less than 3x3 cms in open group whereas in laparoscopy group 8 (32%) patients and 10 (40%) patients had defect size less than 3x3 cms and 4x4 cms respectively. In the study conducted by Misra et al the mean defect size was 42.12 cm2 in open group and 65.66 cm2 in laparoscopy group.[5] In the present study 3 events of intra operative complications have occurred. Two enterotomies are reported in open group when

compared to none in laparoscopy group. Carbajo et al[9] in 1999 in his RCT reported similar results. Asencio et al [7]2009 and Barbaros et al 2006 reported one event of enterotomy each in the laparoscopy group when compared to none in open group. the one intra operative complication that occurred in the laparoscopy group is the bleeding from the inferior epigastric artery, which was controlled by transfascial sutures. Laparoscopic surgery is generally associated with reduced pain. In 4 RCTs (Asencio 2009, Barbaros 2006, Misra 2006, Pring 2008) all reported almost equal incidence of postoperative pain scores in both the groups.

V. CONCLUSION

Laparoscopic ventral hernia repair has shown promising results and a clear advantage over repair in regard with reduced post operative pain, decreased post operative complications, reduced length of hospital stay, and less time for return to normal activity and better cosmesis rates. Hence, laparoscopic ventral hernia repair is a safe and feasible alternative to open repair. The drawback in the study is the time period for the assessment of recurrence rates is short.

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