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Original Research Article

Laparoscopic repairs for anterior abdominal wall hernias

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ABSTRACT

Background: Abdominal wall hernias are familiar surgical problem. Millions of patients are affected each year presenting with most commonly with ventral, incisional, and inguinal hernias. Hernia may be either symptomatic or asymptomatic and may cause pain or are aesthetically distressing. These problems coupled with the risk of obstruction and incarceration are the most common reasons, patients seeking surgical repair of hernias. Laparoscopic repair of hernia demands for significant expertise. Placement of mesh in a sublay position has found to be effective and to have a low recurrence in anterior abdominal wall hernia repairs.
Methods: Prospective study involving 50 patients with anterior abdominal wall hernias undergoing laparoscopic mesh repair in a tertiary center. To determine the usefulness of laparoscopic repairs in the surgical treatment of Anterior Abdominal Wall Hernias (AAWH).
Results: Laparoscopic Ventral Hernia Repair (LVHR) using Intraperitoneal Onlay Mesh Repair (IPOM) technique, and Transabdominal Preperitoneal Repair (TAPP) for inguinal hernias in author's experience was safe, good cosmetic and resulted in short operative time, fewer complications, short hospital stays and no recurrence at 2years follow up. Thus, patients have less morbidity, good quality of life.
Conclusions: Laparoscopic AAWH repair should be considered as the procedure of choice for anterior abdominal wall hernias. Effective, safe and feasible and reproducible technique with avoidance of large incisions and extensive dissections, lower incidence of wound infections, reduced analgesic requirements, early recovery, short length of hospital stay and early return to normal activities.

Keywords: Anterior abdominal wall hernias, Inguinal hernia, Laparoscopic repairs, Ventral hernia

INTRODUCTION

Hernia is a word derived from a Greek word hernos, meaning a branch or protrusion. Hernia is a protrusion of a viscus or part of a viscus through a normal or abnormal opening in the walls of its containing cavity. Abdominal wall hernias are familiar surgical problem. Millions of patients are affected each year presenting with most commonly with ventral, incisional and inguinal hernias. Hernia may be either symptomatic or asymptomatic, and may cause pain or are aesthetically distressing. These problems, coupled with the risk of obstruction and incarceration are the most common reasons, patients seeking surgical repair of hernias.[1]

Ever since the first laparoscopic inguinal hernia surgery by Ralph Ger in 1982 and ventral hernia surgery by Le Blanc in 1993, the procedure has faced many challenges and underwent many modifications till date. To achieve outcomes in comparison with the open repair, laparoscopic repair of hernia demands for significant expertise. Placement of mesh in a sublay position has

found to be effective and to have a low recurrence in anterior abdominal wall hernias, although randomized trials are limited.[2] Objective of this study was to determine the usefulness of laparoscopic repairs in the surgical treatment of Anterior Abdominal Wall Hernias (AAWH), to study various types of anterior abdominal wall hernias (umbilical, para-umbilical, epigastric, groin, incisional hernias) and to evaluate the efficacy and safety, feasibility and reproducibility of the laparoscopic technique in treating defects in the anterior abdominal wall including those of large dimensions.

Elective repair is undertaken to alleviate symptoms and to prevent hernia incarceration. As the result of surgical innovation, the field of hernia has 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 anterior abdominal wall hernias. Recently, the laparoscopic approaches for hernia have increased the options and approaches for repairing the defect.

METHODS

It was a prospective single center study involving total number of 50 patients. All patients aged >18years with anterior abdominal wall hernias undergoing laparoscopic mesh repair in a tertiary center hospital in Mumbai, India from 2012 to 2015.

The patients with any type anterior abdominal wall hernia, willing to undergo laparoscopic repair, who are fit for laparoscopic repair, irrespective of sex and age above 18years were included. The patients with age less than 18years, patients with contra-indications to laparoscopy/ pneumoperitoneum, not consenting to undergo laparoscopic repairs, emergency hernia surgery (incarcerated hernia), abdominal infections, previous pelvic irradiation, patients with severely impaired cardiac or pulmonary status, previous extensive open abdominal surgeries were excluded. Standard laparoscopic equipments were used. Pre-operative evaluation includes complete thorough history taken, examination findings noted, fitness for surgery obtained.

Surgery was performed under general anesthesia. Patients were nil per oral for 8hours, prior to surgery. Antibiotic prophylaxis (IV Cefotaxime 1-1.5gm. at the time of induction) and anesthetic protocol were followed for all patients. Laparoscopic mesh repair was done using the 3-4-port insertion. Pneumoperitoneum was established with CO2 insufflations using Hasson open technique or closed technique. The pressures created as a result of CO2 insufflations was duly noted. eg. 12-14mmHg. The patients were positioned according to the hernia site and the surgeon comfort. Ventral hernia: hernia defect was detected, contents reduced, defect was closed in selective cases where it was feasible and depending on the hernia defect size, adequate size mesh, with 3-5cms overlap from the edge of the defect all around was selected and placed intraperitoneally, Transfascial corner sutures taken using 1-0 vicryl were placed, absorbable tackers were placed in between the corner sutures for ventral hernia defects (Figure 1 to 4).

Figure 1: Transillumination of defect in umbilical hernia.

Figure 2: Intraabdominal view of umbilical hernia defect.

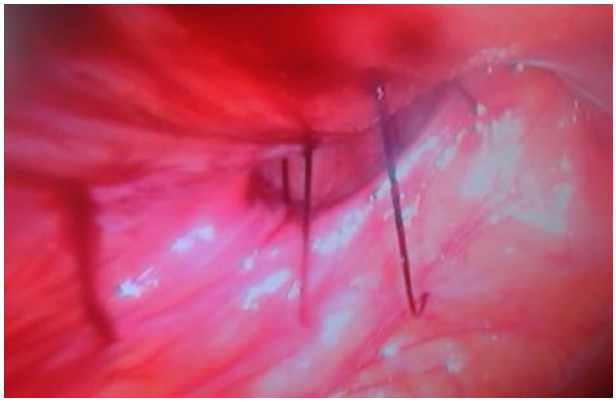

Figure 3: Defect in abdominal wall is closed using suture passer with transfacial sutures (extracorporeal suturing).

Figure 4: Mesh (sepramesh) fixed with tackers.

Inguinal hernia defects: peritoneum was opened at the inner rim of defect, sac separated from peritoneal continuation and sac excised. Peritoneal flap was raised around defect, mesh placed pre peritoneally, conventional poly propylene mesh placed, fixed with tackers, peritoneal flap closed using purse string sutures.

Hemostasis noted, umbilical port sheath was closed with port vicryl suture no.1 and skin was closed with ethilon suture 3-0/ skin stapler. The duration of the surgery was noted.

Post-operatively patients were evaluated for pain and analgesic requirement, return of bowel action, return to enteral feeding, return to normal daily activities, duration of hospital stay and for immediate and late complications. Early ambulation was encouraged and initiation of enteral feed was done within 6hours. Post-operative pain severity accessed by visual analogue score. Patients were discharged within 2 to 3days. Compression bandage was kept for 8days, suture removal was done on post-operative day 8. Follow up after discharge was done at 1week, 1month, 3months and biannually for 2years.

Institutional Ethical Committee clearance was obtained. Source of data collection includes hospital records, patient interview, phone calls. Data thus obtained using a proforma was compiled, analyzed statistically. No proposed funding, no conflict of interest.

RESULTS

The mean age of the patients was 40years, age ranged from 20-70years of all patients who underwent laparoscopic anterior abdominal wall hernia repairs (LAAWH). The minimum age was 20 and the maximum was 65 years. Most of the patients who presented with anterior abdominal wall hernias were aged between 30-40years about 44% (Table 1). Out of 50 patients 32 patients were males i.e. 64% and 18 patients were females i.e. 36%. Among 32 male patients, 27 males had inguinal hernia and 5 had ventral hernia, all females in study belonged to ventral hernias. Inguinal hernias were more common in males, whereas ventral hernias are common in females. Most of the patients in present study population belong to manual labor by occupation, about 46% were manual laborers who were involved in heavy work (Table 2).

Table 1: Age distribution of patients.

Age in years	Number of patients	%
20-30	4	8
30-40	22	44
40-50	18	36
50-60	4	8
60-70	2	4
Total	50	100

Table 2: Occupation distribution.

Occupation	Total number of patients	%
Farmer	8	16
Manual laborer	23	46
Driver	4	8
Housewife	13	26
Student	1	2
Clerk	1	2
Total	50	100

About 36% presented with indirect inguinal hernia, 18% direct inguinal hernia followed by 16% paraumbilical and incisional hernia each, 10% umbilical hernia and 4% epigastric hernia (Table 3).

Table 3: Types of hernia.

Type of hernia	Number	%
Inguinal indirect	18	36
Inguinal direct	9	18
Epigastric hernia	2	4
Umbilical hernia	5	10
Paraumbilical hernia	8	16
Incisional hernia	8	16
Total	50	100

About 69.6% patients with ventral hernia had defect size measuring <3x3cm. only one patient had a size of around 5x5cm who had large incisional hernia through vertical scar of previous caesarean section surgery, 1 patient had size less than 2x2cm belonging to paraumbilical hernia type and 5 patients of <4x4cm defect of incisional hernia (Table 4).

Farmers accounted for 16%, farmers and laborers totally accounted for 62% who were involved in heavy work and housewife's 26% who had other associated risk factors. 88% of patients presented with swelling and 12% with swelling with pain or discomfort in this study. Duration of symptoms-64% of patient had symptoms since 1year (Figure 5).

Table 4: Defect size for ventral hernias.

Ventral hernia defect size	Total number	%
<2x2cm	1	4.35
<3x3cm	16	69.6
<4x4cm	5	21.7
<5x5cm	1	4.35
Total	23	100

Table 5: Predisposing factors for hernia.

Predisposing factors	Total no.	%
Chronic constipation	1	2
Chronic cough	4	8
Strenuous work	21	42
Chronic smokers	3	6
BPH	2	4
BPH with strenuous work	1	2
Chronic cough with strenuous work	1	2
Constipation with strenuous work	1	2
Obesity	8	16
Multiparity	3	6
Previous wound Infection	3	6
NIL	2	4
Total	50	100

About 81.5% had complete inguinal hernia belonging to indirect hernia group and 18.5% had incomplete hernia belonging to direct hernia group of inguinal hernia patients.

Most common predisposing factor in this study group for AAWH occurrence was strenuous work, as most of this study group patients were manual laborers and farmers involved in heavy work explains the cause of hernia, they accounted for 62% together. About 8% had chronic cough with past history of tuberculosis (4 patients) and 6% had chronic smoking history (3 patients) two of them had COPD features.

About 16% of them were obese. One patient had chronic constipation who had hemorrhoidectomy 3years back. 6% of patients had multi parity as risk factors and 4% had mild to moderate BPH (Benign Prostatic Hyperplasia) (urology clearance taken before surgery) and 4% had previous surgical scar over abdomen following emergency LSCS who belonged to incisional hernia group (Table 5). 10% of patients in this study had diabetes mellitus, 12% hypertension.

DISCUSSION

In this study, author included 50 patients with various anterior abdominal wall hernias who underwent laparoscopic repairs with mesh placement in preperitoneal region for inguinal hernias and intra peritoneal onlay fixation for ventral hernias. Farmers and manual laborers totally accounted for 62% in this study, who are involved in heavy strenuous work. In a study by Bay-Nielsen M et al, showed that strenuous work constant and intermittent accounted for 47.2% for inguinal hernias.[3]

In this study, all 100% of patients had swelling as chief complaint. So, swelling was the most common presenting symptom in patients with anterior abdominal wall hernias.

In a study by Liem MS et al, for groin hernias showed 93% had swelling as complaint.[4]

In Bose SM et al, series for ventral hernias 100% of patients had swelling symptoms with 24% presented with swelling with pain.[5] Indirect inguinal hernia was the most common groin hernia and incisional hernia and para umbilical hernia most common ventral hernia in this study.

In a study by Bose SM for ventral hernias 62.86% had incisional hernia, 18.25% had paraumbilical, 12% epigastric, 6.85% umbilical hernias.[5]

In Shakya VC et al, study 88% had indirect inguinal hernia and 12% direct hernia.[6]

In the present study, 69.6% patients with ventral hernia had defect size measuring <3x3cm includes 5 umbilical, 7 paraumbilical, 2 epigastric and 2 incisional hernias. In a study by Heniford BT et al, for ventral hernias, the mean defect size was 118cm^2. Mesh averaging 344cm^2 was used in all cases.[7]

The present general recommendation was a minimum of 3- 5cm overlap from the fascial defect. The main reason for this was the probability of shrinkage of the mesh. In the present study author ensured a minimum of 3-5cm overlap beyond defect edge in all cases. About 62% had strenuous work as predisposing factor for hernia causation in this study. In a study by Liem MS et al, for inguinal hernias, 24% were involved in strenuous work, 10% had COPD, 5% BPH and 5% constipation.[4]

In this study group, females with ventral hernia, most precipitating factor was obesity and multiparity. 16% had obesity and 6% were multipara. This can be attributed to stretching and weakening of anterior abdominal wall musculo-aponeurotic layer and fat penetrates muscle bundles and layers, weakens aponeurosis and favors appearance of hernia in obese patients. Out of eight incisional hernia, 62.5% had previous LSCS history and 37.5% had abdominal hysterectomy surgery in past. It was the infraumbilical midline incision through which herniation occurred in 62.5% of patients. In a study by Bose SM et al, series, 61.53% had infraumbilical midline incision herniation.[5] About 82.72% had midline incision. Midline abdominal incisions are more at risk to develop herniation.

Mesh was placed in 54% in pre-peritoneal space and these patients belong to inguinal hernia group with TAPP surgery was done. 46% of patients with ventral hernia underwent IPOM.

In IOPM, mesh was placed directly under the peritoneum and anchored with trans-abdominal sutures and tacks (Smietanski M et al, 2007).[8]

In present study too, transfascial sutures and tacks were used for ventral hernias. The LVHR (laparoscopic ventral hernia repair) utilizes the principles of the open technique includes using large mesh prosthesis, adequate overlap of the hernia defect and eliminating tension. The mesh was placed intraperitoneally and extensive soft tissue dissection was eliminated (Kannan K et al, 2004).[9]

In about 54% conventional mesh was used, all this mesh was used in inguinal hernia surgery which was placed in preperitoneal region. In 46% composite mesh was used for ventral hernia.

In 56%, mesh size of 6x4" was used to cover defect of inguinal hernia and a defect of around 2x2cm of ventral hernia. Largest mesh used was 6x8" to cover a defect of around 5x5cm with associated small defects of an incisional hernia, 6x6" mesh used to cover defects of around 3x3" and 4x4".

Laparoscopic surgeries are associated with lesser pain and early recovery, in this study, 96% of patients were free of pain at 1week post-operative period and only 4% had a VAS score of 1-5. These 4% of patients were free of pain when they had come for follow up at 1month.

The operating time was one of the important factors in the assessment of the effectiveness of the procedure. In the present study, the operating time ranged between 75min to 150mins in difficult cases due to adhesions and obesity for anterior abdominal wall hernias. Others have reported mean operating time as 90.6 and 117min, whereas in one series average time taken was 65.6min (range 28-130min) (Adotey JM, Kannan K et al, Olmi S et al) for ventral hernias.[9-11]

In a study, by Shakya VC et al, the average operating time for unilateral TAPP was 95.4±12.34min.[6] The mean operative time in this study was 96.15minutes. Parental analgesics was used in all patients for first 24hours, followed by oral analgesics for next 24hours (up to 48hours) thereafter depending on severity of pain oral analgesics were prescribed. Analgesics were prescribed during hospital stay 48-72hrs following surgery, no analgesics were advised for regular intake after discharge. There were no major intraoperative complications and also no mortality in this study. Some study series have reported fewer complications, commonly a seroma in 2-4.4%, pain in 2.5% and sepsis in only 0.25% patients (Olmi S et al, Pierce RA et al, Chelala E et al) for ventral hernias.[11-13]

Author had seroma in 6% patients of laparoscopic ventral hernia repair group of patients and they were treated conservatively.

The suture site pain was present in first 24hours, later reduced, suture site pain may have originated from tissue entrapment during placement of sutures through full thickness of anterior abdominal wall. Possibly due to traction of transabdominal sutures, while fixing the mesh to the anterior abdominal wall. Author noticed less pain in patients when used vicryl sutures and absorbable tacks. But no chronic pain was reported in study group, all patients were free of pain at 1 month follow up, suggesting no nerve entrapments. The pain was also less in TAPP patients in whom mesh was not fixed (20%).

The other major complications following LAAWH, like bowel perforation, mesh infection, skin breakdown, intra-abdominal abscess, recurrences have been documented in literature, but author did not encounter any such complications at 2years follow up in this study.

However, others have reported a recurrence rate of 4% and 2.5% between 1-3months of surgery (Gray SH et al, Olmi S et al). Cobb et al, reported recurrence as 4.7% after a mean follow up period of 21months for ventral hernias.[11,14,15]

One of the main advantages of laparoscopic repair was the decreased wound related complications. There was no wound infection in this study group, however wound infections following laparoscopic hernia repair were reported.

In a study by Oehlenschlager J et al, for laparoscopic inguinal hernias repair, 0.63% wound infection, 2.6% hematoma and 1.9% recurrence were reported.[16] Mesh infection or chronic pain or need of re-surgery was not observed in any of the cases in present study.

Most of the patients were encouraged to walk by 6-8hrs. after surgery. About 36% were mobilized by evening on the same day of surgery i.e. by 6-8hrs. Rest 64% are mobilized by 24hours.

Most of the patients returned to normal activities by 8-10 days following surgery about 70%, rest 30% were able to carry out normal activities by 15 days. About 46% of patients were discharged by 2day post-operative day and 54% by 3rd post-operative day no patient remained hospitalized beyond 3 days following LAAWH repair. Post-operative mobilization, initiation of enteral feed, hospital discharge and return to activities were prompt, with an average hospital stay of 1.5days in the patients and majority of them returned to normal activities by 2 weeks. Mean hospital stay in LVHR has been reported as 2.4 and 3 days (Pierce RA et al, Cobb WS et al). Navitsky YW et al, has described LVHR as an approach of choice for his obese patients with no perioperative mortality, mean hospital stay of 2.6 days and a recurrence

rate of 5.5% at 25 months follow-up. LVHR can be performed in any patient who was a candidate for open repair and with an acceptable risk for general anesthesia (Kannan K et al).[9,12,15,17]

Relatively small study group and the short mean follow up period were limitations in this study. This article/paper serves to show the institutional experience for better awareness and acceptability of laparoscopic anterior abdominal wall hernia repairs procedure.

Although LAAWH repair may be challenging, it has the potential to be considered as a primary approach for most groin, ventral and incisional hernias. LVHR using IPOM technique and TAPP for inguinal hernias in this experience was safe, good cosmetic and resulted in short operative time, fewer complications, short hospital stays and no recurrence at 2 years follow up. Thus, patients have less morbidity and good quality of life. As most of the patients involved in the study were working class involved in moderate to heavy work, laparoscopic repair meant lesser economic impact and decreased loss of man-power hours. The drawback in the study was the time period for the assessment of recurrence rates was short. LAAWH repair should be considered as the procedure of choice for anterior abdominal wall hernias. LAAWH repairs are effective, safe and feasible and reproducible technique with avoidance of large incisions and extensive dissections, lower incidence of wound infections, reduced analgesic requirements, short length of hospital stay, early recovery and early return to normal activities.

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