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Surgery

Ventral Hernias: Our Experience

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Abstract **Original Research Article**

Background: Ventral hernias result from weakness in the musculofascial layer of the anterior abdominal wall. Ventral hernia repairs are the day to day performed procedures in general surgery operation theatres. These can be done other through open or laparoscopic approach. Moreover, there are various options available for mesh placement during the repair. We here report our experience in surgical management of ventral hernias along with review of published literature along with laparoscopic repair of ventral hernias. ***Methods:*** It was a retrospective study of patients who were operated for ventral hernias over a period of 4 years in a teaching hospital of Gurugram. All patients irrespective of age and sex were included. All patients were evaluated by obtaining proper history and performing detailed physical examination and routine blood investigations. Various intra operative and postoperative parameters were observed and reported. Review of published literature was done along with laparoscopic repair of ventral hernias. ***Results:*** The study included 95 patients with 46 males (48.4 2%) and 49 females (51. 58%) with male: female ratio of 1:1.07. The commonest type of hernias encountered were incisional hernias (76.84%), followed by paraumbilical (11. 58%), epigastric (8.42%), umbilical (3.16%). The common index surgeries were gynaecological and obstetrical surgeries. The mean size of defect was 3.36 cm^2. The mean number of defects encountered were 1.4 (1-3). The content of most hernias was bowel loops (56. 84%), followed by omentum (43.16%). Anatomical repair was done in 18.95% of patients and mesh repair was done in 81.05% of patients. Polypropylene was used in all the cases. Onlay fixation was done in 67.53% and sublay in 32.4 7% patients. Suction drain was used in 85.2 6% patients. We met with single episode of accidental enterotomy (1.05%) while dissection which was primarily closed, mesh was placed and postoperative period was unremarkable. The average operative time was 98.30 minutes in our study. The average requirement of analgesia was 6.4 times in our study. Overall postoperative complication rate was 24.21%. Most of them were superficial wound infections (9.47%) and seroma formation (7.37%). All of which were managed conservatively. One of the patient developed mesh infection, but it was successfully managed with regular wound toileting with betadine, hydrogen peroxide and metrogyl-soaked gauze packing of the wound. The mean length of the post-operative hospital stay was 4.22 days (1-18 days). The overall recurrence rate was 7.37% in our study at an average follow-up period of 12.02 months (3-28 months). Anatomical repair showed more recurrence rate (22. 22%) than those with mesh hernioplasty (3.9%). ***Conclusions:*** The ventral hernia repair can be done by open and laparoscopic technique. Each has its own advantages and disadvantages. There is no conclusively guidelines about the superiority of one technique over the other and also no conclusively guidelines for the proper position of mesh placement. It was rightly mentioned in Author's previous article[11] that surgeons should not perform laparoscopic hernia procedure simply because it is relatively new or potentially economic; they should perform only when convinced that it is anatomically and physiologically correct and logical. Surgeons must be proficient in laparoscopic techniques and must have a precise knowledge of anatomy. The clear advantages of open technique is avoidance of general anaesthesia in many cases (as many ventral hernia repairs can be done under local anaesthesia), lesser learning curve, cheap meshes can be used, easy to learn, no requirement of any sophisticated instruments or OT setup and trained staff. The disadvantage of laparoscopic technique includes the requirement for general anaesthesia (as many ventral hernias can be performed with local anaesthesia in open technique), need to transverse the abdominal cavity, prolonged learning curves, requirement of costly meshes and sophisticated equipment and technical staff. However, laparoscopy has advantage over open hernia repair in terms of reduced postoperative pain, decreased postoperative complications, reduced length of hospital stay, less time for return to normal activity and better cosmesis.

Keywords: Hernia repair, Incisional hernia, Laparoscopic, Open, Ventral hernia.

INTRODUCTION

Ventral hernia are occurring as a result of weakness in the musculofascial layer of the anterior abdominal wall [1]. The estimated incidence of ventral hernia is 15-20% [2]. They are classified into incisional, umbilical, paraumbilical, epigastric and spigelian hernia [3, 4]. Most common are incisional hernia after an abdominal operation [5]. It is estimated that 2-10% of all abdominal operations result in incisional hernia [2]. Primary tissue repair can be done in small hernias (<2.5 cms diameter). However, chances of recurrence increases if primary tissue repair is done for larger hernias (> 2.5 cms in diameter). Therefore, the idea of tension free repair using prosthetic mesh is universally accepted. Prosthetic mesh has decreased recurrence to negligible rates [6].

For laparoscopic ventral hernia repair, the mesh is routinely placed in the intra-peritoneal position. However, for open surgery, there are numerous options for mesh placement [7]. Only repair places the mesh on the anterior fascia which typically involves the dissection of flaps and primary closure of the fascia below the mesh. Inlay repair places the mesh in the hernia defect and secure the mesh circumferentially to the edges of the fascia. Sublay repair refers to retro-rectus preperitoneal mesh placement. Finally in underlay repair mesh is placed in intraperitoneal position and secured to the anterior abdominal wall, a technique popularised with the advent of laparoscopy [7].

The ideal position for placement of mesh has not been conclusively established [8, 9]. Polypropylene mesh is regarded as the implant of choice for repairing abdominal wall defects [8, 10]. Here we report our experience in surgical management of ventral hernias. We also reviewed our results with other studies, along with laparoscopic repair of ventral hernias.

METHODS

It was a retrospective study of patients who were operated for ventral hernias over a period of 4 years in a teaching hospital of Gurugram. All patients irrespective of age and sex were included. All patients were evaluated by obtaining proper history and performing detailed physical examination and routine blood investigations. All patients received antibiotic prophylaxis half an hour before surgery. Most patients were operated under spinal anesthesia. Foleys catheterization and nasogastric tube were occasionally used. Anatomical repair was done for smaller hernias (<2.5 cms in diameter) whereas mesh repair was done for larger hernias (>2.5 cms in diameter). In onlay repair, polypropylene mesh was sutured over the anterior rectus sheath, whereas in sublay technique, the mesh was placed in the preperitoneal space. The mesh was fixed with nonabsorbable sutures. Anterior rectus sheath was closed over the mesh by nonabsorbable sutures. Suction drain was placed based on the surgeon's choice.

The patients were started on oral liquids 8 to 12 hours after the surgery in open mesh repair. Soft diet was started thereafter. Good analgesic coverage was provided with injection diclofenac/injection tramadol in early postoperative period which helped in early ambulation and recovery. Patients were encouraged for sitting up in the bed and advised early movements and activity. The wound was inspected for any seroma, hematoma, or infection. The 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.

RESULTS AND OBSERVATIONS

The study included 95 patients with 46 males (48.4 2%) and 49 females (51. 58%) with male: female ratio of 1:1.07. The commonest type of hernias encountered were incisional hernias (76.84%), followed by paraumbilical (11. 58%), epigastric (8.42%), umbilical (3.16%) Table-1. The common index surgeries were gynaecological and obstetrical surgeries Table-2.

Table-1: Demographic parameters.

Variables	Open ventral hernia repair(n=95)
Mean age(range) in years	36.2(14-78) yrs
Gender distribution • Males • Females	 46(48.42%) 49(51.58%)
Male: Female	1: 1.07
Types of hernia • Umbilical • Incisional • Epigastric • Paraumbilical Total	 3 (3.16%) 73 (76.84%) 8 (8.42%) 11 (11.58%) 95 (100%)

Table-2: Index surgery

Index surgery	No. of patients
Peptic perforation	11
Cholecystectomy(kocher's)	7
Enteric perforation	9
Tubercular perforation	9
Ruptured liver abscess	2
Prostatectomy	2
Pyelolithotomy	2
Appendectomy	7
Hysterectomy	10
Caesarean section	8
Post-tubectomy	4
Ovarian cystectomy	2
total	73

The mean size of defect was 3.36 cm^2. The mean number of defects encountered were 1.4 (1-3). The content of most hernias was bowel loops (56. 84%), followed by omentum (43.16%). Anatomical repair was done in 18.95% of patients and mesh repair was done in 81.05% of patients. Polypropylene was used in all the cases. Onlay fixation was done in 67.53% and sublay in 32.4 7% patients. Suction drain was used in 85.2 6% patients. We met with single episode of accidental enterotomy (1.05%) while dissection which was primarily closed, mesh was placed and postoperative period was unremarkable. The average operative time was 98.30 minutes in our study Table-3.

Table-3: Intra-operative parameters

Mean defect size	**3.36 cm^2**
No. of defects	1.4(1-3)
Contents of hernia • Omentum • Bowel loops	 41 (43.16%) 54 (56.84%)
Technique of repair • Anatomical • Hernioplasty	 18/95(18.95%) 77/95(81.05%)
Type of mesh used	Polypropylene
Site of mesh placement • Onlay • sublay	 52/77(67.53%) 25/77(32.47%)
Drain used(no. of patients)	81/95 (85.26%)
Intra-operative complications • Enterotomy	 1/95 (1.05%)
Operative time(in minutes)	98.30 min

The average requirement of analgesia was 6.4 times in our study. Overall postoperative complication rate was 24.21%. Most of them were superficial wound infections (9.47%) and seroma formation (7.37%). All of which were managed conservatively. One of the patient developed mesh infection, but it was successfully managed with regular wound toileting with betadine, hydrogen peroxide and metrogyl-soaked gauze packing of the wound. The mean length of the post-operative hospital stay was 4.22 days (1-18 days) Table-4.

Table-4: Post-operative parameters.

Mean Analgesia required (in terms of no. of times analgesic drug administered)	**6.4(2-10)**
Post-operative complications. • Overall • Superficial wound infection • Deep wound infection • Mesh infection • Flap necrosis • Seroma	23/95, (24.21%) 9/95, (9.47%) 5/95, (5.26%) 1/95, (1.05%) 1/95, (1.05%) 7/95, (7.37%)
Mean Post-operative hospital stay(in days)	4.22 (1-18)

The overall recurrence rate was 7.37% in our study at an average follow-up period of 12.02 months (3-28 months). Anatomical repair showed more recurrence rate (22. 22%) than those with mesh hernioplasty (3.9%) Table-5.

Table-5: Follow-up and recurrences

Follow-up(in months)	12.02(3-28 months)
Recurrence rate • Overall • Anatomical repair • Hernioplasty	 7/95(7.37%) 4/18(22.22%) 3/77(3.90%)

Fig-1: Incisional hernia post-appendectomy (perforated)

Clinical pictures

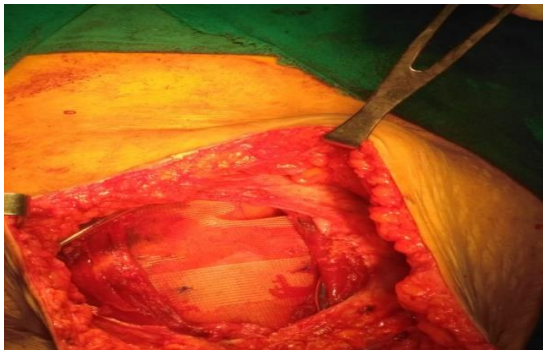

Fig-2: Onlay repair with suction drain

Fig-3: Infected wound with exposed mesh

DISCUSSION

Ventral hernia in the anterior abdominal wall includes both spontaneous and most commonly, incisional hernia after an abdominal operation[5]. Since the success of hernia repair surgery is usually reflected in terms of hernia recurrence after the repair, hernia recurrence is distressing to the patient and embarrassing to surgeons. The use of prosthetic mesh has revolutionized the field of hernia repair by providing tension free repair. More recently with introduction of laparoscopy in the field of surgery, the trend of laparoscopic ventral hernia repair is on rise. But with disadvantages of requirement for general anaesthesia (as many ventral hernias can be performed with local anaesthesia in open technique), need to transverse the abdominal cavity, prolonged learning curves, requirement of costly meshes and sophisticated equipment and technical staff makes laparoscopic hernia repair account for minority of cases performed worldwide [11]. However, laparoscopy has advantage over open hernia repair in terms of reduced postoperative pain, decreased postoperative complications, reduced length of hospital stay, less time for return to normal activity and better cosmesis[12].

The present study consisted of 95 patients, 46 males and 49 females with male: female ratio of 1:1.07. The commonest index surgery reported was gynaecological/obstetrical surgery. Most common site of ventral hernia was lower abdominal; again reflecting higher incidence of gynaecological/ obstetrical surgery.

The mean operation time in our study was 98.30 minutes, which is longer than that published in literature for laparoscopic ventral hernia repair surgery, which reflects the more time involved in dissection and securing haemostasis (95 minutes in Park *et al*., [13], 87 minutes in Carbaja *et al*., [14], 56 minutes in Rameshaw *et al*., [15], 55 minutes in Badiger S *et al.,* [16]). With respect to intraoperative complications, there was single episode of inadvent enterotomy while dissection which was primarily closed as it involved no spillage, mesh was placed and later postoperative period was uneventful.

The overall incidence of wound infection in our study was 24.21%. Since the amount of tissue dissection needed in open ventral hernia repair is more, the chances of wound related complications is more. Such complications are lower in laparoscopic ventral hernia repair as it does not need much of abdominal wall dissection. Most of the wound infections can be managed conservatively by local wound toilets and antibiotics. Removal of mesh is rarely required. For open mesh repair, the wound related complications range from 3.5%-18% [17-29], with an average of 8.1%; whereas for laparoscopic repair it is overall 2% [17, 11, 30-33].

The average number of times the analgesic drug administered in our study was 6.4. The literature [34, 35, 17, 11] reported a lower rate of requirement for analgesia in laparoscopic hernia repair than open technique as it involves lesser tissue dissection and avoidance of sutures as done in open ventral hernia repair. For the similar reason the early ambulation and hospital stay is prolonged in open ventral hernia repair then in laparoscopic repair.

Our study reported an average of 4.22 days as mean length of postoperative hospital stay for open ventral hernia repair. Syed JF Qadri *et al.*, [17] reported 1.53 days as mean hospital stay in laparoscopic incisional hernia repair group compared to 4.33 days in open hernia repair group. Similarly, Park *et al.*, [14] reported 3.4 days for laparoscopic repair group and 6.5 days for open hernia group; Rameshaw *et al*., [15] reported 1.7 days for laparoscopic repair group and 2.8 days for open hernia repair; and Badiger S *et al.*, [16] reported 2.6 days for laparoscopic repair group and 6.8 days for open repair group.

In various studies of open and laparoscopic incisional hernia repair, the recurrence rate reported is 0-12.5% for laparoscopic repair, with an average of 5.97 %; and 0-13% for open technique with an average of 6.22 % [36-41, 12]. Ramshaw *et al.*, [37] reported a recurrence rate of 7% in open group and 0% in laparoscopic group at an average follow up for 21 months for each group. Pring *et al.*, [39] reported a recurrence rate of 4.16 in open group and 3.3% in laparoscopic group at an average follow-up period of 27.5 months for each group. Itani *et al.*, [41] reported a recurrence rate of 8.2 % in open group and 12.5% in laparoscopic group at an average follow-up period of 24

months. Thota *et al.*, [12] reported a recurrence rate of 0% in both open and laparoscopic repair group at an average follow-up period of 13.25 months in open group and 10.5 5 months laparoscopic group.

Thus, in conclusion, the ventral hernia repair can be done by open and laparoscopic technique. Each has its own advantages and disadvantages. There is no conclusively guidelines about the superiority of one technique over the other and also no conclusively guidelines for the proper position of mesh placement. It was rightly mentioned in Author's previous article [11] that surgeons should not perform laparoscopic hernia procedure simply because it is relatively new or potentially economic; they should perform only when convinced that it is anatomically and physiologically correct and logical. Surgeons must be proficient in laparoscopic techniques and must have a precise knowledge of anatomy.

The clear advantages of open technique is avoidance of general anaesthesia in many cases (as many ventral hernia repairs can be done under local anaesthesia), lesser learning curve, cheap meshes can be used, easy to learn, no requirement of any sophisticated instruments or OT setup and trained staff. The disadvantage of laparoscopic technique includes the requirement for general anaesthesia (as many ventral hernias can be performed with local anaesthesia in open technique), need to transverse the abdominal cavity, prolonged learning curves, requirement of costly meshes and sophisticated equipment and technical staff. However, laparoscopy has advantage over open hernia repair in terms of reduced postoperative pain, decreased postoperative complications, reduced length of hospital stay, less time for return to normal activity and better cosmesis.

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