

Laparoscopic Ventral Hernia Repair Using Intraperitoneal Onlay Polyester Mesh Alone

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ABSTRACT

Background: Although the standard practice in laparoscopic ventral hernia repair is placing a dual mesh so as to prevent visceral adhesions to the mesh but majority of the patients cannot afford the cost of these meshes. We propose simple polyester mesh with omentum as a cheap and effective alternative to the dual mesh.

Methods: This is a retrospective review of a prospectively maintained database and is conducted at one private and one teaching hospital of Lahore. The case records of all patients presenting with ventral hernia with a defect size of more than 4cm were eligible. Those unfit for GA or with a defect size of 15 cm or more with or without skin ulceration or bowel fistulation or loss of domain were excluded. All patients received standard preop prophylaxis for wound infection and DVT.

Results: From the period March 2007 to Sep 15, 2008; 18 patients underwent Laparoscopic intraperitoneal onlay mesh repair (IOM). Male to female ratio was 3:2. Mean age was 35 with age range of 19 to 73. There were 5 Primary paraumbilical hernias and 4 incisional hernias. All the rest were primary midline hernias with multiple defects. Two patients underwent Dual polyester mesh (Parietex composite) whereas all other patients underwent simple polyester mesh with omentum sandwiched between abdominal wall and viscera. Average operating time was 75 minutes. Seroma formation was the commonest complication whereas port site infection happened in 10% patients. There are two recurrences; both in the simple polyester mesh group, with a minimum follow up of 6 months but were not statistically significant. No mesh infection happened in this period of time. One case had prolonged ileus but it resolved with conservative management.

Conclusion: Laparoscopic hernia repair is a useful technique especially in obese patients with hidden defects or multiple previous operations. Simple polyester mesh with omental barrier is a safe and cheap alternative to the dual mesh technique.

Key words: Ventral hernia, dual mesh, laparoscopy

INTRODUCTION

The goals of a new technique for ventral hernia repair should be to decrease the high recurrence rates and the associated problems of conventional open hernia repair. The recurrence rates after open ventral herniorrhaphy range from 25% to 52%¹. The use of prosthetic material in open ventral herniorrhaphy has decreased this recurrence rate but with it comes complication of the mesh such as infection^{2,3}.

There have been several well-received series that have reported comparatively lower infection and recurrence rates in the laparoscopic approach to ventral hernia repair⁴⁻⁶. Although the standard practice in laparoscopic ventral hernia repair is placing a dual mesh so as to prevent visceral adhesions to the mesh but majority of the patients cannot afford the cost of these meshes. In this study we share our initial experience with simple polyester,

mesh with omentum as a cheap and effective alternative to the dual mesh for laparoscopic ventral hernia repair.

METHODS

There were a total of 18 patients who underwent LVHR between the period of March 2007 to Sep 2008. These were performed by general surgeons who have a special interest in laparoscopic hernia repair. All patients presenting with ventral hernia with a defect size of more than 4cm were eligible. Patients who had inguinal hernias, obstructed or strangulated hernias, and those with intra-abdominal sepsis were excluded from the laparoscopic repair. Those unfit for GA or with a defect size of 15 cm or more were also excluded. The patient's age, sex, hernia type and co-existing medical problems were noted. The hernia defect size, prosthetic material used in the repair, and method of fixation of the prosthesis were recorded. The above data together with length of postoperative stay, peri-operative and post-operative complications

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were all recorded in a database and analyzed. The angled (30 degrees) 10mm laparoscope was used in all cases. Pre-operative prophylactic antibiotics were given in all cases. All patients were catheterized to decompress the urinary bladder. Gastric decompression was achieved by placement of a nasogastric tube.

The patients were given general anesthesia and placed in a supine position. Access to the abdomen was accomplished by means of either the close technique by placing the veress needle in the left hypochondrium or guided entry with a visiport clos. Adhesiolysis was done using only sharp dissection with minimal use of diathermy or ultrasonic energy. This was to avoid inadvertent thermal injury to the bowel. The hernia contents were reduced but the peritoneal sac was left in-situ. The margins of the hernia defect were delineated and measured internally with the help of spinal needle. The mesh was tailored such that it would overlap the defect by 3cm to 4cm on all sides. Sutures were placed at eight places using prolene 2-0 for the corners and vicryl 2-0 in between making a total of eight sutures so as to achieve secure attachment to the anterior abdominal wall. The mesh was then introduced into the abdominal cavity via the 10mm port. A larger port was used for the very large mesh. Omentum was then sandwiched between abdominal wall and viscera. After the mesh was positioned intraperitoneally, the sutures were passed through the anterior abdominal wall using a laparoscopic suture passer. The sutures were tied down and secured at two points. The circumference of the mesh was then tacked to the posterior fascia at intervals of 1cm. Drains were not inserted. The wound was infiltrated with a long acting local anaesthetic agent post-operatively in all patients.

RESULTS

The 18 patients in our data analysis were 12 men and 6 women, with a mean age of 35 (range 19-73) years. In our series, hypertension, diabetes, asthma and hypothyroidism were the most common co-existing medical conditions. They bore no co-relation to the presence of hernia in this group of patients. Of the hernia types, there were 5 Primary paraumbilical hernias and 4 incisional hernias. All the rest were primary midline hernias with multiple defects. About 50% (n=9) of the patients had a single abdominal wall defect, and the rest had multiple defects. Two patients underwent Dual polyester mesh (Parietex composite) whereas all other patients underwent simple polyester mesh.

All the patients in the series were operated on as elective cases, with successful completion of the

procedure laparoscopically in all cases. No additional procedures were carried out during the herniorrhaphy. Intraoperative blood loss was negligible. The mean operative time was 75 minutes (range 55-180 minutes). The mean size of the mesh was 225 cm² (range 66-900 cm²). The mean post-operative length of stay was 4.0 days (range 1-10 days). In our series, the overall complication rate was 10.0%.

Seroma formation was the commonest complication whereas port site infection happened in 10% patients. The seromas were not aspirated and allowed to resolve spontaneously. Port site infection was also managed with oral antibiotics.

There are two recurrences; both in the simple polyester mesh group, with a minimum follow up of 6 months, giving a recurrence rate of 11.1%. Two cases of mesh infection happened in this period of time ultimately leading to removal of the mesh. One case had prolonged ileus but it resolved with conservative management.

DISCUSSION

An incisional hernia develops in 3% to 13% of patients following a laparotomy, and is the most common long-term complication following abdominal surgery⁷. A lasting surgical correction of a ventral hernia thus remains a challenge. Open primary suture repair has led to extremely high recurrence rates. For a fascial defect equal to or more than 4cm in size, the recurrence rate exceeds 40%. For a fascial defect less than 4cm in size, the recurrence rate can be as high as 25%⁸. The use of prosthetic mesh came into popularity after it was shown that the long-term failure rate could be reduced to 11% to 21%⁸⁻¹⁰. However, the placement of mesh typically required extensive soft tissue dissection, raising of flaps and insertion of drains. This in itself increased the incidence of wound infections and local wound complications^{4,11,12}.

The laparoscopic repair of ventral hernia utilizes the principles of the open technique popularized by Stoppa, Rives et al, and Wantz^{9,13,14}. These principles include using large mesh prosthesis, adequate overlap of the hernia defect, and eliminating tension. In the laparoscopic technique, the mesh is placed intraperitoneally and extensive soft tissue dissection is eliminated. It has been shown, based on widely quoted comparative studies, that with LVHR wound complication rate, patient discomfort, length of hospital stay, time to return to normal activities and recurrence rates are all reduced^{10,15,16}. LVHR has also been established as a cost-effective procedure, with total facility costs for the laparoscopic repair

being significantly lower than that for the open repair¹⁷.

Intra-abdominal placement of a large mesh with wide overlap of defects, use of smaller incisions, laparoscopic adhesiolysis to uncover small impalpable defects that may go unnoticed with open repair, and use of large non-absorbable sutures for stronger patch fixation could account for the greater success of the laparoscopic operation⁵. In our series, the patients as a group had a good outcome. Despite an early experience with this technique, there were no conversions to open surgery. The mean operative time was about 75 minutes, with a single case taking about 180 minutes due to dense intra-abdominal adhesions. This time is longer than most mean operative times reported in other series, which range from 82 to 97 minutes^{5,7,10,18}. This is attributable to the more careful and meticulous approach adopted by the surgeons in the execution of a new procedure.

There were also no operative mortalities or major complications in our series. Seroma formation was the most common post-operative complication, which was defined as any bulge at the operation site observed by the surgeon or the patient. It is considered significant if it lasts more than six weeks. We found that all of them resolved without treatment within six weeks. Heniford et al recommend aspirating seromas, in patients who are symptomatic; but allowing the others to resolve spontaneously⁶.

We also observed that seroma at the site of hernia repair and suture site pain were the most common minor complications reported in other series as well^{7,15,19}. The suture site pain experienced may have originated from tissue or nerve entrapment during placement of sutures or tacks through the full thickness of the anterior abdominal wall. It could also have resulted from traction of the transabdominal sutures fixing the mesh to the anterior abdominal wall. However, suture placement is vital to the long-term durability of the mesh repair and we do not advocate any change in the technique. Suture site pain can be managed conservatively but the possibility of traction on the mesh from a large, heavy abdominal apron of fat and subsequent detachment must be borne in mind, as was the case in one of our patients.

The major complications following LVHR are well documented. These include enterotomy, mesh infection, skin breakdown, intra-abdominal abscess and mortality. The overall complication rates range from 0% to 24% (Table II). The recurrence rate in our series was 11.0%, with 2 recurrences. Given that 66% to 90% of recurrences occur within two years after operation, our mean follow-up of about 12 months is acceptable, and we do not expect the recurrence rate in this series to change markedly^{8,20}.

Recurrence rates following laparoscopic repair in other series range from 0% to 11% (Table II).

90% of the hernias in our series were repaired with simple polyester mesh; with two repairs utilizing Dual polyester mesh (Parietex composite). Both types of mesh have been observed to cause severe bowel adhesions, with subsequent intestinal erosion and fistulisation^{4,19-25}. It is therefore recommended that mesh materials be separated from the intestine, whenever possible^{15,20,27}.

Majority of the surgeons agree that a Dual Mesh with one rough surface and other smooth surface facing the intestine is the mesh of choice in LVHR. The smooth side placed directly adjacent to the bowel has a pore size of 3µm, resulting in minimal tissue attachment; while the other side has an average size of 22 µm, allowing tissue in growth and attachment to the anterior abdominal wall. There have been no reported cases in the literature of erosion or fistulation with the use of the Dual Mesh. However, dual meshes cost more and are opaque, making laparoscopic work expensive and slightly harder.

We have therefore recommended through over experience the use of omentum as a protective barrier to prevent the adhesions between the mesh material and bowel. The placement of omentum as a sandwich between the posterior abdominal wall and the abdominal viscera has shown to give similar results to that seen with a dual mesh. This has brought down the cost of laparoscopic ventral hernia repair markedly and has thus made this procedure cost effective and affordable; especially in our country where the cost of medical treatment are borne by the patient themselves.

LVHR can essentially be extended to any patient who is a candidate for open repair and with an acceptable risk for general anaesthesia²⁸. As experience increases, LVHR can be safely extended to patients with multiple prior abdominal procedures and atypically-located hernias. Incarceration is not a contraindication as onset of anaesthesia, muscle relaxation and introduction of pneumoperitoneum make reduction easy. The procedure should however be generally avoided in children.

The data derived from our first 18 patients represents the first local series on laparoscopic ventral hernia repair in Pakistan using simple polyester mesh with omentum as barrier. In our series, we have found this procedure to be technically feasible, safe and effective, with good clinical outcome for our patients. The possible limitations in our series are the relatively small study group and the short mean follow-up period. The concept of LVHR has developed considerably since it was first described by LeBlanc in 1993²⁹. This paper

serves to share our experience and it is hoped that by doing so, there will be better awareness and acceptability of the procedure.

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