

Original Research Article

Laparoscopic ventral hernia mesh repair without the use of transfascial sutures: our experience

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ABSTRACT

Background: Repair of the abdominal wall defects can be quite challenging even for most experienced surgeon under best of conditions. In the laparoscopic method there have been many modifications with regard to the type of mesh and methods of fixation. The aim of this study was to identify immediate post-operative pain and the long-term outcomes of laparoscopic ventral hernia mesh repair without the use of transfascial sutures to fix the mesh.

Methods: A total of hundred (n=100) patients underwent Laparoscopic Ventral Hernia Mesh Repair by our surgical unit between January 2011 and December 2015. All patients underwent standardized Laparoscopic mesh repair with light weight composite meshes and without the use of transfascial sutures. Only absorbable tackers were used to anchor the mesh. Analgesics stopped after 24 hours or given only on demand. Mesh fixation time, post-operative pain score (visual analogue score), and follow up for pain and recurrence (at 6 months, 12 months and 24 months) were recorded and analyzed.

Results: Out of 100 patients (42 men and 58 women), the mean age was 48 years and BMI of the patients was 20-35. Types of hernias operated were 63 para umbilical hernias, 32 incisional and 5 recurrent hernias. The median defect size was 5 cm (Range 3-8 cm) and the mesh sizes used were 15 x 15 cm circular (87) and 15 x 20 rectangular (13). The median mesh fixation time with only absorbable tackers was 15 mins (range 15-20 mins). Visual analog scale for pain (VAS) was of median 1 (Range 0-2) at 24 hours. Five patients required analgesics for 48 hours. No patients complained of pain at follow ups (1 month, 6 months, 12 months and 24 months). Mean hospital stay post operatively was 2-3 days. Only one patient had recurrence of hernia within 6 months

Conclusions: Laparoscopic Ventral Hernia Mesh Repair without the use of transfascial sutures is an easy and feasible approach. The use of only absorbable tacks to fix the mesh is time saving and gives less post-operative pain. However, randomized controlled trials are required to compare transfascial sutures with absorbable tacks for fixing the mesh in separate cases to reach a standardized method.

Keywords: Absorbable tackers, Laparoscopic ventral hernia mesh repair, Transfascial sutures

INTRODUCTION

Repair of the abdominal wall defects can be quite challenging even for most experienced surgeon under best of conditions. Majority of patients with ventral hernia require repair by some method although there are no guidelines as to which hernia needs intervention.

Laparoscopic Ventral hernia mesh repair (LVHMR) was first reported by Le Blanc and Booth in 1993¹ and since then the procedure has gained popularity with the belief that it may shorten the hospital stay, improve patient outcomes, fewer complications, early return to work and importantly reduced recurrence rates. Even in the laparoscopic method there have been many modifications

with regard to the type of mesh and method of fixation. Though technique of laparoscopic repair of ventral hernias has almost been standardized, the ideal mesh, management of the defect and fixation techniques are still areas of debate.²⁻⁵

An ideal mesh should include adhesion prevention on one hand and excellent fibrous ingrowth on the other hand. Composite light weight meshes are designed to preserve parietal tissue ingrowth while preventing adhesions to the visceral surface of the mesh.^{1,2,6-8}

Studies have shown that the primary closure of the hernial defect allows better to reinforce the wall, to reduce the dead space and the possibility of formation of seromas.⁹⁻¹²

There is no description of a standard technique of mesh fixation. The use of transfascial sutures in the laparoscopic repair of incisional hernia has considerably facilitated the accurate intraperitoneal placement and fixation of the synthetic mesh.

Despite the benefits associated with this technique, several (minor) complications have been documented including prolonged abdominal wall pain caused by the use of transfascial sutures. Some studies have suggested that transfascial suture fixation causes more pain.⁷ Sutures penetrate through the full thickness of the abdominal wall musculature and fascia. This has been theorized to cause local muscle ischemia resulting in severe pain postoperatively.¹³

Author's report their experience (2011-2015) in the treatment of consecutive 100 cases of ventral hernia by laparoscopy without the use of transfascial sutures. Although roughly 7% of cases occur in patients younger than 50 years of age, the incidence of colon cancer in the general population increases exponentially after the fifth decade of life.⁶

The male to female ratio is 5:3. Aim of the present study was to explore the disease on clinical presentation, histopathological typing and grading, to determine the nature of surgical procedure and other therapeutic options and to know the outcome of disease.

The aim of this study was to identify immediate post-operative pain and the long-term outcomes of laparoscopic ventral mesh repair without the use of transfascial sutures to fix the mesh.

METHODS

All the patients (n=100) undergoing LVHMR were studied during the period of 4 years from 1 January 2011, by single unit at department of general and minimal access surgery, Manipal Hospitals, Bangalore. The patients were interviewed for detailed clinical history according to a definite Performa.

Inclusion criteria

Consecutive patients presenting with any ventral hernia, hernia defect diameter of 8 cm or less at its greatest diameter and fit for surgery.

Exclusion criteria

- patients unfit for general anesthesia
- BMI >45 kg/m²
- hernia defects more than 8 cm
- pregnancy and contaminated abdominal cavity.

All the patients were clinically examined, underwent abdominal ultrasound, routine blood investigations and pre-anesthesia evaluation. There were 42 men and 58 women of median age of 48 years (range 24-65 years). The median Body mass index (BMI) was 26 (range 20-35). Types of hernias operated were 63 para umbilical hernias, 32 incisional and 5 recurrent hernias. The median hernia defect was 5 cm (range 3-8cm).

Informed written consent and with pre-anesthesia preparation the patients were taken up for the surgery. General anesthesia was used with endotracheal intubation in all patients. Patient in supine position, pneumoperitoneum was created with a Veress needle at the Palmer's point (2 cm below left subcostal margin in mid-clavicular line).¹⁴ A 5 mm port introduced at the level of umbilicus in the left flank. Under vision two further ports introduced, one 10mm in epigastric region (for 30° laparoscope) and another 5 mm in the right flank at the level of umbilicus.

In uncomplicated hernias, using harmonic scalpel, monopolar diathermy, bipolar or scissors adhesiolysis done and hernia sac contents (omentum or bowel) reduced. In smaller defects of less than 5 cm closure of the defect was not done, to prevent tension of the tissue. In hernia with bigger defects up to 6 cm, closure of the hernia defect done with non-absorbable synthetic material using exterior suture retrieval technique.

In cases of complicated hernias, like irreducible with big defects more than 6 cms and Swiss cheese multiple defects with bowel contents, hybrid techniques were used. In such cases, Laparoscopic adhesiolysis was performed, followed by opening the hernia from outside, excising the sac, closure of the defect in layers. Subsequently closing the wound and placing intraperitoneal laparoscopic mesh.

The mesh sizes based on the defect used were 15 x 15 cm circular (86) and 15 x 20 rectangular (14). The size of the mesh had to overlap the defect from all sides by 4-5 cm. Abdomen desufflated and skin marked around the defect using the mesh template. Pneumoperitoneum re-created and mesh deployed via the 10 mm port site. Two prolene sutures (at caudal/cephalic ends) were used to lift the mesh up on the anterior abdominal wall. Absorbable

tackers were then used to anchor the mesh in each case. Double crown technique was applied, that is two circular rows of tacks, one row at the extreme periphery of the mesh all around and second row of tacks around the margins of the hernia defect¹⁵. The distance between each tack was about 2-3 cm. The two prolene sutures were not tied, pulled and cut at the level of skin after anchoring the mesh with tackers. The median mesh fixation time with only absorbable tackers was 15 mins (range 15-20 mins). The abdomen was desufflated and skin closed with either absorbable subcuticular sutures or non-absorbable synthetic sutures. Pressure dressing applied for 48-72 hours.

The patients were mobilized the same day. Visual analogue score was evaluated at 6 hours and 24 hours. After 24 hours the patients were given analgesia only on demand. IV antibiotics were given as protocol, one dose before surgery and two doses after. The oral feeding was resumed same day for clear liquids, first post-operative day (POD) patients were put on liquid diet and second POD patients were given solids and sent home by evening.

The patients were sent home on 2nd or 3rd post-operative day with abdominal binder. After discharge the patients were followed up in the outpatient clinic at 1 week (for suture removal), 6 months, 12 months and 24 months. Postoperative complications such as pain, seroma, wound infection or recurrence were noted.

RESULTS

Out of 100 patients (42 men and 58 women) that underwent LVHMR the median age was 48 years (range 24–65 years). The median Body mass index (BMI) was 26 (range 20 -35).

Table 1: Demographic data.

Parameters	Values
Sex	
Male	42
Female	58
Age (median - 48)	
20-30	10
31-40	26
41-50	34
51-60	24
61-70	6
BMI (Body Mass Index) (median - 26)	
20-25	42
26-30	48
31-35	10

Patients with Dukes A stage did not receive postoperative chemotherapy and were advised regular follow up. 38 patients received post-operative chemotherapy. 18 patients were given radiotherapy. New evidence suggests

a role for anti-inflammatory drugs in the treatment and prevention of colon and rectal cancers.

Types of hernias operated were 63 para umbilical hernias, 32 incisional and 5 recurrent hernias. The median hernia defect was 5 cm (range 3-8 cm). Hernia defects were closed in 45 cases of hernia defects between 5 cm-8 cm. In 55 cases with small hernia (3-4 cm), the defect was not closed. Composite meshes were used in all the cases and the sizes used were 15 x 15 cm circular (87) and 15 x 20 rectangular (13).

Table 2: Hernia characteristics and mesh used.

Sizes (n=100)	Para umbilical (63)	Incisional (32)	Re-current (5)	Mesh size (cm)
3 cm (30)	30	-	-	15x15
4 cm (25)	13	12	-	15x15
5 cm (30)	17	12	1	15x15
6 cm (2)	-	1	1	15x15
7 cm (4)	1	2	1	15x20
8 cm (9)	2	5	2	15x20

Table 3: Intraoperative and post-operative data.

Parameters	N=100	Range	Median
Mesh fixation time	All	15-20 mins	15 mins
Hospital stay post operation	All	1-2 days	1day
Post-operative complications			
Visual analogue score (Pain)	-	0-2	1
Paralytic ileus	2	-	-
Urine retention	2	-	-
Seroma	5	-	-
Wound infection	2	-	-
Recurrence	1	-	-

DISCUSSION

Laparoscopic mesh repair has now become a standard approach for repairing ventral hernias over the last decade.^{16,17} The ideal procedure should aim to restore the integrity of the abdominal wall and redistribute the intra-abdominal pressure and tension.¹⁸ The primary closure of the hernial defect allows better to reinforce the wall, to reduce the dead space and the possibility of formation of seromas.³

The ideal design of a mesh should be such that the visceral side of the mesh should be smooth, non-erosive, anti-adhesive, and not easily susceptible to infection. The ventral side of the mesh should be macroporous, allowing for fibroblast ingrowth, and a foreign body reaction actually may be necessary for incorporation and high tensile strength.¹⁹ Various composite light weight meshes are now available with easy intra operative handling. It is

been recommended that minimum mesh overlap should be 4-5 cm to the defect.

The fixing of the mesh is controversial and still widely discussed, even after more than 20 years of introduction of this technique. There are various methods of mesh fixation described in the literature, including staples, tacks in a single crown and transfascial sutures either alone or in combination with tacks.^{1,20} There is no consensus regarding the number of sutures, material of suture and amount of force used to tie the sutures. Many centers now use combinations of tacks and transfascial sutures.

Not many studies in the literature compare various methods of mesh fixation in laparoscopic incisional and ventral hernia repair. Most of the studies compare transfascial sutures with metallic tacks.

According to studies, sutures penetrate through the full thickness of the abdominal wall musculature and fascia. This has been theorized to cause local muscle ischemia resulting in severe pain postoperatively.¹³ Cobb et al has also suggested that intercostal nerves may become entrapped within the transabdominal sutures causing chronic, persistent neuropathic pain.²¹ Present series demonstrates that use of only absorbable tacks is easy, safe and feasible. The post-operative pain is less.

CONCLUSION

Laparoscopic Ventral Hernia Mesh Repair without the use of transfascial sutures is an easy and feasible approach. The use of only absorbable tacks to fix the mesh is time saving and gives less post-operative pain. However, randomized controlled trials are required to compare transfascial sutures with absorbable tacks for fixing the mesh in separate cases to reach a standardized method.

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