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Hybrid: Evolving Techniques in Laparoscopic Ventral Hernia Mesh Repair

Wasim Dar, Uday Muddebihal and Uliargoli Vasudeva Rao

Abstract

Laparoscopic repair is now the treatment of choice for most cases of ventral/incisional hernia. It is superior to open repair. Although the technique has undergone many refinements, there is no standard technique for difficult or complicated hernias. In cases with difficult hernias, combined open/laparoscopic hybrid techniques to avoid dissection of large subcutaneous flaps benefit the patients. It has been reported that hybrid methods are effective for treating cases of ventral hernias involving a large orifice. The techniques used and proposed by us are - (1) laparoscopic adhesiolysis, open sac excision with closure of defect and laparoscopic mesh placement, (2) laparoscopic adhesiolysis, omphalectomy with closure of defect and laparoscopic mesh placement and (3) open adhesiolysis, sac excision with closure of defect and laparoscopic mesh placement. Laparoscopic Ventral Hernia Hybrid Mesh Repair (LVHHMR) is a safe and feasible approach for complicated/difficult ventral hernias.

Keywords: composite mesh, hybrid techniques, laparoscopic ventral hernia mesh repair

1. Introduction

Hernia is the protrusion of viscus or part of viscus through a weakness/defect in the anterior abdominal wall. It can be seen in all age groups and in either of the sexes. It is a common surgical condition.

The surgical description and treatments of hernia date to most of the ancient civilisations. One of the earliest documentations appeared in 1500 BC in Epytian papyrus of Ebers. The repair of hernia went through many changes during 15th to 20th centuries. Surgical meshes for repair of hernias have been used since 1891.

In 1979, P. Fletcher performed the first laparoscopic hernia surgery.

Laparoscopic ventral hernia repair is superior to open technique and now a first option for most of the cases [1]. Over the past four decades this procedure has undergone many changes, however, there is no gold standard technique for difficult or complicated hernias.

There are lots of debate and research going on to standardize the technique of laparoscopic ventral hernia repair, including the ideal mesh, closure of defect and fixation methods [2].

One of the areas of non-consensus, over the period was regarding the closure of the defect. Many centers did not close the hernia defect, but directly placed a mesh and fixed it. However, now there is huge data available to support the fact that primary closure of the hernial defect allows better reinforcement of the wall and by reducing the dead space, it decreases the chances of seroma formation [3].

It is challenging to deal with difficult hernias, and hence patient undergoes conventional open repair with dissection of large subcutaneous flaps and post-operative morbidity. Recent studies have shown that hybrid techniques involving both open and laparoscopic methods benefit the patients [4]. It's been reported that Hybrid methods are effective for treating cases of ventral hernias involving a large orifice [5].

2. Types of hernia

A. Based on the cause

- a. Congenital – birth defects
- b. Acquired - develop later in life

B. Based on the site [6]–

1. Groin hernias

- a. Inguinal hernias – (70–75% of all abdominal hernias) Abdominal contents protrude into the groin through the inguinal canal.
- b. Femoral hernias – (6–18% of all abdominal hernias) Abdominal contents protrude into the groin through the femoral triangle

2. Ventral hernias – These hernias can be

- a. Umbilical
- b. Paraumbilical
- c. Epigastric
- d. Spigelian
- e. Incisional

3. Hiatus hernia – A part of stomach or intestine protrude into the chest via the diaphragm

C. Based on clinical presentation

- 1. Reducible
- 2. Irreducible

3. Obstructed

4. Strangulated

3. Ventral hernias

The most common types of ventral hernias are umbilical, paraumbilical and incisional hernias. The acquired risk factors for such hernias are – Chronic cough, constipation, heavy weightlifting, trauma, obesity, pregnancy, and prior surgery.

Clinical diagnosis is made by proper history of lump, duration, pain, reducibility, and obstruction. Including, complete physical examination involving all hernial orifices, cough impulse and tenderness. Imaging such as Ultrasound, CT and MRI are done to confirm the clinical diagnosis and to know the features of hernia such as site, size, number, and contents.

4. Treatment

A hernia does not go away without surgery. The closure of hernial defect with the use of mesh has been widely accepted.

Techniques of ventral hernia repair

A. Open technique

B. Laparoscopic technique (LVHR)

C. Hybrid techniques (LVHHMR)

In most of the patients with small hernial defects and uncomplicated clinical presentation, laparoscopic approach for repair and mesh placement is now the preferred method of management [7, 8].

Open approach for large, multiple defects and complicated hernias is used and accepted. The morbidity associated with open repair are dissection of large subcutaneous flaps, multiple drain placements, delayed post-operative recovery, more chances of infection and recurrence [9]. To avoid such complications a combination of laparoscopic and open techniques is being reported.

It has been established that to avoid seroma formation and recurrence of hernia, the defect must be closed [10]. Patients that undergo laparoscopic hernia mesh have comparatively lesser complications like decreased operative time, no drains, decreased post-operative pain, early discharge and getting back to work. Avoids complications of open repair [11, 12].

In hybrid technique, various combinations of steps of open and laparoscopic hernia repair are used. The basic principle involves hernia sac excision, closure of all the defects and removal of necrotic skin (if applicable). Here a composite mesh is always used laparoscopically.

Research show that the hybrid technique, when used in recurrent difficult incisional hernias is safe [13]. Some reports also suggest that hybrid techniques should be used in hernia with difficult defects, hernias with necrotic skin, irreducible hernias, obese patients with difficult incisional hernias, lateral incisional hernias [14] and parastomal hernias [15].

5. How we do it?

We have been doing Laparoscopic Ventral Hernia Hybrid Technique Mesh Repair (LVHHMR) since 2014.

All patients presenting with complicated ventral hernia of defect diameter of up to 8 cms and fit for surgery undergo LVHHMR. The common complications that the patients present with are, large defects, obstructed hernia with bowel contents, irreducible hernia with necrotic umbilical skin and multiple defects.

Patients unfit for general anesthesia, BMI > 35 kg/m², hernia defects more than 8 cms, pregnancy and contaminated abdominal cavity do not undergo such repair.

The routine clinical diagnosis supported with abdominal ultrasound is done in all the patients. Pre anesthesia evaluation and informed written consent is taken before the surgery. Standardized procedure, involving patient in supine position and general anesthesia with endotracheal intubation is done in all the patients.

Palmer's point approach is used to create pneumoperitoneum (2 cms below left subcostal margin in mid-clavicular line) [16]. Alternatively, optical port entry is also used in some patients.

Under vision two further ports are introduced, one 10 mm port in epigastric region (for 30° laparoscope) and another 5 mm port in the right flank at the level of umbilicus. Alternatively, all the three ports are placed in the left flank.

6. The LVHHMR techniques include

1. Laparoscopic adhesiolysis, open sac excision with closure of defect and a laparoscopic mesh placement
2. Laparoscopic adhesiolysis, omphalectomy with closure of defect and laparoscopic mesh placement.
3. Open adhesiolysis, sac excision with closure of defect and laparoscopic mesh placement.
4. Laparoscopic adhesiolysis, open sac excision with closure of defect and a laparoscopic mesh placement –

Used in patients with large hernial sac. Harmonic shears or Bi-polar is used for laparoscopic adhesiolysis. Contents of hernia sac are reduced. A small circum-umbilical incision is taken, and complete hernia sac is excised. Closure of the defect with interrupted prolene sutures and skin closed.

1. Laparoscopic adhesiolysis, omphalectomy with closure of defect and laparoscopic mesh placement –

This is done in patients with large sac, multiple defects, and necrotic umbilical skin. Laparoscopic adhesiolysis is done and contents reduced. Abdomen desufflated and omphalectomy is done. Hernia sac is then excised, and the defect closed with interrupted prolene sutures and skin closed.

2. Open adhesiolysis, sac excision with closure of defect and laparoscopic mesh placement –

This is done in patients with large hernia sac, small defect, and obstructed bowel. Diagnostic laparoscopy is performed. Abdomen desufflated and infra umbilical incision is taken. Open adhesiolysis is done. Hernia sac is excised, and the defect is closed with interrupted prolene sutures and skin closed.

7. Meshes used

In laparoscopic and hybrid procedures the mesh is placed intraabdominally, and in direct contact with bowel and omentum. The accepted meshes are composite with partial absorbable properties and with collagen layers. The mesh sizes used are 15 x 15 cms circular (20), 15 x 20 rectangular (25) and 20 x 20 cms circular (30). The size of the mesh must overlap the defect from all sides by 4–5 cms.

8. Mesh fixations

Prefixed sutures on the mesh are used to lift it up on the anterior abdominal wall. Trans fascial sutures along with absorbable tackers are used to anchor the mesh. Alternatively, in light weight meshes and in patients with BMI less than 30, only tackers are used to fix the mesh. There is consensus in method of using tackers to fix the mesh. Circumferential row of tackers at extreme periphery of the mesh and another around the margins of the hernia defect. This technique is called the double crown technique [17] and emphasis is given to the distance between each tack (about 2–3 cms).

9. Literature

Our study (Hybrid: Evolving techniques in laparoscopic ventral hernia mesh repair) published in journal of minimal access surgery July 2020, has similar results as compared to that of literature [18]. We have demonstrated various hybrid techniques and their post-operative outcome.

10. Conclusion

Laparoscopic Ventral Hernia Hybrid Technique Mesh Repair (LVHHMR) is safe and feasible approach for complicated/difficult ventral hernias. However, further larger studies are required to establish these methods as gold standard.

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