



Laparoscopic retro muscular lumbar hernia repair using an extended totally extraperitoneal (eTEP) approach: how do we do it?

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Abstract: Lumbar hernias are infrequent defects of the posterior abdominal wall, located between the 12th rib and the iliac crest. These types of hernias are classified as congenital, spontaneous, traumatic, and incisional. The lumbar hernias generally protrude through two anatomical regions: the superior lumbar triangle of Grynfeltt-Lesshaft and the inferior lumbar triangle of Petit. Although they are usually small defects, they can be very symptomatic and a real surgical challenge even for experienced surgeons. Many techniques have been described for the surgical treatment of these hernias, but there is still no gold standard for multiple reasons. The extended totally extraperitoneal (eTEP) technique consists of a series of maneuvers and operative strategies aimed at enhancing the extraperitoneal space for a minimally invasive repair of ventral, inguinal, and lumbar hernias, in a safe and effective manner. This manuscript describes our technique for a lumbar hernia repair done through an eTEP approach. We have adopted since 2018 the eTEP approach for inguinal and ventral hernia repair and have found these approaches very reproducible and ergonomic, after almost 100 inguinal and 50 ventral cases, this experience helped us extrapolate the skills and competence to tackle down a lumbar hernia defect using an eTEP approach.

Keywords: Hernia; Petit's; extended totally extraperitoneal (eTEP); laparoscopic; repair

Received: 07 September 2021; Accepted: 25 March 2022; Published online: 11 April 2022.

doi: 10.21037/asj-21-90

View this article at: <https://dx.doi.org/10.21037/asj-21-90>

Introduction

Lumbar hernias are infrequent defects of the posterior abdominal wall located between the 12th rib and the iliac crest (1). The lumbar hernias generally protrude through two anatomical regions: the superior lumbar triangle of Grynfeltt-Lesshaft and the inferior lumbar triangle of Petit (2).

The description of the anatomical limits of the inferior lumbar space was made by Petit in 1783, and a description of the superior space was made by Grynfeltt in 1866 (3).

Petit's hernia occurs at the lower lumbar triangle, limited by the iliac crest as the base, the external oblique muscle

as the lateral border, and the latissimus dorsi muscle as the medial border (4).

Grynfeltt's hernia occurs at the superior lumbar triangle, defined medially by the erector spinae muscle group, laterally by the internal oblique muscle, and superiorly by the 12th rib. The floor of this triangle is formed by the aponeurosis of the transverse abdominal muscle, and the roof is formed by the latissimus dorsi muscle (3).

These types of hernias are classified as congenital, spontaneous, traumatic, and incisional. The risk of incarceration and strangulation of a lumbar hernia is 25% and 8–18%, respectively (5).

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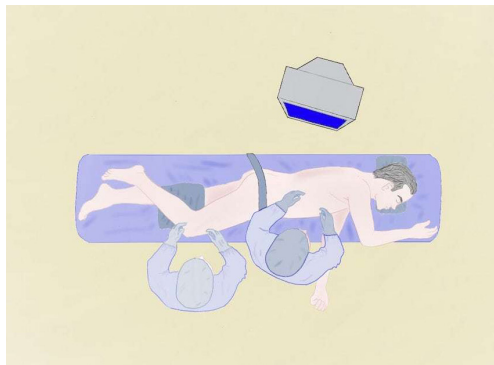


Figure 1 Surgical team position.

Many different techniques have been described for the surgical treatment of these hernias, but there is still no gold standard.

The extended totally extraperitoneal (eTEP) technique consists of a series of maneuvers and operative strategies aimed at enhancing the extraperitoneal space for a minimally invasive repair of ventral, inguinal, and lumbar hernias, in a safe and effective manner. It is a novel technique that was first introduced by Jorge Daes in 2012 to address difficult inguinal hernias (6). The principle is to create a larger space than what is done in TEP to tackle large groin hernias.

This extraperitoneal approach has some advantages such as diminished risk of: visceral injury, postoperative ileum, adhesion formation, and the benefits of using the retromuscular plane for a polypropylene mesh placement.

The goal of this manuscript is to present a safe and replicable surgical technique for lumbar hernia management.

Patient selection and workup

At least two preoperative consults were made before admission, in which the “Strong for Surgery” protocol is discussed and implemented to improve our patient preoperative status, this is a standard in all our hernia cases (7).

We focus on all the risk factors related to the surgical event. It is mandatory to get a computed tomography (CT) scan for proper visualization of the hernia and surgical planning [e.g. eTEP *vs.* transabdominal preperitoneal (TAPP)], it allows us to assess the extent of the defect, the state of the musculature, and the sac content.

Smoking cessation, weight reduction and physical activity

at least 3 times a week for 30 minutes is indicated in almost every patient.

Preoperative preparation

- ❖ Admission to the general surgery department the day before the surgical event;
- ❖ Prophylactic antibiotic 30 minutes before the initial incision;
- ❖ We usually use a single intravenous dose of first or second-generation cephalosporins.

Patient and surgical team position

The patient is placed in a lateral decubitus position, opposite to the hernia side. At this point, it is important to ensure the correct fixation of the patient to the operating table using straps to avoid accidents due to mobilization (*Figure 1*).

Skin preparation

According to local guidelines, chlorhexidine plus alcohol is applied to the surgical field.

Equipment

The material needed to perform this type of approach is usually the minimum necessary for a regular laparoscopic surgery, however, we designed a list of materials of our preference to carry out this kind of surgery (*Table 1*).

Surgical procedure

Step 1

The first trocar is placed 2-cm lateral to the semilunar line, ipsilateral to the hernia defect, at the level of the anterior iliac spine. Ultrasound on site is used to mark the semilunar line.

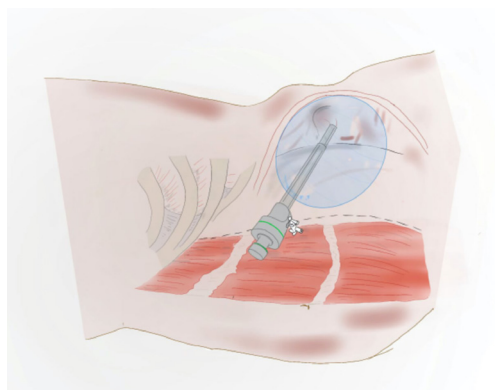
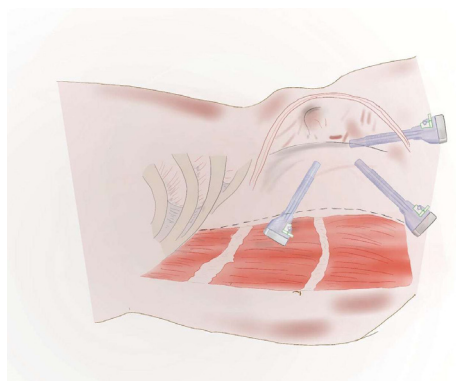
After accessing the preperitoneal space (Bogros space), the dissecting balloon is insufflated, creating a space between the transverse abdominal muscle and the peritoneum (*Figure 2*). The objective is to get adequate access to the preperitoneal space, adequate hemostasis, and extended dissection.

Step 2

Pneumoperitoneum is established at 12–15 mmHg.

Table 1 Equipment preference card

Dissecting balloon
Angled 30° 5 or 10 laparoscope
Atraumatic grasper and dissecting instruments
Monopolar hook or energy devices
Needle holder
Scissors
Non-absorbable suture (Polypropylene 0)
Polypropylene medium-weight mesh (size according to hernia defect's size)

**Figure 2** Dissecting balloon.**Figure 3** Patient and trocar positioning.**Step 3**

It is important to perform a review of the preperitoneal space generated with the balloon, in order to reveal

peritoneal injuries, and to make sure we have not injured any structure; afterward, two accessory working ports are added under direct vision (*Figure 3*). Trocar positioning depends on the location and size of the defect, the presence of other surgical scars, and the patient's body habitus.

Correct anatomical knowledge is important to identify nerves and vascular structures in this step.

Step 4

Once in the preperitoneal space, we begin with blunt dissection, and the identification and release of the hernial sac. In this step, we strongly recommend the use of atraumatic graspers and dissecting instruments instead of energy devices, especially on patients with intestinal content of the hernia sac.

Step 5

After the hernia defect is identified, the whole defect must be circumferentially cleaned out from fat tissue to allow an adequate visualization of the hernia ring (*Figure 4*).

Step 6

Then the hernia sac is reduced, and carefully returned to the abdominal cavity.

Step 7

The hernia defect closure may be performed in two different ways. If a barbed non absorbable suture is available, a simple running suture is the best closure option. When this suture is not available, we recommend closing the defect using non-absorbable sutures like polypropylene 0 with extracorporeal knots. The trick is to place one or two extracorporeal knots in the middle of the defect for tension reduction (*Figure 5*). After achieving these knots, a simple running suture is used to close the whole defect (*Figure 6*).

Step 8

Once the defect is completely closed (*Figure 7*), we apply a medium or high-weight polypropylene mesh in the retromuscular space. The mesh must overlap the defect at least 5 cm in every direction (*Figure 8*).

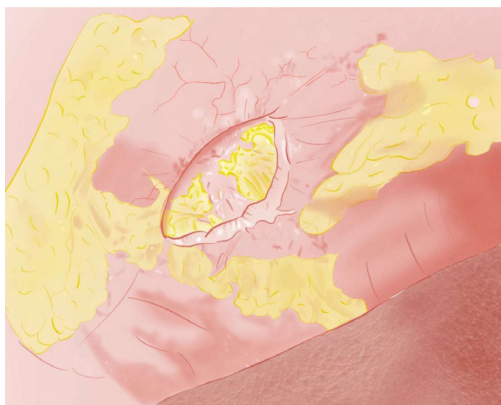


Figure 4 Defect identification.

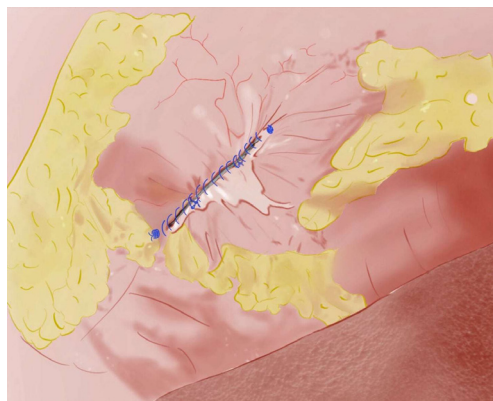


Figure 7 Defect closure.

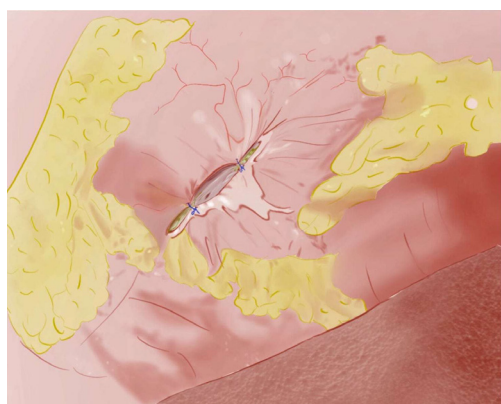


Figure 5 Tension reduction knots.



Figure 8 Reinforced defect with mesh.

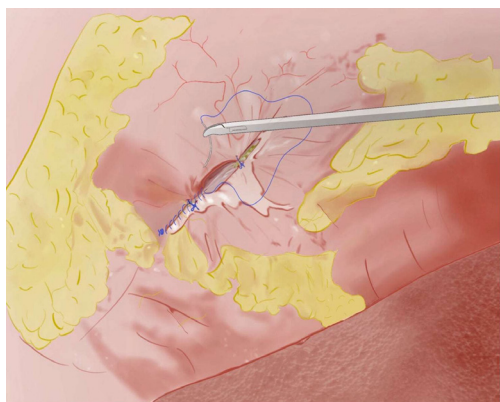


Figure 6 Running suture.

Step 9

Mesh may be or may not be fixated. We prefer fixation with absorbable tackers, but simple sutures may be used, always avoiding potential nerve entrapment, in order to accomplish an adequate flat mesh placement after desufflation.

Step 10

The last step is the pneumoperitoneum removal under direct vision and making sure an adequate collapse of the space and correct position of the mesh are seen.

Post-operative management

Patient may be discharged from the hospital 24 hours after surgery, depending on their clinical improvement.

Follow-up through the general surgery consultation is given, with an appointment at 10 and 30 days after hospital discharge and a follow-up appointment every year.

Tips, tricks, and pitfalls

- ❖ Adequate hernia ring exposure;
- ❖ Place one or two extracorporeal knots in the middle of the defect for tension reduction before the intracorporeal running suture;
- ❖ Always make sure you correctly and clearly identify all nerve structures before you fix your mesh;
- ❖ While pneumoperitoneum is being removed, you can still use your atraumatic grasper if you notice any wrinkles of the mesh.

Acknowledgments

Funding: None.

Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://asj.amegroups.com/article/view/10.21037/asj-21-90/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

doi: 10.21037/asj-21-90

Cite this article as: Romero JA, Farell J, Ruiz-Funes AP, Gonzalez JP, Guillen EA. Laparoscopic retro muscular lumbar hernia repair using an extended totally extraperitoneal (eTEP) approach: how do we do it? AME Surg J 2023;3:7.

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