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L3W3 Incisional Hernia with LOD – Robotic eTEP-TAR Repair (with video)

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Abbreviations:
eTEP: enhanced view totally extraperitoneal;
TAR: transversus abdominis release;
AWR: abdominal wall reconstruction;
BMI: body mass index;
LOD: loss of domain;
BTA: botulinum toxin A;
PPP: progressive pneumo-peritoneum.

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Rezumat

Hernia incizională L3W3 cu pierdere de domiciliu - abord robotic eTEP-TAR

Introducere: Procedeul Rives-Stoppa reprezintă "gold-standard-ul" în tratamentul chirurgical al herniilor ventrale, iar principiile sale sunt aplicate în mod similar în chirurgia minim invazivă, respectiv în abordul endoscopic retromuscular eTEP (enhanced view totally extraperitoneal). De remarcat că procedeul eTEP oferă rezultate excelente privind recuperarea rapidă postoperatorie, nivel foarte scăzut de durere şi spitalizare redusă in cazul pacienților la care s-a practicat reconstrucția de perete abdominal (AWR). Este de asemenea important de menționat că procedeul prezintă câteva contraindicații; în general, procedeul laparoscopic eTEP nu poate fi aplicat pacienților cu hernii abdominale voluminoase, şi mai ales situațiilor de pierdere de domiciliu (loss of domain - LOD), când, după reducerea herniei spațiul de lucru devine foarte mic. Pentru unele din aceste cazuri am apelat la chirurgia robotică; cu ajutorul robotului chirurgical am reuşit să obțin un spațiu de lucru acceptabil pentru reconstrucția peretelui abdominal, radicând peretele abdominal cu ajutorul brațelor robotului, asemenea unui "laparo-lift".

Prezentare de caz: În cele ce urmează vă prezint cazul unei paciente în vârstă de 65 de ani, supraponderală având BMI 28.5, care prezintă o hernie incizională voluminoasă cu pierdere de domiciliu, situată în flancul drept, apărută după o incizie Jalaguier. CT ne-a furnizat informații valoroase privind dimensiunile orificiului herniar, volumul sacului de hernie, volumul cavității abdominale restante precum şi informații privitoare la conținutul sacului de hernie. Pe baza acestor detalii radiologice s-a confirmat diagnosticul de LOD, folosind ecuația Sabbagh, care a relevat un volum al

viscerelor herniate reprezentând 46.47% din volumul cavității abdominale. Luând în considerare localizarea şi dimensiunea defectului, pe baza clasificării EHS a herniilor abdominale, am precizat diagnosticul de hernie incizionala complexă L3W3 dreaptă cu pierdere de domiciliu. Protocolul de optimizare pre-operatorie în acest caz se referă în special la chimio-relaxarea musculaturii peretelui abdominal prin injectare de toxină botulinica tip A (BTA) în muşchii laterali ai abdomenului. Aceasta s-a realizat cu aproximativ 6 săptămâni înaintea intervenției chirurgicale. Bazându-mă pe succesul obținut după injectarea cu BTA, probat de reuşita reducerii herniei, am decis programarea recostrucției peretelui abdominal prin abord robotic eTEP-TAR.
Concluzie: Evoluția postoperatorie a fost favorabilă, pacienta fiind mobilizată activ precoce post-operator, prezentând durere minimă (disconfort) şi reluare rapidă a tranzitului intestinal. A fost externată în ziua următoare intervenției chirurgicale.

Cuvinte cheie: robotic eTEP-TAR, reconstrucție de perete abdominal, pierdere de domiciliu, reconstrucție robotică de perete abdominal, hernie incisională, hernie incizională robotic, eTEP, eTEP-TAR, robotic TAR

Abstract

Introduction: The Rives-Stoppa procedure has emerged as the preferred method for ventral hernia repair, and the principles of this technique are similarly applied in minimally invasive surgery using the eTEP (enhanced view totally extraperitoneal) approach. It appears that the eTEP approach offers excellent outcomes in terms of less post-operative pain, faster recovery, and shorter hospital stays for patients undergoing abdominal wall reconstruction (AWR). It's important to note that there are some contra-indications of this procedure. In general, laparoscopic eTEP may not be suitable for cases with large hernias and loss of domain where the working space is limited. In such cases, alternative approaches, such as using a robotic platform, may be considered to ensure an adequate working space for abdominal wall reconstruction (AWR). A robotic platform can create a working space by using the robotic arms as a "laparo-lift," enabling the AWR to be performed.
Case Report: In this case, we have a 65-year-old female patient with a BMI of 28.5 who presents with a large incisional hernia with LOD. This hernia is located on the right flank and occurred after a Jalaguier incision. The CT scan provided valuable information regarding the size of the hernia, the remaining volume of the abdominal cavity, and the content of the hernia sac. Based on these radiological details, the LOD diagnosis was confirmed using the Sabbagh equation, which revealed that the hernia volume accounted for 46.47% of the total peritoneal volume. Based on the location, size of the defect, and the EHS classification for incisional hernias, the diagnosis for this case is a Complex incisional hernia of L3 right W3 with LOD. The protocol for optimization in this case involves chemo-relaxation, which refers to the injection of botulinum toxin A (BTA) into the large lateral muscles of the abdomen. This is done approximately 6 weeks before the surgery. Based on the successful reduction of the hernia during the consultation, the decision has been made to perform the Abdominal Wall Reconstruction (AWR) procedure using the robotic eTEP-TAR technique.
Conclusion: The post-operative course was favorable, with the patient experiencing early active mobilization, reduced pain, and early return of bowel movement. The patient was discharged the day after the surgery.

Key words: robotic eTEP-TAR, abdominal wall reconstruction, loss of domain, robotic abdominal wall reconstruction, incisional hernia, robotic incisional hernia repair, eTEP, eTEP-TAR, robotic TAR

Introduction

The Rives-Stoppa procedure has emerged as the preferred method for ventral hernia repair (1), and the principles of this technique are similarly applied in minimally invasive surgery using the eTEP (enhanced view totally extraperitoneal) approach. It appears that the eTEP approach offers excellent outcomes in terms of less post-operative pain, faster recovery, and shorter hospital stays for patients undergoing abdominal wall reconstruction (AWR).

The eTEP/eTEP-TAR (transversus abdominis release) technique, pioneered by Igor Belyansky in 2015 (2), has been recognized as a groundbreaking approach in abdominal wall reconstruction. This technique involves closing the hernia defect, positioning the mesh outside of the abdominal cavity, and minimizing the need for mesh fixation. It has shown promise in providing improved outcomes for patients undergoing ventral hernia repair (3).

It's important to note that there are some contraindications of this procedure. In general, laparoscopic eTEP may not be suitable for cases with large hernias and loss of domain where the working space is limited (2).

In such cases, alternative approaches, such as using a robotic platform, may be considered to ensure an adequate working space for abdominal wall reconstruction (AWR). A robotic platform can create a working space by using the robotic arms as a "laparo-lift," enabling the AWR to be performed.

Absolutely, preoperative optimization of patients with loss of domain is crucial. This may involve measures such as weight loss and management of comorbidities to ensure that patients are in the best possible condition before undergoing any surgical procedure.

Surgical Technique

In this case, we have a 65-year-old female patient with a BMI of 28.5 who presents with a large incisional hernia with LOD. This hernia is located on the right flank and occurred after a Jalaguier incision. The CT scan provided valuable information regarding the size of the hernia, the remaining volume of the abdominal cavity, and the content of the hernia sac. Based on these radiological details, the LOD diagnosis was confirmed using the Sabbagh equation (4), which revealed that the hernia volume accounted for 46.47% of the total peritoneal volume.

Based on the location, size of the defect, and the EHS classification for incisional hernias, the diagnosis for this case is a Complex incisional hernia of L3 right W3 with LOD.

The protocol for optimization in this case involves chemo-relaxation, which refers to the injection of botulinum toxin A (BTA) into the large lateral muscles of the abdomen. This is done approximately 6 weeks before the surgery (5).

The injection of BTA helps to relax the muscles in the area, which can have several benefits. First, it can help reduce muscle contractions and spasms, which can contribute to pain and discomfort. By relaxing the muscles, it can also improve the ability of the surgeon to access the hernia and perform the repair.

In addition, by relaxing the muscles, BTA can aid in the closure of the hernia defect. It can help to reduce tension in the tissues, allowing for better approximation and closure of the abdominal wall. This can result in a stronger repair and potentially lower the risk of hernia recurrence.

After the 6-week period following the injection of BTA, we reevaluated the condition of the hernia. As an additional measure to improve the volume of the abdominal cavity, the progressive pneumo-peritoneum (PPP) technique might be considered, if necessary.

Based on the successful reduction of the hernia during the consultation, the decision has been made to perform the Abdominal Wall Reconstruction (AWR) procedure using the robotic eTEP-TAR technique. By combining successful reduction of the hernia with the robotic eTEP-TAR approach, the aim is to achieve a optimal and durable repair while minimizing the risk of complications.

The key stages of robotic surgery in this laparoscopic procedure are as follows (3):

1. Development of the retro-rectus space using an optic trocar.
2. Crossing over the linea alba to connect both retro-rectus spaces and placing the robotic trocars below the costal margin. Docking the robotic arms is also done during this stage.
3. Incision of the medial aspect of the posterior rectus sheaths.
4. Performing TAR (Transversus Abdominis Release) on the right side, with the TAR-cutline placed medially to the neuro-vascular bundles. (In this case, bilateral TAR was not necessary, and the defect was closed successfully.)
5. Closure of the defect in the posterior layer.
6. Restoration of the abdominal wall by closing the defect in the muscular layers.
7. Placement of mesh to reinforce the repaired area.

Results and Discussion

The post-operative course was favorable, with the patient experiencing early active mobilization, reduced pain, and early return of bowel movement. The patient was discharged the day after the surgery.

Conclusion

The management of LOD cases presents considerable challenges in abdominal wall surgery. To reduce risks, it is essential to optimize the patient preoperatively through compensating for any comorbidities, reducing weight in obese patients, and utilizing methods like chemo-relaxation with BTA (Botulinum Toxin A) or PPP (Preoperative Progressive Pneumoperitoneum).

Although LOD situations typically contra-indicate minimally invasive surgery (MIS), robotic-assisted MIS can be beneficial in repairing such hernias.

It is crucial to obtain informed consent from the patient, specifically discussing the possibility of converting to an open approach and the potential need for bridging the defect without restoring the architectural integrity of the abdominal wall. In some cases, restoring the architecture may be impossible despite preoperative optimization, hence an open discussion is necessary.

Conflict of Interest

No conflict of interest exists.

Ethical Statement

The protocol was approved by the ethics committee of the institutions.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the journal's web-site:

Video: L3(right)W3 incisional hernia LOD robo-eTEP-TAR