



## Innovation in surgical technique

# Moving the concept associated to laparoscopic intracorporeal rectus aponeuroplasty (LIRA) to lateral hernia

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### ABSTRACT

The surgical repair of lateral hernias is considered a challenge. Laparoscopic intracorporeal rectus aponeuroplasty (LIRA) has been described as a minimally invasive technique for primary incisional ventral hernias of the midline, especially for M2 to M4 ventral hernias but the indications of the concept associated to LIRA are beginning to expand to other complex locations. The aim of this video is to show the surgical steps for lateral hernias where the concept associated to LIRA is followed to repair this type of hernias.

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### Trasladando el concepto asociado a la aponeuroplastia intracorpórea del recto (LIRA) laparoscópica a la hernia lateral

### RESUMEN

La reparación quirúrgica de las hernias laterales se considera un reto. La aponeuroplastia intracorpórea de rectos laparoscópica (LIRA) ha sido descrita como una técnica mínimamente invasiva para tratar las hernias incisionales primarias de la línea media, especialmente para las hernias ventrales M2 a M4, pero las indicaciones del concepto asociado a LIRA comienzan a expandirse a otras localizaciones complejas. El objetivo de este vídeo es mostrar los pasos quirúrgicos de las hernias y laterals siguiendo el concepto asociado a LIRA para reparar este hernias.

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## Introduction

Lumbar hernias, lateral are rare and are usually caused after trauma or retroperitoneal surgery as incisional hernias.<sup>1</sup> The surgical repair of these hernias is considered a challenge. Difficulties associated to minimally invasive approach to these hernias include the position of the patient, the management of the hernia defect, the proper overlap of the mesh and the fixation.<sup>2</sup> Since 2005, there is sufficient evidence to support the use of the laparoscopic approach in this type of hernias, using the traditional IPOM technique.<sup>3</sup> New approaches and techniques are being described to improve the results of a minimally invasive approach, such as recurrences of bulging, by closing the defect. Traditional IPOM-plus technique by closing the defect adds tension to the repair and could be related to long-term recurrences, looking for alternative to overtake these drawbacks.

Laparoscopic intracorporeal rectus aponeuroplasty (LIRA) has been described<sup>4</sup> as an alternative to simple closure of the defect and as a minimally invasive technique for primary and incisional ventral hernias of the midline, especially for M2 to M4 ventral hernias following the EHS classification. Despite this, the indications of the concept associated to LIRA are beginning to expand to other complex locations. The aim of this video is to show the surgical steps for lateral hernias where the concept associated to LIRA is followed to repair this type of hernias.

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## Surgical technique

The LIRA technique was performed on a 56-year-old female patient without previous surgical history. Clinical examination and computed tomography (CT) showed a lateral hernia 6.4 cm in width (W2) and a longitudinal length of 6.6 cm. First, the patient was placed in the right semi-lateral decubitus (30°). Intrabdominal access is performed using a Verres needle in the left upper quadrant and one 12 mm and two 5 mm trocars are placed at the right side of the patient, using a 30° laparoscopic camera. The concept associated to the LIRA technique was followed by opening the peritoneum and fascia, exposing the fibers of the internal oblique and the posterior rectus sheath near the border of the defect of the lumbar hernia over the arcuate line as described by our group.<sup>4</sup> At this area of the abdominal cavity, the peritoneum and the fascia transversalis, and medially the posterior aponeurosis of the rectus muscle, are opened. Also, it is important to create a lateral peritoneum flap to identify the nerves at the lateral side of the abdomen when exposing the muscles in order to avoid nerve entrapment and postoperative pain and to partially cover the mesh in this area, using a hybrid procedure that involves a partially extraperitoneal and transabdominal (TAPE) technique.<sup>5</sup> This manoeuvre will reduce the surface of the mesh that can be exposed to the bowel, decrease the amount of mesh exposed to the bowel.<sup>6</sup> Double loop long-term absorbable monofilament running sutures are used for closing the defect using the peritoneum-fascia transversalis and posterior rectus sheath, observing a release of the tension when closing. After the continuous

suture is completed, a 2 mm skin incision is made to remove the two threads of the double-loop suture through the same skin incision and different area at the internal abdominal wall in order to tie them extracorporeally. Pneumoperitoneum is released in order to tie them, decreasing tension at the defect with this manoeuvre, leaving all knots at the subcutaneous area. A uncoated medium weight monofilament polypropylene mesh on the anterior side with an absorbable hydrogel barrier based on Sepra® Technology on the posterior side for laparoscopic ventral hernia repair is used in this case (Ventralight™ ST Mesh). Finally, the mesh is placed intraperitoneally and partially extraperitoneal being covered with the flap of the peritoneum. Fixation was performed with a permanent fixation devices and fibrin glue added to seal the possible gaps between the mesh and the peritoneum.

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## Results and conclusions

The best surgical technique for lateral hernias is still not clear.<sup>7</sup> The anatomical location of these hernias is challenging and sometimes compromises bony structures<sup>8</sup> and could be related to nerve injuries. Recurrence and bulging are also frequent because of the asymmetric forces acting on the edges of the defect.<sup>9</sup> The transperitoneal approach has always been accepted for these hernias, especially in large defects, where closure is difficult. In 1996, Burick and Parascandola<sup>10</sup> and a year later, Heniford et al.<sup>11</sup> described the first transperitoneal approach for the surgical treatment of these hernias and has remained the standard access in laparoscopic repair of lateral hernias. The conventional laparoscopic repair bringing the defect, IPOM, showed some advantages, since offer a proper placement of the mesh, showing more favorable surgical results (shorter operating time and shorter hospital stay, etc.) than open repair.<sup>12</sup>

Since the introduction of the concept of primary closure of the hernia defect (IPOM-plus), the surgical repair of hernias in different locations has changed, although the concept of LIRA could be related to better results in term of recurrences, bulging and pain. The idea of expanding the indication of LIRA has recently been described plus to repair M2-M4 primary and incisional hernias<sup>13</sup> and the use of this technique for lateral hernias provides another extension of the concept. This new technique allows the tension-free closure of large defects that can be located in this area while maintaining the advantages of minimally invasive surgery.

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## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.ciresp.2022.03.013](https://doi.org/10.1016/j.ciresp.2022.03.013).

## Conflict of interest

Authors deny any conflicts of interests or obligations.

## REFERENCES

- Henriksen NA, Kaufmann R, Simons MP, Berrevoet F, East B, Fischer J, et al. EHS and AHS guidelines for treatment of primary ventral hernias in rare locations or special circumstances. *BJS Open* [Internet]. 2020;4:342–53. <http://dx.doi.org/10.1002/bjs5.50252>.
- Salameh JR, Salloum EJ. Lumbar incisional hernias: diagnostic and management dilemma. *JLS J Soc Laparoendosc Surg* [Internet]. 2004;8:391–4. Available from: <https://pubmed.ncbi.nlm.nih.gov/15554289>
- Moreno-Egea A, Torralba JA, Morales G, Fernández T, Guzmán P, Hita G, et al. Reparación laparoscópica de las hernias lumbares secundarias: cirugía abierta frente a laparoscópica. Estudio prospectivo no aleatorizado. *Cirugía Española* [Internet]. 2005;77:159–62. Available from: <https://www.elsevier.es/es-revista-cirugia-espanola-36-articulo-reparacion-laparoscopica-hernias-lumbares-secundarias-13072270> [cited 21.02.22]
- Gómez-Menchero J, Guadalajara Jurado JF, Suárez Grau JM, Bellido Luque JA, García Moreno JL, Alarcón Del Agua I, et al. Laparoscopic intracorporeal rectus aponeuroplasty (LIRA technique): a step forward in minimally invasive abdominal wall reconstruction for ventral hernia repair (LVHR). *Surg Endosc*. 2018;32:3502–8.
- Sun J, Chen X, Li J, Zhang Y, Dong F, Zheng M. Implementation of the trans-abdominal partial extra-peritoneal (TAPE) technique in laparoscopic lumbar hernia repair. *BMC Surg* [Internet]. 2015;15:118. <http://dx.doi.org/10.1186/s12893-015-0104-3>.
- Sharma A, Mehrotra M, Khullar R, Soni V, Bajjal M, Chowbey PK. Laparoscopic ventral/incisional hernia repair: a single centre experience of 1,242 patients over a period of 13 years. *Hernia*. 2011;15:131–9.
- Li B, Qin C, Yu J, Gong D, Nie X, Li G, et al. Totally endoscopic sublay (TES) repair for lateral abdominal wall hernias: technique and first results. *Hernia* [Internet]. 2021;25:523–33. <http://dx.doi.org/10.1007/s10029-021-02374-z>.
- Katkhouda N, Alicuben ET, Pham V, Sandhu K, Samakar K, Bildzukewicz N, et al. Management of lateral abdominal hernias. *Hernia*. 2020;24:353–8.
- Köhler G, Kaltenböck R, Fehrer H-J, Függer R, Gangl O. Management der lateralen Bauchwandhernien. *Der Chir* [Internet]. 2021. <http://dx.doi.org/10.1007/s00104-021-01537-z>.
- Burick AJ, Parascandola SA. Laparoscopic repair of a traumatic lumbar hernia: a case report. *J Laparoendosc Surg* [Internet]. 1996;6:259–62. <http://dx.doi.org/10.1089/lps.1996.6.259>.
- Heniford BT, Iannitti DA, Gagner M. Laparoscopic inferior and superior lumbar hernia repair. *Arch Surg*. 1997;132:1141–4.
- Shen C, Zhang G, Zhang S, Yin Y, Zhang B, Song Y, et al. Clinical, surgical characteristics and long-term outcomes of lumbar hernia. *BMC Surg*. 2021;21:332.
- Jeri-McFarlane S, et al. Expanding indication of laparoscopic intracorporeal rectus aponeuroplasty (LIRA) to suprapubic area: LIRA & TAPE. *Cir Esp*. 2022. <http://dx.doi.org/10.1016/j.ciresp.2022.01.001>.