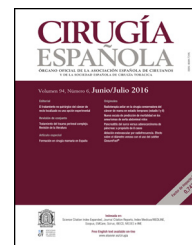




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## Innovation in surgical technique

# Expanding indication of laparoscopic intracorporeal rectus aponeuroplasty (LIRA) to suprapubic area: LIRA & TAPE



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### ABSTRACT

Laparoscopic intracorporeal rectus aponeuroplasty (LIRA) is a minimally invasive technique described to repair M2–M4 primary and incisional hernias. Defects below this area (M5 – Suprapubic area) could be treated using the concept associated to LIRA, expanding the indication of this technique in combination with a transabdominal partially extraperitoneal (TAPE) repair. The aim of this video is to show the surgical steps in the combination of LIRA & TAPE for M2–M5 ventral hernias.

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## Indicación extendida de la aponeuroplastia intracorpórea de rectos laparoscópica (LIRA) al área suprapúbica: LIRA & TAPE

### R E S U M E N

Palabras clave:

Técnica LIRA

Reparación extraperitoneal

Laparoscopia

Hernia ventral

Hernia incisional

Malla

La aponeuroplastia intracorpórea de rectos laparoscópica (LIRA) es una técnica mínimamente invasiva para la reparación de las hernias incisionales de M2 a M4. Los defectos por debajo de esta zona (M5 – área suprapúbica) se pueden reparar mediante una indicación extendida de LIRA combinada con la reparación transabdominal parcialmente extraperitoneal (TAPE).

El objetivo de este video es demostrar los pasos quirúrgicos en la combinación de LIRA & TAPE para hernias ventrales de M2 a M5.

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## Introduction

Laparoscopic intracorporeal rectus aponeuroplasty (LIRA) has been described as a minimally invasive technique for primary or incisional ventral hernias of the midline, specially from M2 to M4 ventral hernias of the European Hernia Society (EHS) classification.<sup>1</sup> These defects, larger than 5–6 cm, are related to an increase in pain and recurrence when the defect is just closed (IPOM-Plus) or as in classic laparoscopic repair (IPOM), bridging the defect is related to pseudo-recurrence and an important rate of *bulging*.<sup>2</sup>

The aim of this video is to show the surgical steps for those ventral hernias located at the suprapubic area (M5), where the concept associated to the LIRA technique is used. The idea of expanding the indication of LIRA combined with a transabdominal partially extraperitoneal (TAPE) repair is performed in a 75 years old female patient (supplementari data).

### Surgical technique

LIRA-TAPE technique was performed, as a modification of the original LIRA, in a 75 years-old female patient with BMI of 28.31 kg/m<sup>2</sup>. Clinical examination and computed tomography (CT) scan showed a 9 cm width incisional hernia (W2), including the supraumbilical (M3), infraumbilical (M4) and suprapubic area (M5) with a total longitudinal length of 18 cm. The first step of the procedure is to open the peritoneum and posterior rectus sheath at 1–2 cm from the edge of the defect over the arcuate line as described by Gomez-Menchero et al.<sup>3</sup> This flap allows following the dissection below that arcuate line as a modification of the original technique. This initial approach allows the possibility to modify the procedure into a laparoscopic transversus abdominis release (TAR) in case of high-tension when closing the fascia. At the suprapubic area, a bilateral peritoneal flap was done as indicated during the TAPE repair until both Cooper ligaments are identified.<sup>4</sup> Three double loop long-term absorbable monofilament sutures was used for closing the defect, using the rectus muscle below the arcuate line, as well as the posterior rectus sheath above this line. Once each suture is performed, a 2–3 mm skin incision is done in order to remove the individual threads of each double loop using the same skin incision but different direction in the

fascia. Pneumoperitoneum is lowered to pull off all threads at the same time, approaching both rectus muscles at the midline, leaving all knots at the subcutaneous area. A double layer mesh (macroporous knit of dense, monofilament PTFE with polyglycolic acid/trimethylene carbonate intraperitoneal film – Gore® SYNECOR Intraperitoneal Biomaterial) is used in this case, being placed intraperitoneally.

This mesh should overlap at least 2 cm of the lateral opening of the posterior rectus fascia and fixed to the pubis and both Cooper ligaments using permanent fixation. We believe that absorbable fixation is a good option for the LIRA technique, although they are not considered the proper fixation system to the pubic bone and Cooper ligaments since they do not have the same fixation strength as permanent fixation devices. This is the reason why we recommend the use of them at this area. In fact, some authors even have suggested using a mechanism used in orthopedic surgery to insert sutures into the bones to fix the mesh at this area.

The peritoneal flap during the TAPE is a useful option in this area since it allows identification of the anatomy, which could avoid vascular injuries and nerve entrapments. On the other hand, this flaps allows proper fixation of the mesh to the bone margins.

## Results and conclusions

E. Chelala et al where the first to introduce the concept of primary defect closure during laparoscopic ventral hernia repair.<sup>5</sup> Since then, many authors have published different surgical options to perform this technique, but without establishing which size of the defect might be related to an increase of recurrence or surgical site occurrences (SSO). J. Gomez-Menchero et al published a prospective study proposing the LIRA technique for ventral hernias repair larger than 5 cm, concluding that simple closure could be safe in defects less than that width. Moreover, they indicated that defects larger than 10 cm in width required open or laparoscopic component separation.<sup>3</sup> They also stated that LIRA guarantees a reconstruction of the midline, reinforcing this area without tension, since the lateral aspect of the posterior rectus sheath remains in place, promoting also the healing process at the midline by joining the opening of the fascia.

Two of the criticisms related to the LIRA technique are, in one hand, that the mesh is placed intraabdominally and on the other hand, the need for traumatic fixation, which could be related to pain and also an increase of adhesions.<sup>3</sup> However, this technique may allow the possibility of using absorbable fixation devices at non-bone areas, instead of permanent metal tackers, which are the ones related to those adhesions. Finally, one of the contraindications of this procedure could be the presence of a previous intraperitoneal mesh, since it would be difficult to create adequate flaps.

The combination of LIRA & TAPE techniques provides an extension of the indication of concept associated to the LIRA technique for the repair of M5/W2 hernias, which could not be achieved using a conventional technique. Our initial experience with this technique, expanding the concept of LIRA to the suprapubic area, shows no recurrences and no postoperative morbidity. This new approach avoids the *bulging* effect observed during conventional laparoscopic repairs, allowing a tension-free closure of the midline together with the advantages of the minimally invasive surgery.

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### Conflict of interest

Authors of this video have nothing to disclose.

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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.2022.01.001](https://doi.org/10.1016/j.ciresp.2022.01.001).

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