

Ventral Hernia Repair with Loss of Domain Using the Rives-Stoppa Technique: Clinical Case and Review of the Retromuscular Approach

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ABSTRACT

Giant ventral hernias with loss of domain represent a significant surgical challenge due to the difficulty in reintegrating herniated contents into the abdominal cavity without causing increased intra-abdominal pressure and its associated complications. We present the case of a 68-year-old female patient with a giant ventral hernia and loss of domain, successfully repaired using the retromuscular Rives-Stoppa technique. Preoperative preparation included respiratory physiotherapy, progressive pneumoperitoneum, and botulinum toxin injections to optimize abdominal wall compliance and pulmonary function. The surgical approach consisted of careful dissection of the hernia sac, reduction of the herniated contents, wide creation of the retromuscular space, tension-free fascial closure, and placement of a polypropylene mesh with adequate overlap. Postoperative recovery was favorable, with no respiratory or infectious complications and satisfactory functional recovery. This case highlights the importance of a multidisciplinary approach and advanced surgical techniques in managing complex hernias with loss of domain, improving clinical outcomes and patient quality of life.

KEYWORDS: Loss of domain hernia, abdominal wall repair, Rives-Stoppa technique, retromuscular space, prosthetic mesh, reconstructive surgery, complex abdominal defect.

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INTRODUCTION

Abdominal wall hernias are among the most frequent surgical complications, with giant hernias constituting a particularly complex subgroup due to their size, functional impact, and technical difficulties in surgical management. A giant hernia is defined as one with a defect larger than 10 cm in diameter or those involving significant loss of domain, where the herniated contents represent a substantial proportion of the

total intra-abdominal volume. These hernias are often associated with multiple predisposing factors such as previous surgeries, infections, obesity, chronic comorbidities, or trauma, and carry a high rate of complications if not managed properly.^{1,2}

Surgical repair presents numerous challenges, including safely reintegrating viscera into the abdomen without compromising respiratory function, tension-free closure of

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the abdominal wall, and prevention of recurrence. Various techniques have been developed for these defects, among which the Rives-Stoppa technique has gained recognition as one of the most effective and safe.³

Initially described by Henri Rives and later popularized by René Stoppa, this technique involves placing a prosthetic mesh in the retromuscular space (between the rectus abdominis muscle and its posterior sheath), allowing solid and durable anatomical reconstruction, excellent tension distribution, and reduced risk of complications such as seromas, infections, and recurrences. Unlike other approaches, the retromuscular plane provides broad mesh coverage, favoring integration and reducing direct contact with viscera, thus decreasing risks of adhesions and fistulas.⁴ Though the Rives-Stoppa technique demands technical expertise and thorough knowledge of abdominal wall anatomy, it offers substantial benefits in complex hernia cases. Additionally, its combination with component separation or minimally invasive techniques has further expanded its applications.⁵

The objective of this article is to present a clinical case of a giant ventral hernia successfully treated with the Rives-Stoppa technique, describing key surgical aspects, pre- and postoperative clinical considerations, and reviewing available

literature on the retromuscular approach for these defects. Cases like this underscore the importance of careful surgical planning, use of established techniques, and application of fundamental reconstructive abdominal wall surgery principles to achieve successful outcomes.^{6,7}

CLINICAL CASE

A 68-year-old female patient with a history of abdominal hysterectomy 15 years prior, grade I obesity, and controlled hypertension, presented with a progressively enlarging abdominal volume accompanied by difficulty walking, a sensation of heaviness, and intermittent pain. Physical examination revealed a giant ventral hernia with loss of domain, characterized by an aponeurotic defect approximately 30 cm in diameter, containing mostly intestinal loops and omentum. The herniated contents represented a very significant proportion of the intra-abdominal volume, complicating complete reduction and impairing abdominal function. Contrast-enhanced computed tomography confirmed the extent of the defect, protrusion of intra-abdominal contents, and loss of domain, without vascular compromise or severe adhesions, highlighting the difficulty of reintegrating contents without adjunctive techniques (**Figure 1,2**).



Figures 1,2: Preoperative photograph.

Given the complexity, an extensive preoperative protocol was implemented, including incentive spirometry respiratory exercises for four weeks to improve pulmonary function and prevent postoperative respiratory complications, as abrupt reduction of herniated contents can increase intra-abdominal

pressure and limit lung expansion. Additionally, progressive pneumoperitoneum with controlled air insufflation into the abdominal cavity was performed weeks before surgery to gradually increase intra-abdominal space, facilitating viscera accommodation after repair. Botulinum toxin (Botox) was

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injected into the lateral abdominal muscles, including obliques and transversus abdominis, to induce temporary paralysis that relaxed and elongated the abdominal wall, allowing tension-free midline closure. Nutritional supervision optimized metabolic status and reduced body weight.

Surgery was performed under general anesthesia with the patient supine. A horizontal incision was made below the hernia site. Careful dissection of the hernia sac was performed, freeing intestinal loops and omentum for complete reduction into the abdominal cavity. The retromuscular plane—between the rectus abdominis muscle and posterior sheath—was accessed and dissected bilaterally

from the costal margin to the suprapubic region, creating a wide field for mesh placement. Posterior borders of the rectus muscles were released to facilitate tension-free midline closure. The fascial defect was closed with a continuous high-strength absorbable suture, ensuring proper muscle edge approximation. A sufficiently large polypropylene mesh was then placed with at least 5 cm overlap beyond all margins, fixed by interrupted sutures to muscle to prevent displacement. Suction drains were placed in the retromuscular space to avoid fluid accumulation, and muscle, subcutaneous tissue, and skin were closed carefully. **(Figure 3,4,5,6).**



Figures 3,4: Surgical approach.

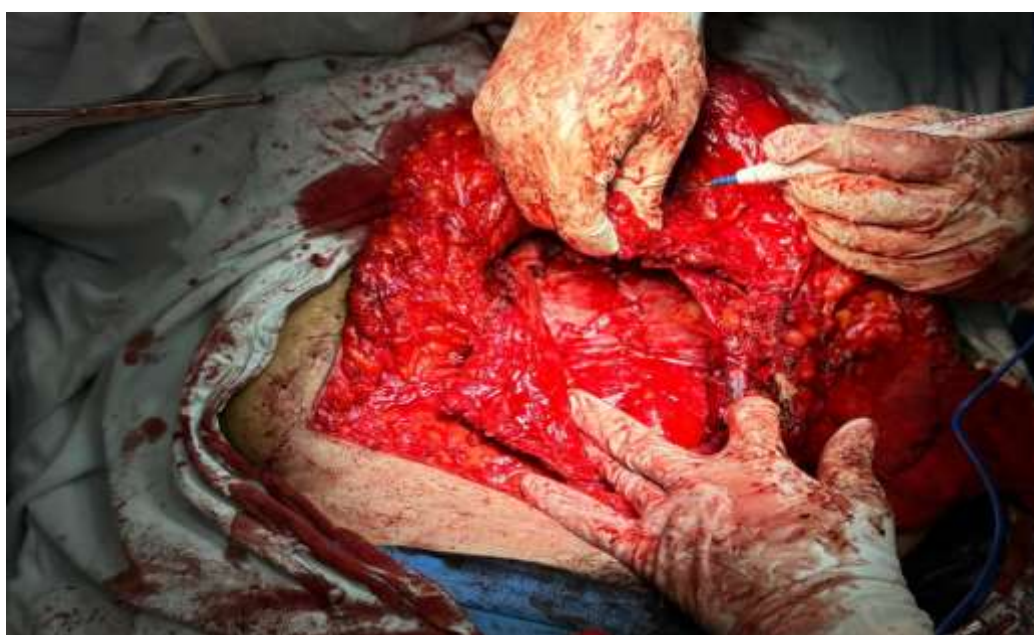


Figure 5: Aponeurotic closure.



Figure 6: Mesh placement using the Rives-Stoppa technique.



Figure 7,8: Immediate postoperative period.

Postoperatively, the patient progressed well without respiratory or infectious complications. Preoperative respiratory exercises, pneumoperitoneum, and botulinum toxin were critical in avoiding ventilatory insufficiency and

facilitating tension-free closure. Postoperative pain was managed with multimodal analgesia, and early mobilization was initiated. Drains were removed on day four, and discharge occurred on day five with good tolerance and

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preserved abdominal function. Follow-ups at one and three months showed adequate healing, no complications, and no recurrence.

In conclusion, the comprehensive approach—including pulmonary optimization, gradual abdominal expansion with pneumoperitoneum, muscle relaxation with botulinum toxin, and retromuscular Rives-Stoppa technique—enabled successful, safe repair with satisfactory clinical and functional outcomes.

DISCUSSION

Giant ventral hernias with loss of domain pose significant challenges in abdominal surgery due to technical complexity and high postoperative complication risk. Loss of domain is defined when herniated content volume exceeds the current abdominal cavity capacity, complicating reintegration without inducing intra-abdominal hypertension and related complications such as abdominal compartment syndrome, respiratory failure, or hemodynamic dysfunction. This is common in long-standing hernias, obesity, and extensive aponeurotic defects, as in this patient.^{8,9}

Preoperative management is crucial to improve surgical prognosis. Combining progressive pneumoperitoneum and botulinum toxin has proven effective in increasing intra-abdominal space and facilitating tension-free closure. Progressive pneumoperitoneum gradually expands the abdomen by insufflating air or gas, conditioning tissues and reducing postoperative intra-abdominal pressure. Botulinum toxin temporarily relaxes lateral abdominal muscles, increasing elasticity and permitting edge approximation without excessive tension, key to preventing recurrence and complications.¹⁰

The Rives-Stoppa technique, which involves retromuscular mesh placement, is considered the gold standard for large abdominal defects. This approach provides robust, durable support, minimizes closure tension, and reduces seromas and complications linked to traditional intraperitoneal repair. In this patient, wide and careful retromuscular dissection allowed proper mesh placement with adequate overlap, achieving effective and stable defect closure.¹¹

Preoperative respiratory preparation with incentive spirometry was vital to optimize pulmonary function, since abdominal content reintegration can restrict thoracic expansion and predispose to respiratory complications, especially in patients with comorbidities such as obesity and hypertension.¹²

The patient's favorable clinical course supports the efficacy of an integrated multidisciplinary approach combining preoperative preparation, advanced surgical techniques, and appropriate follow-up. The absence of respiratory, infectious complications or recurrence during follow-up emphasizes the importance of these strategies for giant hernias with loss of domain.¹²

Management requires careful evaluation and approaches beyond surgery, including preoperative measures to optimize abdominal and respiratory capacity. The Rives-Stoppa technique combined with preoperative preparation—including progressive pneumoperitoneum, botulinum toxin, and respiratory exercises—is a safe and effective option for repairing these complex defects, improving clinical outcomes and patient quality of life.¹²

CONCLUSION

Managing giant ventral hernias with loss of domain involves not only a technical challenge but also a deep understanding of abdominal physiology and dynamics. This case illustrates how a multidisciplinary approach and modern techniques can transform a traditionally high-risk scenario with uncertain outcomes into an opportunity for effective, durable solutions.¹³

Success depends not only on the surgical technique but also on recognizing the importance of optimizing the patient's biological environment. Preoperative preparation, although fundamental, represents only part of a comprehensive process including personalized evaluation, expectation management, and close collaboration among surgeons, anesthesiologists, physiotherapists, and nursing staff.¹⁴

Postoperative rehabilitation and follow-up are crucial to consolidate surgical success, allowing functional recovery and minimizing late complications. Prioritizing patient quality of life and function involves integrating anatomical repair with strategies promoting mobility, pain control, and adaptation to postoperative physical changes.¹⁵

This case also invites reflection on the importance of innovation and ongoing updates in surgical practice. Incorporating techniques such as botulinum toxin application and progressive pneumoperitoneum.¹⁵

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