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# Giant Mesenteric Cyst and Ventral Hernia with Loss of Domain: Combined Approach

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**ABSTRACT**

Mesenteric cysts are extremely rare benign intra-abdominal tumors (1:100,000–250,000 hospital admissions). Recurrence after complete surgical resection is uncommon (0–13%), and massive recurrence more than three decades later constitutes an exceptional event. We present the case of a 59-year-old female patient with recurrence of a mesenteric cyst 33 years after the initial resection, associated with a giant ventral hernia with loss of domain (Tanaka Index 28%) and symptomatic cholelithiasis, successfully treated with a combined single-stage surgical approach.

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## Introduction

Mesenteric Cysts (MCs) are cystic lesions located between the layers of the mesentery, classified by Perrot into six types: lymphatic (lymphangiomas), mesothelial, enteric, urogenital, dermoid, and pseudocysts [1]. The treatment of choice is complete surgical excision, as procedures such as aspiration or marsupialization have high recurrence rates.

Incisional hernia or ventral hernia affects 10–20% of post-laparotomy patients. In large, long-standing defects, Loss of Domain (LOD) may occur, defined by the 2020 Delphi consensus as a ventral hernia in which primary fascial closure cannot be achieved without additional techniques or carries a significant risk of intra-abdominal hypertension [2].

The Tanaka Index (ratio of Hernia Sac Volume / Abdominal Cavity Volume) is the standard metric to objectively quantify LOD [3]. Values >25% are considered high-risk for postoperative Abdominal Compartment Syndrome (ACS), often requiring preoperative preparation or component separation techniques.

## Case Presentation

A 59-year-old female patient with a history of well-controlled hypertension and chronic venous insufficiency. In 1992, she underwent an exploratory laparotomy for acute abdomen with resection of a mesenteric cyst, with no documentation available regarding its characteristics. In 2011, she required a second surgery for an "internal hernia." Since 2005, she progressively developed a ventral hernia along the midline scar, with accelerated increase in abdominal girth, diffuse pain, early satiety, and weight loss. on physical examination, the abdomen was globular and markedly asymmetric, with a large midline defect and a palpable mass occupying the left hemiabdomen. Simple computed tomography revealed a giant intra-abdominal cystic lesion occupying the entire cavity, compatible with mesenteric cyst recurrence (Figure 1 and 2), in addition to a median incisional hernia with a 7×8 cm aponeurotic defect containing the stomach, intestinal loops, and omentum. Volumetry calculated a Tanaka Index of 28% (Hernia Sac Volume 3,013 cc; Abdominal Cavity Volume 10,732 cc), indicating a high risk for ACS. Abdominal ultrasound showed multiple gallstones.

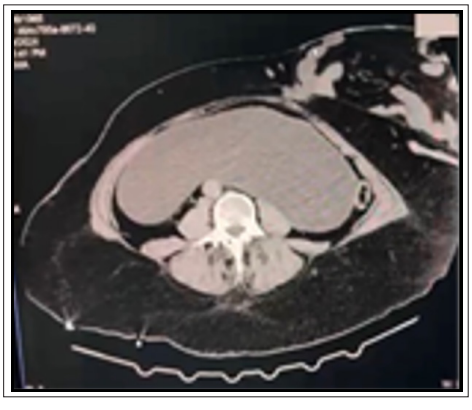

**Figure 1:** Abdominal CT Scan-Axial View: A Giant Intra-Abdominal Cystic Lesion with Homogeneous Content is Observed


**Figure 2:** Abdominal CT Scan-Coronal View: A Giant Intra-Abdominal Cystic Lesion Occupying the Entire Abdominal Cavity is Observed

The diagnoses were established as giant recurrent mesenteric cyst 33 years after the initial resection, giant ventral hernia with loss of domain, and symptomatic cholelithiasis.

Elective combined surgery was planned in November 2025 under general anesthesia with epidural analgesia. The procedure was performed in three sequential stages:

- **Midline Laparotomy:** with complete excision and enucleation of the recurrent mesenteric cyst, yielding a surgical specimen measuring 30×15 cm and weighing 3.3 kg (Figure 3 and 4) with preservation of intestinal vascularization.
- **Standard Cholecystectomy.**
- **Abdominal Wall Repair using the Rives-Stoppa Technique:** Including retro-muscular space dissection, closure of the posterior sheath with Vicryl 2/0, placement of a 30×30 cm macroporous polypropylene mesh in the retromuscular space, closure of the anterior aponeurosis and skin, followed by placement of a negative pressure wound therapy system.

**Figure 3:** Initial Intraoperative Exposure Showing a Giant Mesenteric Mass Occupying the Entire Abdominal Cavity

**Figure 4:** Partially Resected Mesenteric Cyst with Visible Pedicle (Arrow)

The patient had a favorable postoperative course, with no signs of respiratory distress, intra-abdominal hypertension, or abdominal compartment syndrome. Pain management was adequate with multimodal analgesia, including intravenous paracetamol and epidural anesthesia. The negative pressure device and epidural catheter were removed as planned, and the patient was discharged 24 hours postoperatively in good general condition.

Histopathological examination confirmed a serous cystadenoma, with no borderline or malignant areas identified in the sections evaluated. (Figure 5)

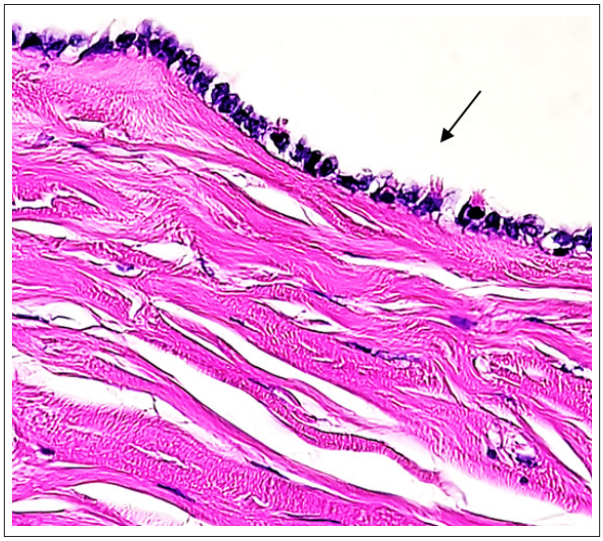

**Figure 5:** Histologic Section Demonstrating a Cyst Wall Lined by a Single Layer of Ciliated Cuboidal Epithelium (Arrow)

**Discussion**

Recurrence of a mesenteric cyst (MC) more than three decades after the initial resection constitutes an exceptional phenomenon, considering that the literature reports recurrence rates between 0 and 13%, usually within the first few years after initial excision [1-4].

Among the proposed pathophysiological mechanisms, incomplete resection may allow microscopic cyst remnants to remain latent for a long period before reactivation. In addition, lymphangioma histology, known for its infiltrative behavior, presents the highest probability of recurrence, with documented cases up to 11 years postoperatively [5].

Although rare, this evidence supports the possibility of extremely late recurrences, as observed in our case. Given the low but present risk of malignant transformation (<3%) described in incompletely excised MCs, radical excision remains the recommended therapeutic strategy [6].

The Classification Proposed by Perrot (1) Describes the Following Classification

| Type | Classification | Origin / Etiology | Pathophysiology | Characteristics |
|---|---|---|---|---|
| 1 | Lymphatic cysts (Lymphangiomas) | Congenital malformations of the mesenteric lymphatic system or acquired lymphatic obstruction | Accumulation of lymph due to obstruction of lymphatic channels. Multilocular and infiltrative nature [4,5]. | Highest recurrence rate. Content: clear chylous fluid |
| 2 | Mesothelial cysts | Mesothelial inclusions during embryonic development or chronic peritoneal irritation | Proliferation of mesothelial cells that secrete serous fluid | Simple mesothelial lining. Content: clear yellow serous fluid |
| 3 | Enteric cysts (Duplication) | Developmental anomalies of the gastrointestinal tract | Duplication of the intestinal wall with production of gastric/ intestinal secretions | Share muscular wall with intestine. Risk of bleeding/ perforation |
| 4 | Urogenital cysts | Embryonic remnants of the urogenital system (Wolffian/ Müllerian ducts) | Persistence of urogenital embryonic structures in the mesentery | Extremely rare in mesenteric location |
| 5 | Dermoid cysts | Differentiation of tissues from all three germ layers (ectoderm, mesoderm, endoderm) | Contain hair, teeth, sebaceous tissue. Risk of malignancy (<1%) | Contain hair, teeth, sebaceous tissue. Risk of malignancy (<1%) |
| 6 | Pseudocysts | Abdominal trauma, pancreatitis, infections | Tissue necrosis with cavity formation without true epithelial lining | No epithelium. Fibrous wall. Variable content (hematic, necrotic) |

The second clinical challenge was the presence of a giant ventral hernia with Loss of Domain (LOD), categorized by a Tanaka Index of 28%, a value classified by the European Hernia Society and the World Society of the Abdominal Compartment Syndrome as high-risk for postoperative abdominal compartment syndrome (ACS) [7, 8]. In most patients with LOD and equivalent volumes, this percentage typically necessitates advanced component separation techniques, such as Transversus Abdominis Release (TAR), or even preoperative preparation with botulinum toxin A or progressive pneumoperitoneum. However, retromuscular repair using the Rives-Stoppa technique was feasible in this case without tension and without additional procedures. This finding can be explained by a phenomenon of "paradoxical facilitation", in which excision of the mesenteric cyst-approximately 3.3 L in volume—created more intra-abdominal space than the volume reintroduced from the hernia sac (≈3 L). This negative volumetric balance, unusual in LOD patients, allowed for safe fascial closure without critical intra-abdominal pressure elevation.

A third relevant aspect was the execution of combined surgery, which included abdominal wall reconstruction with synthetic mesh in a clean-contaminated scenario due to simultaneous cholecystectomy. Traditionally, this approach has been debated, and the Ventral Hernia Working Group suggested favoring biologic meshes in contaminated contexts [9,10]. Nevertheless, recent high-quality evidence contradicts this historical stance. Studies from the Americas Hernia Society Quality Collaborative show that ventral hernia repair with mesh performed concomitantly with cholecystectomy does not increase the incidence of surgical site complications (SSI or SSOPI) compared with isolated hernia repair [11]. Similar results have been reported in multicenter analyses and contemporary meta-analyses, which found no significant differences in mesh infection, sepsis, or reoperation rates between combined and non-combined groups [12,13]. Based on this evidence, the use of macroporous polypropylene mesh in this case is considered safe and appropriate, particularly in the absence of active biliary infection.

Finally, it is noteworthy that, despite the high preoperative Tanaka Index, the patient did not develop ACS in the immediate postoperative period, reinforcing the validity of the pathophysiological analysis based on net volumetric balance. This highlights the importance of individualized assessment in complex abdominal wall surgery. Although the Tanaka Index is a fundamental tool for surgical planning and risk assessment for intra-abdominal hypertension, its interpretation must be contextualized according to associated pathological anatomy. In the presence of large, potentially resectable intra-abdominal masses, physiology may be significantly altered, allowing for surgical strategies that do not necessarily follow established algorithms.

## Conclusions

This case illustrates the successful resolution of a high-complexity surgical scenario through careful preoperative planning and an integrative technical strategy. Recurrence of a giant mesenteric cyst more than three decades after initial resection represents an exceptional finding, likely related to the infiltrative nature of lymphangiomas or incomplete resection during the primary surgery. Similarly, this case emphasizes the importance of interpreting the Tanaka Index within the individual anatomical and pathophysiological context of each patient. Although the index is a key tool to estimate the risk of intra-abdominal hypertension in loss-of-domain scenarios, the presence of a large, resectable intra-abdominal lesion can substantially modify the relationship between hernia contents and abdominal cavity, allowing safe

fascial closure without advanced component separation techniques.

Additionally, combined surgery proved to be a safe approach, as retromuscular Rives-Stoppa repair with synthetic mesh could be performed concurrently with elective cholecystectomy without increasing the risk of infection, in accordance with current evidence from international surgical registries and meta-analyses. Finally, the absence of abdominal compartment syndrome despite the high Tanaka Index reinforces the utility of individualized volumetric analysis as a decision-making tool in complex abdominal wall surgery.

Overall, this case underscores the need to comprehensively evaluate each surgical scenario, recognizing that available algorithms and nomograms must be interpreted within the overall clinical context, especially when coexisting pathologies significantly alter intra-abdominal dynamics. Detailed consideration of these factors can enable safer and more effective surgical approaches, even in settings where guidelines predict the need for more extensive procedures.

## Declarations

### Informed Consent

Informed consent was obtained from the patient for both surgery and publication of the case, ensuring confidentiality.

### Conflict of Interest

The authors declare no conflicts of interest.

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