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Case Report

Laparoscopic excision of a giant retroperitoneal benign mesenteric cyst encasing the left ureter and iliac vessels: a rare case report and literature review

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ABSTRACT

Retroperitoneal mesenteric cysts are exceedingly rare benign intra-abdominal tumors that pose significant diagnostic and therapeutic challenges due to their silent progression, large potential size, and proximity to major retroperitoneal neurovascular and urinary structures. We present the case of a 59-year-old postmenopausal female presenting with chronic, intermittent left-sided abdominal pain for three years and progressive urinary hesitancy for one year. Advanced imaging delineated a giant, thin-walled, unilocular retroperitoneal cystic lesion measuring approximately 12.6 × 11.4 × 10.9 cm, causing severe extrinsic compression, displacement, and complete encasement of the left ureter and left common iliac artery, resulting in moderate hydronephrosis.

Despite the immense size and complex anatomic adherence, the patient successfully underwent a minimally invasive Laparoscopic Excision of the giant cyst with meticulous dissection and preservation of the encased ureter and iliac vessels. Following complete isolation, controlled aspiration was safely executed without spillage to downsize the specimen for extraction, avoiding open conversion. Histopathological evaluation confirmed a benign mesenteric cyst of retroperitoneal origin. The patient experienced an uneventful postoperative recovery with immediate resolution of urinary and painful symptoms. This case underscores that with advanced laparoscopic expertise and precise anatomical navigation, giant adherent retroperitoneal cysts can be safely managed via minimally invasive pathways, avoiding the morbidity of open conversion.

Keywords: Retroperitoneal cyst, Benign mesenteric cyst, Laparoscopic excision, Controlled aspiration, Minimally invasive surgery

INTRODUCTION

Mesenteric cysts are rare intra-abdominal cystic lesions with an estimated incidence of 1 in 100,000 to 250,000 hospital admissions.[1,2] Among these, true retroperitoneal mesenteric cysts-those arising strictly from the retroperitoneum independent of organs like the kidneys, pancreas, or ovaries are even more exceptional, representing a small fraction of all retroperitoneal masses.[1,3] Structurally, they are thin-walled, lined by mesothelial or endothelial cells, and filled with serous, chylous, or mucinous fluid.[4]

Because the retroperitoneal space is compliant and highly distensible, these lesions typically expand insidiously without specific signs until they achieve a giant size or induce mechanical pressure symptoms on adjacent structures.[5-9] When these cysts expand to exceed 10 cm, they are classified as giant cysts.[10]

At this dimension, they pose complex diagnostic dilemmas, frequently mimicking ovarian malignancies, retroperitoneal sarcomas, lymphangiomas, or cystic duplication anomalies.[10-13]

Preoperative imaging like computed tomography (CT) and magnetic resonance imaging (MRI) can define the fluid nature and boundaries of the mass, but cannot reliably differentiate between benign and malignant pathology when tumor markers like Cancer Antigen 125 (CA 125) are equivocal.[14] Historically, surgical management of giant retroperitoneal cysts routinely required exploratory laparotomy to maintain oncological safety and manage dense vascular or visceral adhesions.[1]

However, with the rapid maturation of surgical instrumentation and advanced laparoscopic expertise, laparoscopic resection has emerged as a compelling alternative.[3,5] We report a unique case of a giant 12 cm retroperitoneal mesenteric cyst in a 59-year-old female that completely encased the left ureter and was densely adherent to the left common iliac artery, successfully managed entirely via a minimally invasive laparoscopic approach.[8]

CASE REPORT

A 59-year-old postmenopausal female presented with a three-year history of dull, intermittent pain localised to the left side of the abdomen. Over the past year, she noted progressive urinary complaints, characterised predominantly by a poor stream of urine, hesitancy, and incomplete voiding. She had a history of essential hypertension well-controlled on standard medical therapy, with no prior surgical history. Physical examination revealed a soft, non-tender but visibly asymmetrical abdomen.

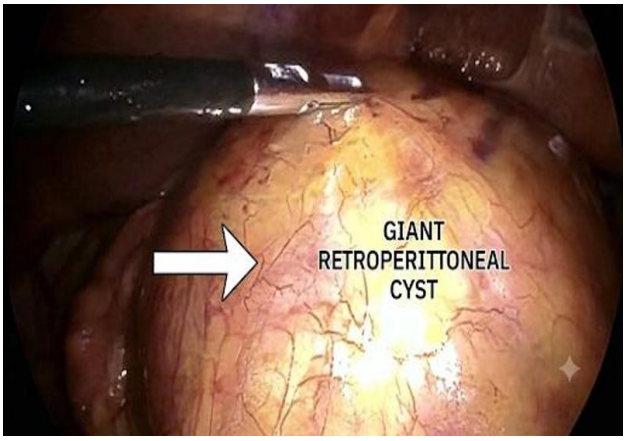

Figure 1: Intra-operative picture of giant retroperitoneal mass in left Iliac fossa.

On deep palpation, a large, firm, smooth, and fixed mass measuring approximately 12 × 12 cm was clearly palpable in the left iliac and lumbar regions, extending medially toward the midline. Laboratory evaluations revealed normal complete blood counts, intact renal function parameters with a serum creatinine level of 0.89 mg/dL, and a baseline cardiorespiratory status suitable for major intervention.

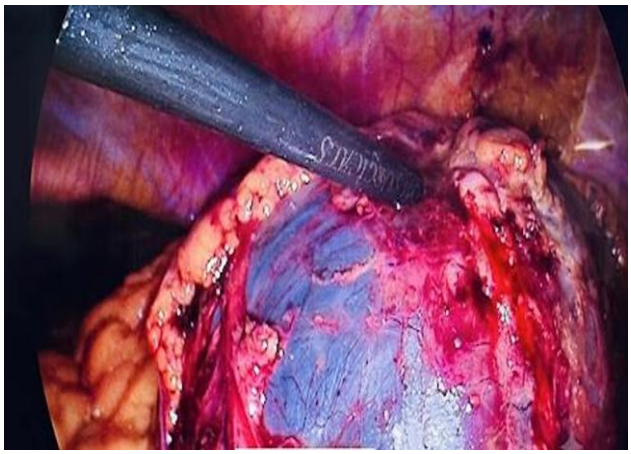

Fig. 2: Intra-operative picture of dissection of mass from mesentery.

Tumor markers evaluated to rule out pelvic or retroperitoneal malignancies revealed a borderline Cancer Antigen 125 (CA 125) level of 35 U/mL, while other markers, including Carcinoembryonic Antigen (CEA) and CA 19-9, were well within their respective normal reference ranges. Based on the baseline clinical features and completely benign radiologic indicators, the clinical impression pointed significantly toward a benign pathology rather than a malignant process.

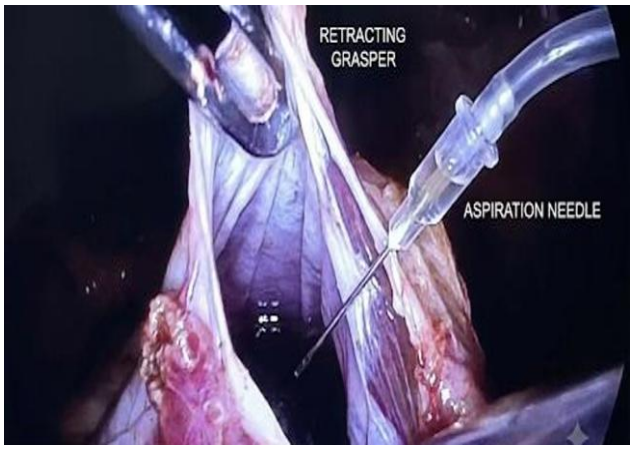

Figure 3: Intra-operative picture of controlled aspiration of cyst fluid.

The patient and her relatives were counseled in comprehensive detail regarding our plan for advanced Minimal Invasive Surgery. This extensive counseling focused on the benefits of laparoscopy, the expected recovery timeline, and the precise intraoperative strategies designed to systematically navigate and manage the complex retroperitoneal mass while mitigating risks to nearby structures.

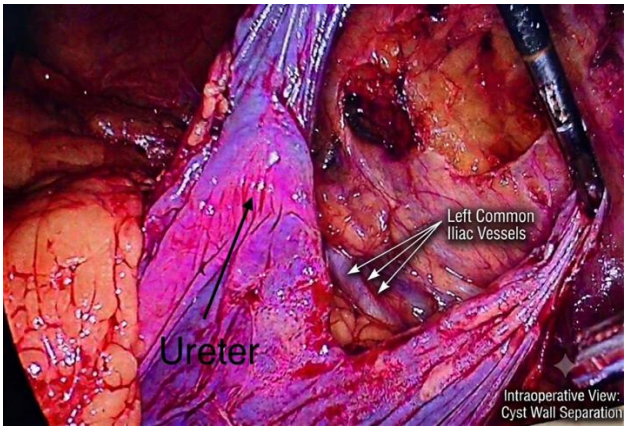

Figure 4: Intra-operative picture of dissection of cyst from left ureter and left Iliac vessel.

Diagnostic imaging was instrumental in mapping the anatomy of the mass. A baseline transabdominal ultrasonography demonstrated a giant, simple, thin-walled unilocular cyst at the level of the aortic bifurcation on the left side, measuring 126.3 × 114.6 × 109.4 mm with an estimated volume of 829 cc. The scan showed no internal septations or papillary projections but noted mild-to-moderate hydronephrosis of the left kidney due to extrinsic compression of the left ureter by the cyst.

To define the spatial relationships precisely, a contrast-enhanced spiral CT scan of the abdomen and pelvis with MRI correlation was performed. The imaging confirmed a thin-walled, non-enhancing retroperitoneal cystic lesion in the left paramedian location, extending from the L3 to S1 vertebral levels. Postero-laterally, the left ureter was compressed, stretched, and completely encased by the lesion, resulting in moderate left-sided hydroureteronephrosis.

Medially, the cyst wall demonstrated a loss of fat planes with the abdominal aorta and the left common iliac artery, with an angle of contact approaching 180 degrees. The overall findings strongly favoured a cystic etiology of retroperitoneal origin, with a primary differential of a giant retroperitoneal mesenteric cyst. Given the symptomatic nature of the mass and its secondary obstructive effects on the urinary system, a laparoscopic excision was planned.

Under general anaesthesia, a pneumoperitoneum was established. Laparoscopy revealed a massive, tense retroperitoneal cyst bulging through the left mesocolon, pushing the descending colon medially and superiorly. Meticulous sharp and blunt dissection was initiated by incising the retroperitoneal peritoneum lateral to the descending colon along the line of Toldt, allowing the colon to be mobilised medially to expose the true boundaries of the cyst. Intraoperatively, the cyst wall was found to be intensely adherent to the left retroperitoneal floor. Crucially, the left ureter was entirely encased by dense fibrous adhesions within the posterior capsule of the cyst, and the medial aspect of the cyst wall was firmly bound to the left common iliac artery. Utilising advanced ultrasonic scalpels and fine-tip bipolar dissectors, a cautious micro-dissection technique was employed.

The left ureter was successfully identified superior to the cyst, carefully isolated, and progressively freed from the encasing cyst wall under direct visualisation without compromising its vascular adventitia. Similarly, the cyst was carefully delineated from the adventitia of the left common iliac artery, separating the dense 180-degree contact zone line-by-line.

After complete dissection of the mass, the architectural appearance and tissue consistency almost confirmed that it was thoroughly benign in nature and purely cystic, without any evidence of a mixed solid-cystic component. Looking at its massive dimensions, we made a strategic intraoperative decision to aspirate the fluid contents under controlled conditions to prevent any intraperitoneal spillage. This decompression was safely completed and confirmed that it was a simple serous cyst.

Following this verified decompression, the cyst wall was safely opened and excised. This tactical decision was highly crucial; otherwise, an un-aspirated specimen of this immense size would have forced the surgical team to convert or create a large incision purely for specimen retrieval, thereby undermining the primary purpose of the minimally invasive approach. Total operative time was approximately 165 minutes with minimal blood loss (<50 ml).

The excised specimen comprised multiple pieces of a thin cyst wall totalling 11 cm in aggregate length, with a smooth inner surface and no solid or papillary components. Histopathological examination showed a fibrocollagenous cyst wall, partially lined by an attenuated layer of flattened-to-cuboidal mesothelial cells. The subepithelial wall demonstrated focal, mature lymphocytic infiltration alongside mild vascular congestion.

There was no cellular or architectural atypia, no granulomatous inflammation, and no evidence of malignancy. The definitive histopathological impression was consistent with a benign mesenteric cyst of retroperitoneal origin. The patient's postoperative course was remarkably smooth and uneventful. She was mobilised early, and regular bowel function resumed within 24 hours.

Her preoperative urinary symptoms specifically the poor stream of urine and hesitancy completely resolved prior to discharge, secondary to the surgical decompression of the left ureter. She was safely discharged in stable condition on postoperative day 4. Serial clinical and ultrasonographic follow-ups have shown complete normalization of the left renal system with resolution of

hydronephrosis and no clinical or imaging evidence of cyst recurrence.

DISCUSSION

Retroperitoneal mesenteric cysts represent a very rare entity among abdominal masses, first described during autopsies by Benevieni in 1507 and surgically resected for the first time by Tillaux in 1880.[1,2] The most widely accepted embryological hypothesis suggests a failure of the lymphatic spaces to communicate with the primary lymphatic system during embryonic development, leading to blind-ending endothelial pouches that gradually fill with fluid.[1,4] Alternative theories include remnants of urogenital structures or localized traumatic or infectious lymphatic obstruction.[2]

Clinical presentations are highly variable and completely non-specific. When these cysts reach giant proportions (>10 cm), they compress adjacent retroperitoneal organs.[10,12] In our case, the cyst's location and its 12.6 cm diameter resulted in direct mechanical compression and encasement of the left ureter, inducing progressive urinary symptoms and moderate hydronephrosis a clinical presentation that is exceptionally rare for benign mesenteric cysts, which usually compress bowel loops rather than the urinary tract.[9]

Furthermore, the proximity to the retroperitoneal sympathetic chain and major vessels can sometimes result in chronic neurogenic pain, which may be misattributed to musculoskeletal or radicular sources before the mass is localized.[12,13] Preoperative diagnosis relies heavily on a multimodal imaging strategy. Contrast-enhanced CT and high-resolution MRI are the gold standards, as they provide critical maps of the relationship between the cyst capsule and major vessels.[4,13]

A major diagnostic challenge is ruling out malignancy preoperatively. While simple unilocular cysts are typically benign, the sheer size and borderline elevation of tumor markers can heighten suspicion for an ovarian malignancy or retroperitoneal sarcoma.[10,13] In such ambiguous cases, the use of diffusion-weighted imaging (DWI) on MRI can be particularly valuable, as it helps characterize the cystic content and can suggest a benign etiology by revealing fluid-like diffusivity, thereby reducing the rate of unnecessary radical surgeries.[14]

To appreciate the management paradigms of giant masses that border vascular frameworks, it is valuable to evaluate how global surgical teams' approach similarly complex anatomical scenarios. Historically, lesions greater than 10 cm that display a 180-degree or higher contact angle with the iliac vessels or aorta necessitated open exploratory laparotomy. For example, in a classic review by Kurtz et al open resection was considered the standard to avoid catastrophic hemorrhage during large vascular isolation.[1]

In contrast, our approach matches the findings of modern cohorts like Santana et al., who established that advanced laparoscopic visual scaling provides safe counter-traction vectors to systematically separate dense planes from major retroperitoneal channels without open conversion.[11] The complete encasement of the ureter observed in our patient represents an extreme presentation. In a similar case documented by Traversa et al a retroperitoneal cyst caused significant ureteral compression; however, our case involved true circumferential encapsulation within the posterior capsule.[9]

While some surgeons deploy prophylactic preoperative double-J (DJ) ureteral stenting to aid tactile identification, our team achieved successful liberation solely through high-magnification laparoscopic sharp micro-dissection.[12] This technique preserves the delicate longitudinal periureteral adventitial blood supply, eliminating the risks of thermal injury or ischemic stricture associated with aggressive energy devices.[5,6]

A technical debate also exists regarding whether to aspirate large cysts intraoperatively. Teams like Karamikheirabad et al and conventional retroperitoneal pseudocyst approaches frequently advocate for fluid decompression to expand the active working field.[10] However, our case prioritized a meticulous full dissection first to secure and clear the margins of the ureter and the iliac vessels while the cyst was tense, providing excellent counter-traction.

Once benign characteristics were macroscopically confirmed in total, controlled decompression was carried out to collapse the giant wall, satisfying modern oncological margin safety while preserving a completely minimally invasive exit route.[3,5] The definitive treatment for retroperitoneal mesenteric cysts remains complete surgical excision.[2] Complete cystectomy is strongly favored over simple aspiration or marsupialization, which are plagued by high recurrence rates (up to 25%) due to the persistence of the secretory lining.[1,2]

This case elegantly demonstrates that a minimally invasive laparoscopic approach is safe and highly effective for giant, heavily adherent retroperitoneal cysts when executed with advanced laparoscopic expertise.[5,8] The high magnification and superior illumination provided by modern laparoscopes allow for exceptional visualisation of the retroperitoneal planes, enabling precise neurolysis of the encased ureter and safe isolation from the left common iliac artery.[3,15]

Furthermore, the advent of indocyanine green (ICG) fluorescence-guided surgery may offer future improvements in defining vascular planes and ureteral viability during such complex dissections.[15] Given the possibility of late recurrence, particularly if the resection margins are near major vascular structures, we recommend serial follow-up via ultrasound to ensure the

retroperitoneal space remains free of fluid re-accumulation.[13]

CONCLUSION

True retroperitoneal mesenteric cysts are exceedingly rare benign lesions that can reach giant proportions, presenting with complex compression symptoms such as ureteral obstruction and hydronephrosis. While dense adherence to major vessels and complete encasement of the ureter have traditionally prompted an open laparotomy, our case confirms that advanced laparoscopic minimally invasive surgery is a safe, reproducible, and highly effective therapeutic path.

Meticulous dissection followed by safe, controlled intraoperative aspiration allows for complete intact cystectomy with preservation of vital structures, providing excellent long-term disease-free outcomes and minimal patient morbidity while entirely bypassing the need for a large extraction incision.

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