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Giant primary retroperitoneal granulosa cell tumor in a post-oophorectomy patient: A rare case report and a literature review

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ABSTRACT

Introduction: Primary retroperitoneal granulosa cell tumors (GCTs) are exceedingly rare, particularly in patients with prior bilateral oophorectomy, posing significant diagnostic challenges.
Case Presentation: A 69-year-old woman with multiple comorbidities and a history of hysterectomy with bilateral oophorectomy presented with a large retroperitoneal mass. Preoperative imaging demonstrated a well-defined fluid collection measuring 142 × 193 × 130 mm in the infra-pancreatic region, along with a tissue mass up to 59 × 50 × 33 mm in the left para-aortic area. These findings were consistent with a retroperitoneal mass. Tumor markers were non-contributory. Intraoperatively, the mass was identified as a giant retroperitoneal cyst and completely drained and excised via laparoscopic drainage and Pfannenstiel laparotomy. The definitive diagnosis was established post-operatively by pathohistological examination, which confirmed the lesion to be a Granulosa Cell Tumor.
Conclusion: This case underscores the importance of considering rare extra-gonadal GCTs in the differential diagnosis of retroperitoneal masses, even in post-oophorectomy patients. Complete surgical excision and long-term surveillance remain essential due to the risk of late recurrence.

1. Introduction

Primary retroperitoneal tumors account for a small fraction of all abdominal malignancies, and those arising from gonadal stromal elements (Sex Cord-Stromal Tumors, or SCSTs) in this location are exceptionally rare [1,2]. Granulosa cell tumors (GCTs) account for 2–5% of all ovarian neoplasms, making them an uncommon malignancy. Many years after the first course of treatment, it may reappear or metastasize. GCT seldom develops in an extraovarian location, even in patients who have had past oophorectomies. Only eight cases of these malignancies have been documented in English-language literature prior to 2001 [3].

The pathogenesis of these extra-ovarian tumors remains a subject of debate, with hypotheses ranging from the malignant transformation of ectopic gonadal remnants along the urogenital ridge to the de novo mesenchymal transformation of retroperitoneal cells. Beyond the diagnostic challenge, these cases often present significant surgical complexity. Managing a giant retroperitoneal mass (exceeding 200 mm) requires meticulous planning, especially in patients with advanced age and significant multi-system comorbidities [4,5].

This report presents the case of a patient with a giant mass initially thought to be a retroperitoneal cyst, whose definitive diagnosis was only achieved following pathohistological confirmation of a Primary Retroperitoneal Granulosa Cell Tumor. This report highlights the strategic management of the retroperitoneal mass in an elderly patient with significant multi-system comorbidities and an extensive profile of life-threatening drug allergies.

2. Case presentation

This case involves a 69-year-old female patient who presented to the surgical clinic for the management of a suspicious abdominal mass. Patient first visited the central district hospital with the primary complaints of indigestion, sudden increase in abdominal circumference and weight. Patient noticed these symptoms for few months prior to the hospital admission and could not specify the time that the symptoms first appeared.

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The patient had several significant comorbidities including, Cardiovascular Diseases: Ischemic Heart Disease (IHD),Atherosclerotic cardiosclerosis, Arterial Hypertension Stage 2 (Risk 4), Mitral Regurgitation Stage 2, and Aortic root dilation (36 mm); Metabolic/Endocrine diseases: Type 2 Diabetes Mellitus (HbA1c 6.2%), Obesity Stage 2 (BMI 37.3), and diabetic microvascular complications including Diabetic Retinopathy and combined-genesis Nephropathy; Pulmonary diseases: Bronchial Asthma (mixed form, DN 1). Also, the patient has Chronic Kidney Disease (CKD) Stage 3 A (GFR 54), and a documented esophageal hiatal hernia measuring up to 92 × 53 mm. Crucially, the patient's surgical history included a previous hysterectomy and bilateral oophorectomy (removal of uterus and both ovaries) 25 years ago, a detail vital to the final pathological diagnosis. Patient also has life threatening allergic reactions to the following drugs: novocain, papaverine, dexamethasone, ampicillin, euphyllin and dibazol.

Upon admission, the patient was clinically stable, without any acute complaints at the time of examination. The abdominal examination revealed non-distended, soft, painless abdomen without peritoneal irritation. The patient was admitted to the Department of Organ and Tissue Transplantation, Plastic and Endocrine Surgery.

Following the admission, a comprehensive laboratory and imaging evaluation was performed, including blood tests, abdominal CT and MRI which guided further management. The patient was further tested for Hepatitis B and C infections and HIV infection. Inflammatory and liver function markers revealed a high-grade inflammatory process with ESR 49 mm/h, Total Bilirubin 47 μmol/L, and AST 50 U/L. Tumor markers CA 19–9 (23.6U/ml) and CA 125 (15.2 U/ml) were within normal limits; alpha-fetoprotein was negative. Also, the patient tested positive for Hepatitis C viral infection. Tables 1 and 2 includes the findings of the patient's major laboratory investigations.

The CT scan of the abdomen revealed a large, complex fluid-density formation (18 Hounsfield Units) measuring approximately 125 × 189 × 139 mm located in the left upper quadrant (mesogastrium), positioned inferior to the tail of the pancreas. The formation displayed thin internal septations and an unevenly thickened background wall (up to 8 mm). Additionally, the CT noted a persistent para-aortic structure (suggestive of a lymph node) measuring 32 × 48 mm.

The MRI confirmed the retroperitoneal, fluid-filled mass measuring up to 142 × 193 × 130 mm (Figs. 1–3) beneath the pancreatic tail, exhibiting moderate diffusion restriction. The MRI also described a closely adjacent soft tissue mass (59 × 50 × 33 mm, para-aortic; Fig. 2B) demonstrating diffusion limitation, which raised suspicion of an enlarged lymph node. Focal formations were also noted in the right lobe of the liver.

Following the laboratory and imaging Studies the pre- operative diagnosis was made as retroperitoneal cyst. Treatment plan following the diagnostic workup included beta-blockers, antihypertensive therapy, antiallergic therapy and elective surgical intervention for the retroperitoneal cyst.

Table 1
Complete blood count.

Parameter	Results	Reference range
Erythrocytes (RBC)	3.75×10^{12} /L	(3.7–4.9) $\times 10^{12}$/ L
Hemoglobin (Hb)	**94 g/L**	(120−160) g/L
Hematocrit (Hct)	**30.6%**	(32−46) %
Mean Cell Volume (MCV)	**81.6 FL**	(82−92) FL
Mean Corpuscular Hemoglobin (MCH)	**25.1 pg**	(28−32) pg
Mean Corpuscular Hemoglobin Concentration (MCHC)	**307 g/L**	(320−370) g/L
Platelets (plt)	221 × 10^9/L	(150−450) × 10^9/L
RDW- CV	16.5%	(11.5–14) %
Leukocytes (WBC)	6.87 × 10^9 /L	(4−9) × 10^9 /L
Neutrophils	**80%**	(45−70) %
Lymphocytes	**9%**	(18−40) %
Monocytes	3%	(3−8) %
Immature granulocytes	4%	(1−5) %
ESR	**49 mm/hr**	(2−15) mm/hr

Table 2
Biochemical analysis.

Parameter	Results	Reference range
Urea	4 mmol/L	(1.7–8.3) mmol/ L
Creatinine	75 μmol/ L	(53−97) μmol/ L
C- reactive protein	**26.1 mg/ L**	(0−6) mg/L
Total bilirubin	**47 μmol/L**	(5–20.5) μmol/L
Aspartate aminotransferase (AST)	**50 U/L**	(5−37) U/L
Alanine aminotransferase (ALT)	27 U/L	(5−42) U/L
Blood glucose	5.4 mmol/L	(3.5–6.2) mmol/L

The surgery began as a diagnostic laparoscopy under general inhalation anesthesia. The surgical team initially created an incision above the umbilicus to insert a trocar and a laparoscope, allowing them to visualize the large cyst located in the left mesogastrium. Laparoscopic exploration revealed a macroscopic cystic lesion measuring 250 × 250 mm, arising from the retroperitoneal space (Fig. 4). The apparent increase in size intraoperatively reflects cyst wall expansion and intraoperative estimation prior to complete drainage.

To manage the cyst's size and facilitate its removal, the team performed a puncture to drain approximately 300 ml of brown fluid. Given patient's coagulopathy and red blood cell deficiency, a transfusion of two doses of fresh frozen plasma (FFP) was carried out. The surgeons carefully dissected the cyst away from critical structures, including the duodenum, left kidney, and aorta. To safely remove the large specimen, a Pfannenstiel incision (a horizontal lower abdominal incision) was utilized. The cyst was placed in a protective container and removed, a drainage tube was installed, and the incisions were sutured without complications.

The immediate postoperative course was uneventful and without any complications. The postoperative diagnosis was made as Retroperitoneal cyst. Postoperative Management included: Thromboembolism Prophylaxis with compressive socks, Dalteparin 5000 IU subcutaneously, continued with Enoxaparin. Despite multiple documented drug allergies, the patient had no known hypersensitivity to low- molecular-weight heparins, which allowed their safe use for postoperative thromboprophylaxis. Antibiotic Prophylaxis was achieved with Cefazolin 2 g IV. Also, Omeprazole 40 mg IV was prescribed daily. Pain Management was achieved with Ketorolac and Drotaverine.

Following the surgical procedure, the patient's immediate postoperative course was uneventful, leading to a discharge plan focused on multi-disciplinary continuity of care. Outpatient management included surgical follow-up for wound care with dressings every other day and the successful removal of sutures. Due to the patient's extensive history of life-threatening allergies to six drug classes, specifically novocain, papaverine, dexamethasone, ampicillin, euphyllin, and dibazol, a strict hypoallergenic regimen was mandated, including a diet free from honey and herbal preparations and the absolute avoidance of all identified "culprit" drugs.

To manage her chronic conditions, a comprehensive pharmacological strategy was implemented: respiratory therapy for bronchial asthma consisted of salmeterol/fluticasone (50/500 mcg) twice daily for at least three months, supplemented by montelukast (10 mg) every evening, tiotropium bromide (2.5 mcg) daily, and rescue inhalers as needed. Cardiovascular and metabolic stability was maintained through a regimen of candesartan (32 mg), hydrochlorothiazide (25 mg), amlodipine (10 mg), aspirin (75 mg), and atorvastatin (20 mg), with moxonidine (0.4 mg) added for blood pressure control. Additionally, oral iron preparations and folic acid were prescribed three times daily to address hematological needs, with scheduled monitoring of hemoglobin levels.

The patient was also counseled on lifestyle modifications to manage Stage 2 obesity and Type 2 diabetes, including a low-cholesterol, low-

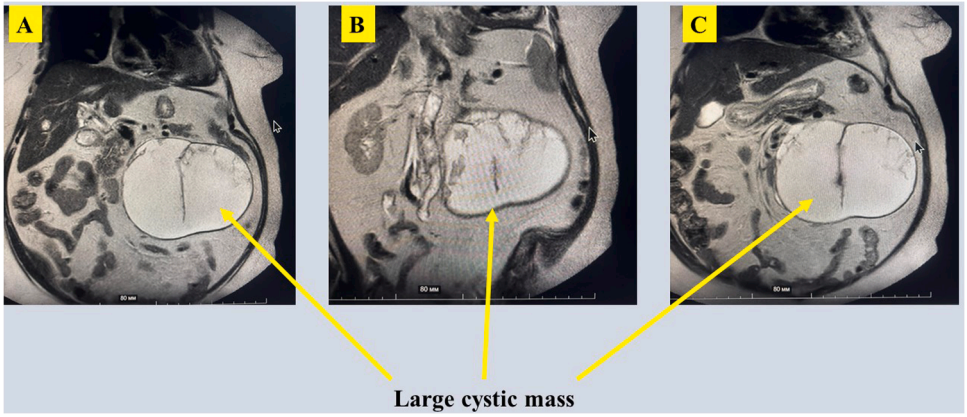

Fig. 1. Coronal MRI View of the abdominal cyst.

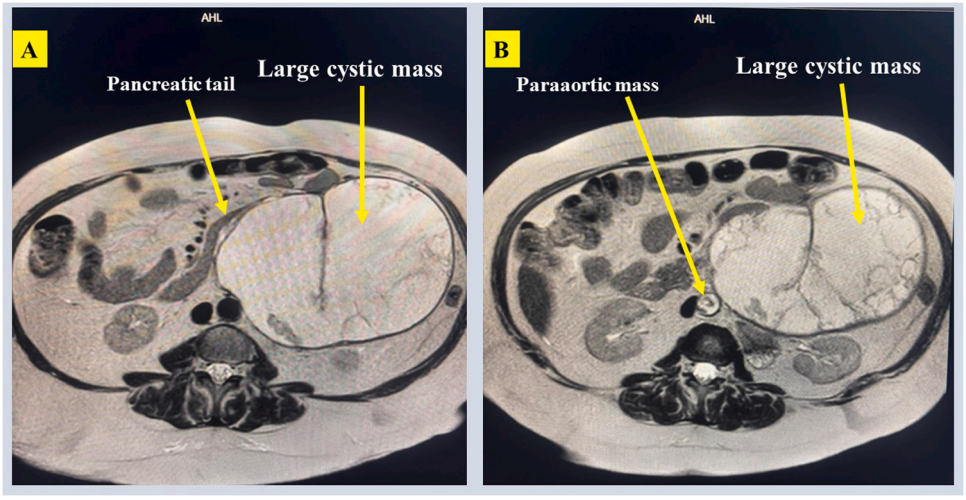

Fig. 2. Axial T2 weighted MRI view of the Abdominal Cyst and Para-Aortic Mass.

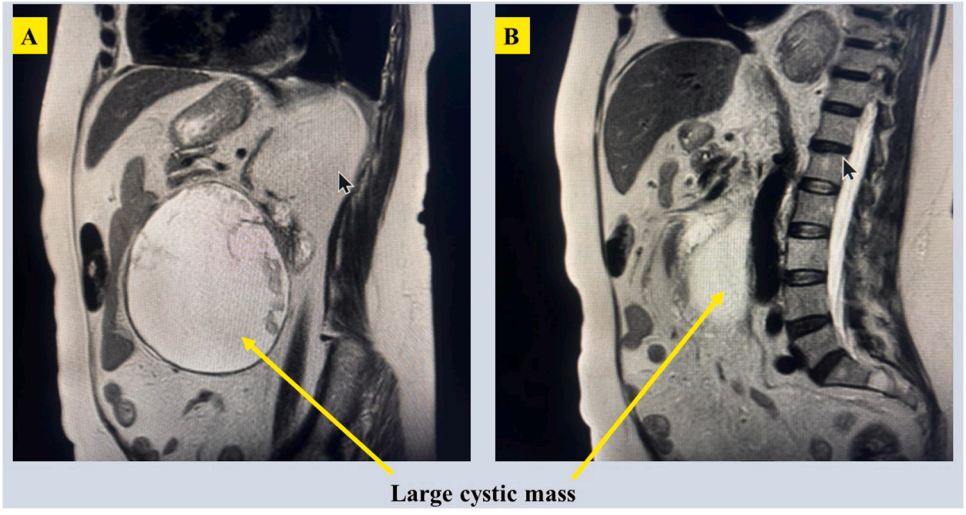

Fig. 3. Sagittal MRI view of the Abdominal cyst.

sodium diet (limiting salt to 5 g per day) and a regular aerobic exercise program of at least 150 min of moderate intensity per week. A specialized safety protocol was established for any future diagnostic requirements involving iodine contrast agents, necessitating a medical board review, formal consent, and pre-medication with prednisolone and bronchodilators. Finally, given the propensity of Granulosa Cell Tumors for late recurrence, the patient was enrolled in long-term oncological surveillance with instructions to retrieve definitive histology results ten days post-discharge and remain under the observation of both a surgeon and a therapist.

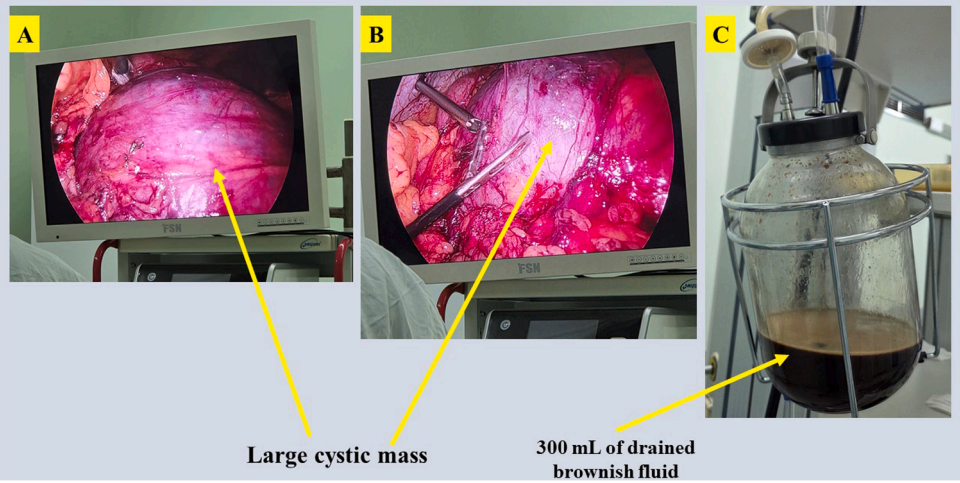

Fig. 4. Intraoperative views demonstrating the retroperitoneal cystic mass and the drained cystic fluid.

Initial pathohistological examination of provided histological preparations was limited by suboptimal slide quality. Following the preparation of good quality sections, the material revealed a neoplasm characterized by connective and adipose tissue containing cystic cavities. These cavities are lined by a monolayer of polygonal and cuboidal cells featuring angular to oval nuclei. Notably, there is an absence of significant cytological atypia or increased mitotic activity. To further characterize the cellular lineage, an extensive immunohistochemical (IHC) panel was performed (Table 3)

The morphological architecture, combined with the co-expression of WT1 and CD99, strongly supports a diagnostic hypothesis of a sex cord-stromal tumor [6].

The low Ki-67 proliferation index (5%) and the absence of mitotic figures suggest a tumor with low proliferative potential [7]. The IHC profile (specifically the negativity for CK7, CK20, and CDX2) effectively excludes common metastatic carcinomas of the gastrointestinal tract or lungs. Furthermore, the absence of SOX11 and specific neuroendocrine markers rules out lymphoproliferative and high-grade neuroendocrine malignancies [8]. Therefore, based on integrated morphological and immunohistochemical findings, the above profile was more consistent with sex cord stromal tumor, most compatible with granulosa cell tumor (GCT) in the retroperitoneum. The chronological sequence of clinical events, diagnostic findings, and interventions is summarized in Fig. 5.

Patient perspective: The patient expressed concern during diagnostic evaluation of the abdominal mass. Following treatment, she expressed reassurance and satisfaction with the care received.

3. Discussion

Retroperitoneal granulosa cell tumors (GCT) represent an extraordinary clinical consideration given their rarity, atypical location, and nonspecific clinical presentation [2]. This case underscores several critical aspects of diagnostic reasoning, surgical management, and long-term follow-up in such unusual tumors.

Imaging findings of a large, cystic, infra-pancreatic lesion with thin septations strongly favored a benign etiology. The absence of elevated tumor markers further reinforced this impression. However, GCTs are notorious for mimicking benign cystic lesions radiologically, leading to potential delays in definitive diagnosis [1,2,9]. This case underscores the importance of careful preoperative assessment and tailored surgical planning in the management of large retroperitoneal cystic masses in elderly patients with prior surgical interventions. The patient's prior hysterectomy and bilateral oophorectomy provided a pivotal clue in establishing the retroperitoneal origin of the tumor. The absence of ovaries excluded the possibility of an ovarian primary, thereby confirming the lesion as a true extra-gonadal granulosa stromal cell tumor. This raises intriguing questions regarding tumorigenesis: whether the mass arose from ectopic gonadal stromal remnants, vestigial tissue, or de novo transformation of retroperitoneal mesenchyme. [2,10].

Beyond establishing tumor origin, this case underscores extreme surgical complexity. The patient presented with a high-risk profile, including Stage 2 obesity, Ischemic Heart Disease, Type 2 Diabetes, and a rare pharmacological profile involving life-threatening allergies to six distinct drug classes. These factors necessitated a highly tailored surgical strategy.

While laparoscopy was initially attempted, the 250 mm size of the mass and its complex adherence to the duodenum and left kidney region necessitated removal of the specimen through a Pfannenstiel laparotomy. This decision was strategic; a transverse incision offered superior wound strength and a lower risk of incisional hernia critical considerations for an obese, diabetic patient while ensuring the complete oncological resection necessary for such tumors [11]. Although percutaneous biopsy or primary open laparotomy may be considered in selected retroperitoneal masses, biopsy was not pursued in this case due to the predominantly cystic nature of the lesion and the potential risk of tumor seeding. Complete surgical excision was therefore considered both diagnostic and therapeutic.

The use of a Pfannenstiel incision was further justified by the patient's surgical history of hysterectomy and bilateral oophorectomy, as re-opening a likely pre-existing scar is preferred over creating a perpendicular midline incision. Furthermore, this transverse approach facilitated controlled specimen extraction for the 142 × 193 x130 mm mass. By accessing the lower pole of the cyst through a lower transverse opening, the surgical team could stabilize the mass and perform drainage in a manner that prevented the spilled contents from contaminating the upper abdomen and paracolic gutters, offering improved specimen control while minimizing wound complications in high risk patients. [12].

Table 3
IHC profile.

Marker Category	Positive Expression	Negative Expression
Epithelial/ Structural	Pan-CK, E-cadherin, Beta-catenin	EMA, CK7, CK20
Specialized/ Diagnostic	WT1, GATA3, CD99, CD56 (focal)	p63, CDX2, SOX11, ER
Neuroendocrine	Not performed	Chromogranin A, Synaptophysin
Proliferation	Ki-67: ~5% (low proliferation)	Not performed

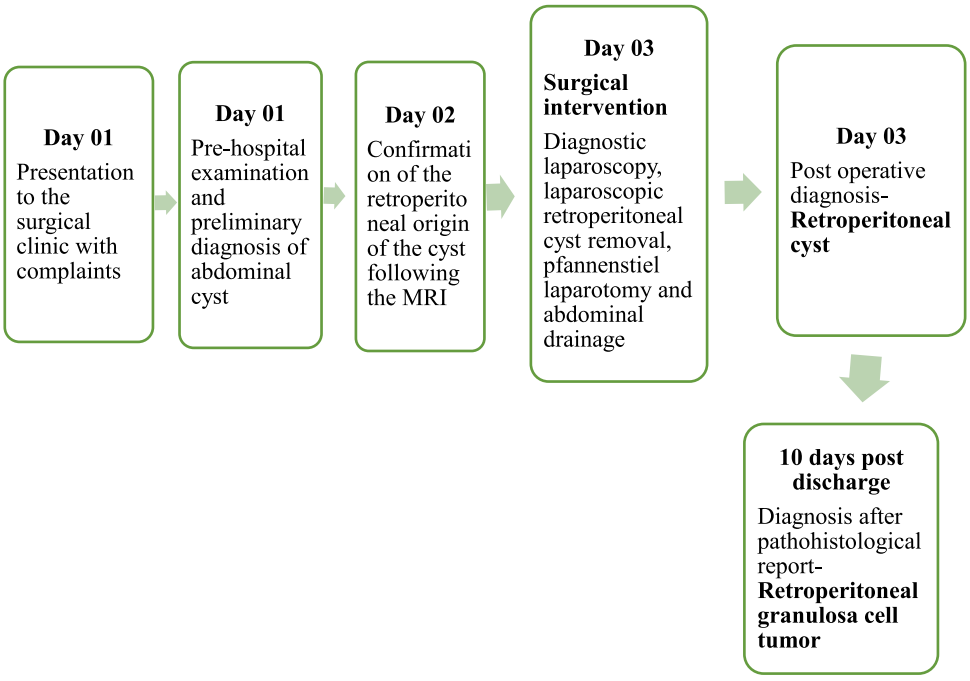

Fig. 5. Timeline of events.

Although the tumor was successfully excised and histologically benign, granulosa cell tumors are well-documented for their propensity for late recurrence, sometimes decades after initial treatment. This biological behavior necessitates vigilant, long-term surveillance [9,13]. Beyond therapeutic benefit, excision provided the tissue necessary for definitive histopathological diagnosis, which could not have been achieved through imaging or cytology alone. This reinforces the surgical principle that in rare retroperitoneal tumors, complete resection is both diagnostic and curative.

The diagnosis of indeterminate cystic masses is complicated by their nonspecific radiological features and the unreliability of common tumor markers like CA 19–9 or CA 125. In this case, a specialized immunohistochemistry (IHC) panel was essential for establishing the definitive diagnosis [14,15]. EMA and inhibin can aid in the differentiation of these malignancies. GCT is negative for EMA and positive for inhibin [16]. Due to the compromised quality of both the histological and immunohistochemical specimens, testing for inhibin was not undertaken by the pathologists, as the results would lack diagnostic validity. According to a study conducted by Němejcová et al. [17] with 290 patients with adult GCTs; 98%, 100%, 90%, 78%, 45%, 41%, 94%, 82%, 26%, and 9% of GCT expressed FOXL2, SF1, CD99, inhibin A, calretinin, ER, PR, AR, CKAE1/3, and CAIX, respectively. Although inhibin and FOXL2 testing could not be performed due to technical limitations, the morphological features combined with the IHC profile were more consistent with a diagnosis of extra- gonadal (retroperitoneal in this case) granulosa cell tumor.

It is important to distinguish extraovarian GCT from other ovarian metastatic cancers with comparable morphologies. These tumors can be differentiated with the aid of EMA and inhibin. GCT is negative for EMA and positive for inhibin. Additionally, it needs to be distinguished from other malignancies such lymphoma, endometrial stromal sarcoma, carcinoid, small cell carcinoma, and undifferentiated carcinoma. These tumors do not exhibit inhibin positivity. They can be diagnosed and differentiated with the use of IHC for CK, EMA, LCA, CD99, and chromogranin. EMA, LCA, and chromogranin are not detected by GCT [16]. The predominantly cystic radiological appearance and normal tumor markers initially favored a benign etiology in our case. However, definitive differentiation requires complete surgical excision and histopathological evaluation, particularly when imaging demonstrates adjacent solid components or diffusion restriction.

Tables 4 and 5 summarize eight similar cases with their major clinical and pathological findings.

The limitations of this report are primarily related to its single- case design and the rarity of primary retroperitoneal granulosa cell tumors. While the diagnosis was supported by concordant clinical, morphological and IHC findings, additional molecular characterization was not feasible due to technical constrains. Furthermore, the nonspecific radiological appearance reflects a recognized challenge in the preoperative evaluation of such rare tumors. Long term follow-up is ongoing to monitor for potential late recurrences. Nevertheless, this case adds meaningful clinical and surgical insight into a rare extra- gonadal presentation and contributes to the limited existing literature.

4. Conclusion

This case highlights the importance of considering rare extragonadal presentations of granulosa cell tumors in the differential diagnosis of retroperitoneal masses, particularly in patients with a history of oophorectomy. The successful management of such tumors requires not only complete surgical excision but also careful preoperative planning tailored to complex comorbidities and allergy profiles. Beyond the immediate surgical outcome, the unpredictable biological behavior of granulosa cell tumors underscores the necessity of long-term oncological surveillance. Documentation of this unusual presentation serves to broaden clinical awareness and contribute to the growing body of literature that informs diagnostic reasoning and surgical strategies for rare retroperitoneal masses.

CRediT authorship contribution statement

Kulasinghe Nethuki Akithma: Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Obuhovich Anneta Romualdovna:** Supervision, Resources, Methodology, Investigation. **Yauheni Aliaksandravich Stasiukevich:** Supervision, Resources, Methodology, Investigation.

Table 4
Clinical and imaging characteristics of reported retroperitoneal GST cases.

Reference	Age (years)	Clinical presentation	Tumor location	Tumor size	Imaging
[2]	55	Intermittent pain in the left lumbar region of one-year duration	Retroperitoneal	72 × 103 × 194 mm	CT-Longitudinally oriented heterogeneously enhancing solid cystic mass
[1]	52	Right adnexal mass detected on routine vaginal examination	Retroperitoneal	66 × 57 × 80 mm	USS-Adnexal complex mass of mixed echogenicity measuring
[3]	58	Pain in the right side of the abdomen for 9 months.	Retroperitoneal and mesenteric masses	*Retroperitoneal mass-* 80 × 45 × 50 mm *Mesenteric mass-* 130 × 150 × 80 mm	CT- well-defined heterogenous mass with areas of necrosis
[10]	54	Postcoital bleeding	Retroperitoneal	75 × 88 mm	CT- large solid lobulated mass with multiple necrosis
[13]	54	Acute pain in abdomen	Mesenteric mass	130 × 120 mm	USS- Solid heterogeneous mass
[18]	69	Abdominal discomfort	Retroperitoneal	112 × 80 × 120 mm	CT- solid heterogeneous mass
[9]	45	Continuous dull-aching pain of 1-month duration in the right lumbar and umbilical regions	Retroperitoneal	200 × 150 mm	CT- solid heterogeneous mass
[16]	60	2 months of a localized left upper quadrant abdominal pain, dull aching nature and associated with occasional episodes of vomiting and a history of non-documented weight loss.	Retroperitoneal	110 × 100 x 80 mm	CT- well-defined cystic mass

(CT- Computer Tomography; USS- Ultrasound Scan)

Table 5
Pathological and treatment modalities of retroperitoneal GCT cases.

Reference	Histopathology	IHC	Treatment	Ovaries examined
[2]	GCT	*Positive* -inhibin, calretinin, PR, WT1 *Negative* -EMA.	Laparotomy and excision of the retroperitoneal mass.	Previous TAH- BSO
[1]	GCT	*Positive*- inhibin, vimentin and calretinin *Negative*- CK7, CK20, ER, EMA, synaptophysin, chromogranin A	Laparotomy and excision of the retroperitoneal mass.	Planned TAH- BSO
[3]	GCT	*Positive*- inhibin *Negative* -EMA	Laparotomy and excision of the retroperitoneal and mesenteric masses	Previous TAH- BSO
[10]	GCT	*Positive*- inhibin, vimentin *Negative* -EMA, synaptophysin, NSE	Laparotomy and excision of the retroperitoneal mass.	Previous right oophorectomy. Planned left salphingo- oophorectomy and TAH
[13]	GCT	*Positive*- inhibin *Negative* -EMA	Laparotomy and excision of the mesenteric mass.	Previous TAH- BSO
[18]	GCT	*Positive*- inhibin *Negative* -EMA	Laparotomy and excision of the retroperitoneal mass.	Previous TAH- BSO
[9]	GCT	*Positive* -calretinin, SMA, melan-A, inhibin-alpha, PgR *Negative* -EMA, desmin, CD10, cytokeratin, synaptophysin, chromogranin-A.	Laparotomy and excision of the retroperitoneal mass.	Previous unilateral salphingo-oophorectomy and TAH
[16]	GCT	*Positive*- inhibin *Negative* -EMA	Laparotomy and excision of the retroperitoneal mass.	Planned TAH- BSO- Refused by the patient

(GCT- Granulosa Cell Tumor; EMA- epithelial membrane antigen; SMA- smooth muscle actin; ER- estrogen receptors; PgR- progesterone receptors; TAH- Total abdominal hysterectomy; BSO- Bilateral salphingo-oophorectomy)

Ethical approval and patient consent

The study was approved by the Institutional Ethics Committee and the written informed consent was obtained from the patient for the publication of the case report and any accompanying images. The signed consent form is held by the authors' institution and will be made available upon request.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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