

Retropancreatic Retroperitoneal Teratoma in an 11-Year-Old Girl: Challenging Perivascular Dissection and Organ-Preserving Resection — A Case Report

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ABSTRACT

Background: Retroperitoneal teratomas are rare extragonadal germ cell tumors of childhood that are diagnosed predominantly during the first year of life. Although mature forms are histologically benign, their close anatomical relationships with major retroperitoneal vessels and adjacent organs may render surgical resection technically demanding.

Case Presentation: An 11-year-old girl presented with a two-month history of lumbar and epigastric pain and a palpable, firm mass in the upper abdomen. Contrast-enhanced computed tomography demonstrated a well-circumscribed retroperitoneal mass measuring approximately $8 \times 7 \times 6$ cm, situated posterior to the body and tail of the pancreas and containing cystic, fatty, calcified, and solid components. The lesion compressed and displaced the superior mesenteric artery and vein, the splenic vessels, the inferior mesenteric vein, the portal vein, the abdominal aorta, and the celiac trunk, with no imaging evidence of vascular invasion. Serum alpha-fetoprotein and carbohydrate antigen 19-9 levels were within reference limits. Through an upper midline laparotomy, careful vessel-controlled, stepwise perivascular dissection enabled complete excision of the tumor with an intact capsule despite its complex vascular relationships, while preserving the pancreas and all major vascular structures; neither vascular resection nor reconstruction was required. Histopathological examination confirmed a mature retroperitoneal teratoma (dermoid cyst). The postoperative course was uneventful, with no complications. At the one-month follow-up after discharge, the patient was clinically well, and abdominal ultrasonography revealed no abnormalities.

Conclusions: A mature retroperitoneal teratoma may combine benign biological behavior with considerable surgical complexity. In lesions situated posterior to the pancreas, detailed preoperative cross-sectional imaging and meticulous stepwise perivascular dissection may allow complete tumor excision without pancreatic or vascular resection when uninvolved structures can be safely preserved.

Keywords

Retroperitoneal teratoma, Mature teratoma, Dermoid cyst, Retropancreatic location, Germ cell tumor, Pediatric surgery, Perivascular dissection, Case report.

Abbreviations

AFP: alpha-fetoprotein, CA 19-9: carbohydrate antigen 19-9, CT: computed tomography, MRI: magnetic resonance imaging.

Introduction

Retroperitoneal teratomas are a rare group of extragonadal

germ cell tumors that occur predominantly in infancy and early childhood [1,2]. They arise from pluripotent germ cells and may contain variably differentiated tissues derived from one or more of the three embryonic germ layers. According to the degree of tissue differentiation, teratomas are classified as mature or immature, with mature forms predominating among retroperitoneal teratomas in children [1-3].

The clinical presentation is nonspecific and depends primarily on tumor size and anatomical location. Owing to the large capacity of the retroperitoneal space, these lesions may grow considerably

before becoming symptomatic. Patients may present with a palpable abdominal mass, abdominal or lumbar pain, or symptoms resulting from compression of adjacent structures [1,2]. Computed tomography (CT) and magnetic resonance imaging (MRI) play a central role in preoperative assessment: the presence of cystic components, fat, calcifications, and solid areas is characteristic of teratomas, while accurate delineation of the relationships between the tumor and the adjacent organs and major vessels is essential for surgical planning [2,4].

Complete surgical excision remains the mainstay of treatment for mature retroperitoneal teratomas [1,2]. Despite their generally benign biological behavior, surgical management may represent a considerable technical challenge because of displacement, distortion, or involvement of the major retroperitoneal vessels, as well as the close anatomical relationships of these tumors with the pancreas, kidneys, bowel, and other vital structures [4-6]. Precise preoperative assessment of these relationships is therefore an essential component of operative planning.

We report the case of an 11-year-old girl with a mature retroperitoneal teratoma in a retropancreatic location and complex anatomical relationships with multiple major abdominal vessels, in whom complete excision was achieved with preservation of the pancreas and of all major vascular structures, and we review the published literature on the surgical management of these tumors in children.

Case Presentation

An 11-year-old girl was admitted with a two-month history of lumbar and epigastric pain. There was no history of vomiting, diarrhea, or weight loss. On physical examination, a rounded, firm, non-tender mass was palpable in the upper abdomen. The family history was unremarkable.

Abdominal ultrasonography performed on admission revealed a complex solid-cystic mass in the upper abdomen. Further diagnostic evaluation was performed using contrast-enhanced CT and MRI of the abdomen.

Contrast-enhanced CT of the abdomen and pelvis revealed a well-circumscribed retroperitoneal mass in the upper abdomen, predominantly located in the midline and measuring approximately $8 \times 7 \times 6$ cm. The lesion had a complex, heterogeneous appearance, containing cystic components, areas of fat attenuation, internal calcifications, and solid components. It was located posterior to the body and tail of the pancreas and was in close proximity to the superior mesenteric artery and vein, splenic artery and vein, inferior mesenteric vein, portal vein, abdominal aorta, and celiac trunk. The mass caused compression and displacement of these adjacent vascular structures, with no radiological evidence of vascular invasion or infiltration of the surrounding organs (Figure 1).

Magnetic resonance imaging (MRI) was subsequently performed and further supported the radiological diagnosis of a teratoma (Figure 2).

Laboratory investigations showed a serum alpha-fetoprotein (AFP) level of 7.1 ng/mL (reference range, 0–8 ng/mL) and a carbohydrate antigen 19-9 (CA 19-9) level of 11 U/mL (reference range, 0–22 U/mL). Complete blood count, liver function tests, and renal function tests were within normal limits.

Surgery was performed through an upper midline laparotomy. After division of the gastrocolic ligament and exposure of the retropancreatic space, a well-circumscribed tumor measuring approximately 7–8 cm was identified posterior to the body and tail of the pancreas. Its relationships with the adjacent vascular

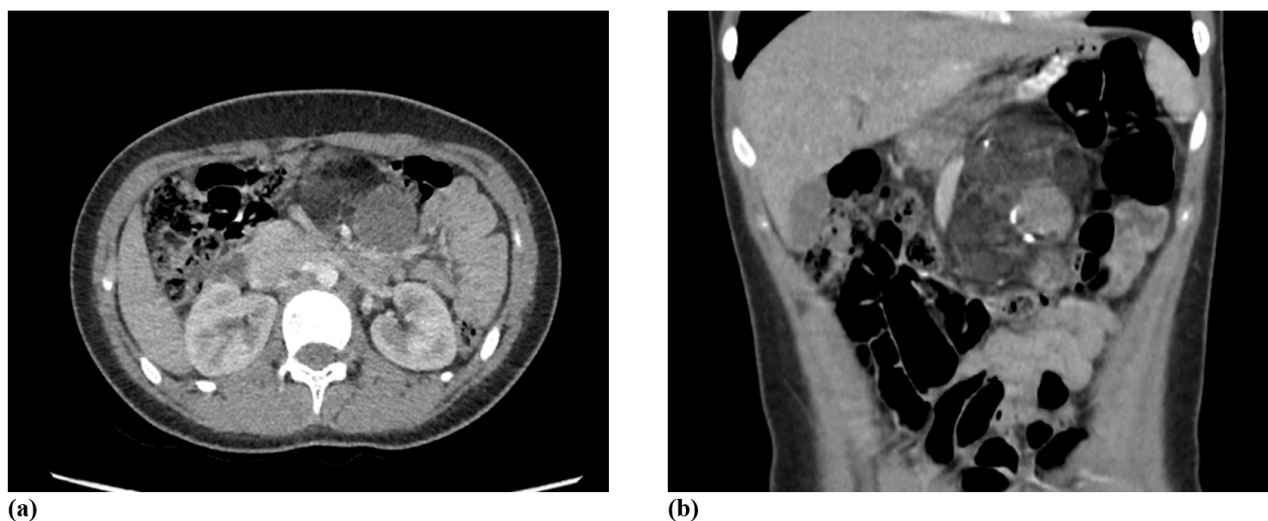


Figure 1: Contrast-enhanced CT of the abdomen. (a) Axial image showing a retropancreatic retroperitoneal tumor with a heterogeneous appearance, containing cystic, fatty, and calcified components. (b) Coronal reformatted image demonstrating the relationships of the tumor with the pancreas and the major vascular structures, with compression and displacement but no evidence of vascular invasion.

structures were complex. Medially, the mass extended toward the abdominal aorta and the superior mesenteric vessels; superiorly, it displaced the pancreas and the splenic vessels anteriorly and lay in close proximity to the portal vein; laterally, it markedly displaced the inferior mesenteric vein; and caudally, it extended beneath the root of the mesocolon.

Intraoperatively, the tumor was densely adherent to several major arterial and venous structures, a number of which were markedly displaced. Once the adjacent vessels had been identified and controlled, careful stepwise perivascular dissection was performed, and the vascular branches supplying the tumor were sequentially controlled and divided. The mass was progressively separated from the major vessels and from the pancreas using a combination of blunt and sharp dissection and electrosurgery (Figure 3). Complete excision was achieved with an intact tumor capsule and with preservation of the pancreas and of all major vascular structures; neither vascular resection nor reconstruction was required. Two retroperitoneal drains were placed. The operative time was 130 minutes, with an estimated blood loss of 80 mL. No intraoperative blood transfusion was required.

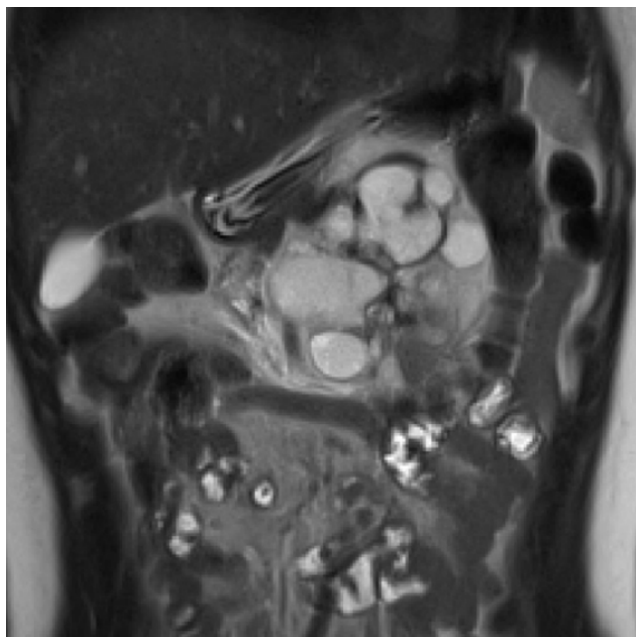


Figure 2: Magnetic resonance imaging demonstrating a well-circumscribed, lobulated, heterogeneous retroperitoneal mass with multiple cystic and soft-tissue components of varying signal intensity, suggestive of a teratoma.

Macroscopic examination of the surgical specimen revealed a tumor measuring 7×7 cm with a heterogeneous cut surface (Figure 4). Histopathological examination demonstrated mature tissues derived from more than one embryonic germ layer, including keratinizing squamous epithelium with skin adnexal structures and mature cartilage, without immature or malignant components. The findings established the diagnosis of a mature retroperitoneal teratoma (dermoid cyst) (Figure 5).

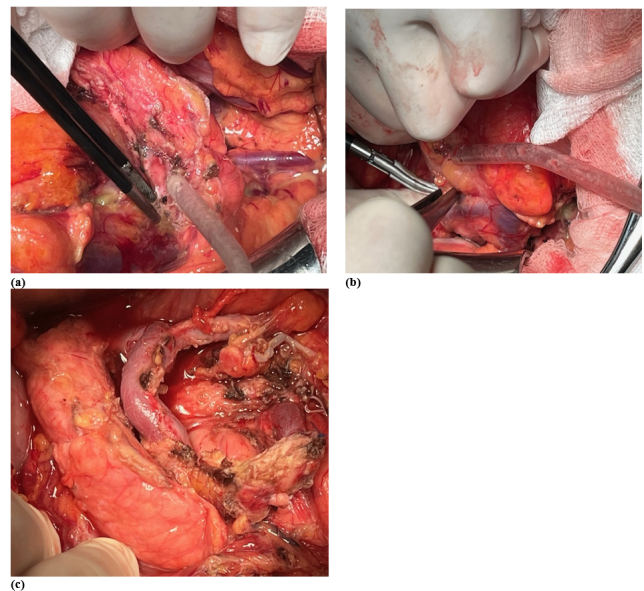


Figure 3: Intraoperative stages of excision of the retropancreatic teratoma. (a) Dissection and mobilization of the tumor within the retropancreatic space. (b) Perivascular dissection along the course of the inferior mesenteric vein. (c) Tumor bed after complete excision of the mass.

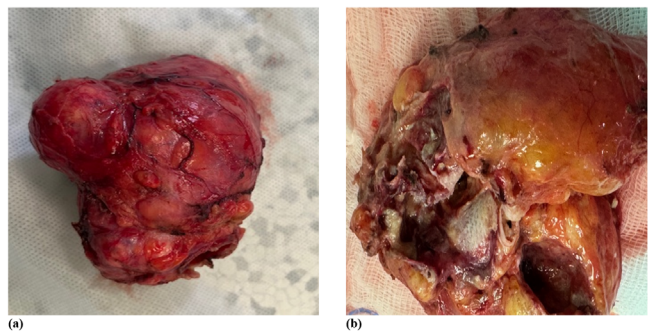


Figure 4: Gross pathological findings. (a) Surgical specimen after complete excision, with an intact capsule. (b) Cut surface of the tumor demonstrating its heterogeneous appearance.

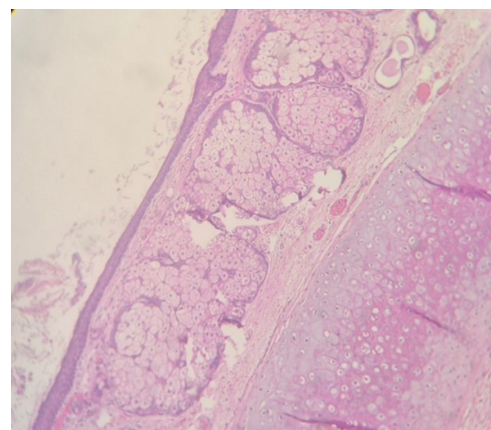


Figure 5: Histopathological examination of the mature retroperitoneal teratoma demonstrating skin adnexal structures and mature cartilage (hematoxylin and eosin).

Postoperative Course and Follow-up

The postoperative course was uneventful, with no complications according to the Clavien–Dindo classification. Oral intake was resumed on postoperative day 3. The retroperitoneal drains were removed on postoperative days 4 and 5, and the patient was discharged on postoperative day 10. At the one-month follow-up after discharge, the patient was clinically well, with normal laboratory findings. Follow-up abdominal ultrasonography was unremarkable. No postoperative CT examination was performed.

Table 1 presents the timeline of the clinical presentation, diagnostic work-up, surgical management, and postoperative follow-up.

Table 1: Timeline of clinical presentation, diagnostic work-up, surgical management, and postoperative follow-up.

Time point	Clinical event
2 months before admission	Onset of lumbar and epigastric pain
Admission	Physical examination and abdominal ultrasonography
During diagnostic work-up	Contrast-enhanced CT and MRI
Preoperative period	Surgical planning based on vascular anatomy
Day 0	Upper midline laparotomy and complete tumor excision
Postoperative day 3	Oral intake resumed
Postoperative days 4–5	Retroperitoneal drains removed
Postoperative day 10	Discharge
1 month after discharge	Clinical and ultrasonographic follow-up; no abnormalities

Differential diagnosis

Based on the patient's age, tumor location, and heterogeneous imaging appearance, the differential diagnosis included other retroperitoneal germ cell tumors and neoplastic lesions of the pancreatic or adjacent retroperitoneal structures. The combination of cystic, fatty, calcified, and solid components, together with the absence of vascular invasion and the characteristic MRI findings, favored the diagnosis of a mature retroperitoneal teratoma.

Discussion

The present case highlights three features relevant to the diagnosis and surgical management of retroperitoneal teratomas: the relatively late age at diagnosis, the retropancreatic location of the tumor, and its complex relationships with multiple major abdominal vessels. Retroperitoneal teratomas in children are diagnosed predominantly during infancy. CC. Luo et al. reported that seven of ten patients in their series were younger than one year, whereas S. Fumino et al. reported a median age at diagnosis of 5.5 months [2,6]. Against this background, the diagnosis of a mature retroperitoneal teratoma in an 11-year-old child represents an unusually late presentation.

The retropancreatic location is particularly relevant to surgical planning because of the proximity of the tumor to several major vascular and visceral structures. In the present case, the mass was located posterior to the body and tail of the pancreas and

was closely related to the superior mesenteric artery and vein, the splenic vessels, the portal vein, the abdominal aorta, and the celiac trunk. Preoperative imaging demonstrated displacement of these structures without evidence of vascular invasion or infiltration of the surrounding organs. Intraoperatively, the mass was clearly separable from the pancreatic parenchyma, supporting its retroperitoneal origin. The designation “retroperitoneal teratoma in a retropancreatic location” therefore more accurately reflects the anatomical characteristics of the lesion than the term “pancreatic teratoma”.

The relationship between retroperitoneal teratomas and major vessels is an important determinant of operative complexity. N. M. Jones and E. M. Kiely described six children in whom the tumors enveloped and displaced the aorta and vena cava; renal vessels were displaced in two patients and the portal vein in one, while extensive resection including major vessel ligation was required for complete excision [5]. S. Fumino et al. similarly reported dense adhesions to major vessels, with ligation of the splenic and gastroduodenal arteries required in two patients and injuries to the portal vein, renal artery, and inferior vena cava also occurring [6]. A. De Backer et al. likewise described serious perioperative complications related to displacement and adhesion of retroperitoneal germ cell tumors to surrounding structures [3]. These observations emphasize that benign histology does not necessarily imply a technically straightforward resection.

The extent of vascular distortion reported in larger pediatric series further illustrates this surgical challenge. J. Hart et al. found substantial distortion of the vascular anatomy in all 12 infants with upper abdominal teratomas in their series, while preoperative CT did not always permit identification of all major vessels, most commonly the inferior vena cava [4]. T. Yang et al. analyzed 152 resections of retroperitoneal teratomas in 102 children and reported perioperative complications in 41% of procedures. Among patients with available preoperative CT or MRI, distortion of arteries, veins, and adjacent organs was observed in 99%, 98%, and 100% of cases, respectively, while vascular encasement was present in 25% [7]. These findings support the importance of detailed preoperative assessment of vascular anatomy when planning resection of anatomically complex retroperitoneal teratomas.

In the present case, cross-sectional imaging demonstrated the characteristic heterogeneous composition of the lesion, including cystic, fatty, calcified, and solid components, and provided an anatomical map of its relationships with the pancreas and major vessels [1,4]. The operative findings confirmed the anticipated anatomical complexity, with dense adherence and marked displacement of several major vascular structures. Careful stepwise perivascular dissection, including sequential control of vascular branches supplying the tumor, allowed complete excision with preservation of the pancreas and all major vascular structures, without vascular resection or reconstruction.

Surgical resection is the mainstay of treatment for retroperitoneal teratomas and provides definitive histological diagnosis [1]. In

mature lesions, complete excision is associated with favorable outcomes [1,2]. However, the aim of complete resection should be balanced against unnecessary sacrifice of adjacent organs or major vessels when these structures are not invaded and can be safely preserved. In this setting, an organ- and vessel-preserving approach appears appropriate whenever complete excision can be achieved without compromising surgical safety.

Limitations

This report has the limitations inherent to a single case. The findings describe one patient managed at a single institution and therefore cannot be generalized; the comparison with published series is narrative rather than systematic; and the follow-up period was limited to one month after discharge, precluding assessment of long-term outcomes and the possibility of late recurrence. Larger multicenter series are needed to better define the optimal operative strategy for retroperitoneal teratomas with complex vascular relationships.

Conclusion

Mature retroperitoneal teratomas may combine benign biological behavior with substantial surgical complexity. In tumors located posterior to the pancreas, the operative strategy should be individualized according to the specific vascular and visceral anatomy. Careful preoperative imaging assessment and meticulous intraoperative perivascular dissection facilitate complete tumor excision while preserving uninvolved major vessels and adjacent organs. In benign lesions, organ- and vessel-preserving surgery should therefore remain a central objective whenever complete tumor removal can be achieved safely.

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References

1. Gatcombe HG, Assikis V, Kooby D, et al. Primary retroperitoneal teratomas a review of the literature. *J Surg Oncol*. 2004; 86: 107-113.
2. Luo CC, Huang CS, Chu SM, et al. Retroperitoneal teratomas in infancy and childhood. *Pediatr Surg Int*. 2005; 21: 536-540.
3. De Backer A, Madern GC, Hazebroek FWJ. Retroperitoneal germ cell tumors a clinical study of 12 patients. *J Pediatr Surg*. 2005; 40: 1475-1481.
4. Hart J, Mazrani W, Jones N, et al. Upper abdominal teratomas in infants radiological findings and importance of the vascular anatomy. *Pediatr Radiol*. 2008; 38: 750-755.
5. Jones NM, Kiely EM. Retroperitoneal teratomas potential for surgical misadventure. *J Pediatr Surg*. 2008; 43: 184-187.
6. Fumino S, Maniwa J, Takeuchi Y, et al. Surgical intervention and perioperative risk factors of retroperitoneal teratomas in children a single institution experience. *Pediatr Surg Int*. 2016; 32: 909-914.
7. Yang T, Li H, Li J, et al. Surgical risk factors of retroperitoneal teratoma resection in children. *J Pediatr Surg*. 2019; 54: 1495-1499.