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Case report

Large mesenteric cyst mimicking an ovarian cyst in an 8-year-old: A case report

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ABSTRACT

Introduction and importance: Pediatric mesenteric cysts, rare and usually benign intra-abdominal tumors, are a difficult preoperative diagnosis due to ambiguous clinical characteristics. The final diagnosis is typically established only during surgery or histological analysis.

Case presentation: An 8-year-old female presented with five days of worsening abdominal pain, associated with nausea, vomiting, and fever, as well as vague tenderness in the right quadrants on examination. Computed tomography imaging showed a 10.5 × 8.7 × 7 cm abdominal mass, most suspicious for a cystic mass of ovarian origin. Upon diagnostic laparoscopy, a mesenteric cyst extending to the root of the mesentery was visualized and entirely resected after conversion to an exploratory laparotomy. Histopathological examination of both the cystic fluid and specimen suggest a benign mesenteric cyst.

Clinical discussion: Although mesenteric cysts are noticeably rare, it is important differential to consider in pediatric patients with non-specific symptoms like abdominal pain and distention, intestinal obstruction, or a palpable abdominal mass. Notably, these cysts can be managed successfully by complete surgical resection with an excellent outcome.

Conclusion: This report recounts an interesting case of a large mesenteric cyst that mimicked an ovarian cyst in a pre-pubertal girl.

1. Introduction

Mesenteric cysts are rare tumors that can occur anywhere along the mesentery from the duodenum to the rectum [1], but are most prevalent around the ileum (60%), followed by mesocolon (24%), and retroperitoneum (15%) [2–4]. Since the first description of this growth in 1507 by Florentine Antonio Benivieni, Physician of the Renaissance [5], the total reported cases of mesenteric cysts equate to less than 1000 [6] with an incidence of 5 per 105,000–250,000 per pediatric admissions [7,8]. Mesenteric cysts vary greatly in size ranging from a few to 36 cm, establishing residence anywhere in the abdominal cavity [9,10]. While there are several proposed etiologies, the true cause of their development is unknown [11].

The most common signs and symptoms include abdominal pain, palpable abdominal mass or distention, nausea, vomiting, constipation, and diarrhea [11]. Due to a non-specific clinical presentation, low overall incidence, lack of characteristic imaging, or pathognomonic signs or symptoms, pre-operative diagnosis remains challenging [12]. Complications, while rare, can cause significant morbidity and mortality if left undiagnosed.

In this study, we present a case of an 8-year-old girl with a giant cystic mass identified on computed tomography (CT) confirmed intra-operatively and on pathology to be a mesenteric cyst. This case report has been reported in line with the Surgical CAse REport (SCARE) guidelines [13].

2. Presentation of case

An 8-year-old female child presented with five days of worsening abdominal pain to an outside hospital and was transferred for higher

Abbreviations: CT, computer tomography; CA-125, Cancer Antigen-125.

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acuity of care. She had a nonsignificant past medical and surgical history. The patient's family history was significant for endometriosis (mother, maternal grandmother), chronic myelogenous leukemia (maternal grandfather), and heart disease (paternal grandmother). The physical exam showed a fever 38.9 °C, tachycardia with a heart rate of 142, and abdominal distention with tenderness to palpation over the right hemi-abdomen.

The patient first experienced abdominal pain five days prior to presentation without an inciting event. On the second day of symptoms, the non-localized pain persisted and was accompanied by nausea and non-bilious, non-bloody emesis, which the parents attributed the symptoms to motion sickness on a long road trip. On day four, episodes of emesis turn bilious with subjective fevers and an increasing abdominal pain, which prompted a visit to the emergency room at an outside hospital, then transferred to our tertiary center.

Laboratory investigation showed elevated white blood cells 14.4 bil/L (reference range (rr): 4–11.8), elevated erythrocyte sedimentation rate 56 mm/h (rr: 0–20) and elevated C-reactive protein 13.6 mg/dL (rr: 0–0.8). Preoperative tumor markers included Cancer Antigen-125 (CA-125): 43.6 units/mL (rr: 0–35), lactate dehydrogenase 75 U/L (rr: 120–260) and human chorionic gonadotropin and alpha-fetoprotein (within normal limits). A comprehensive metabolic panel, uric acid, and lipase were within normal limits.

An abdominal radiography was obtained showing contrast opacification without evidence of bowel obstruction (Fig. 1). Additionally, there was contrast opacification of the dilated left renal collecting system which was likely related to distal ureteral compression from the abdominal mass (Fig. 2). Computer tomography imaging showed a 10.5 × 8.7 × 7 cm large cystic mass, possibly ovarian origin, involving the entire abdomen (Figs. 3, 4).

After standard preoperative preparation and appropriate consent, the patient was taken to the operating room by two experienced pediatric surgeons (AR, DM) for a diagnostic laparoscopy for the large cystic mass suspected to have ovarian origin. A single incision in the umbilicus was used to visualize the anterior portion of a very large cystic

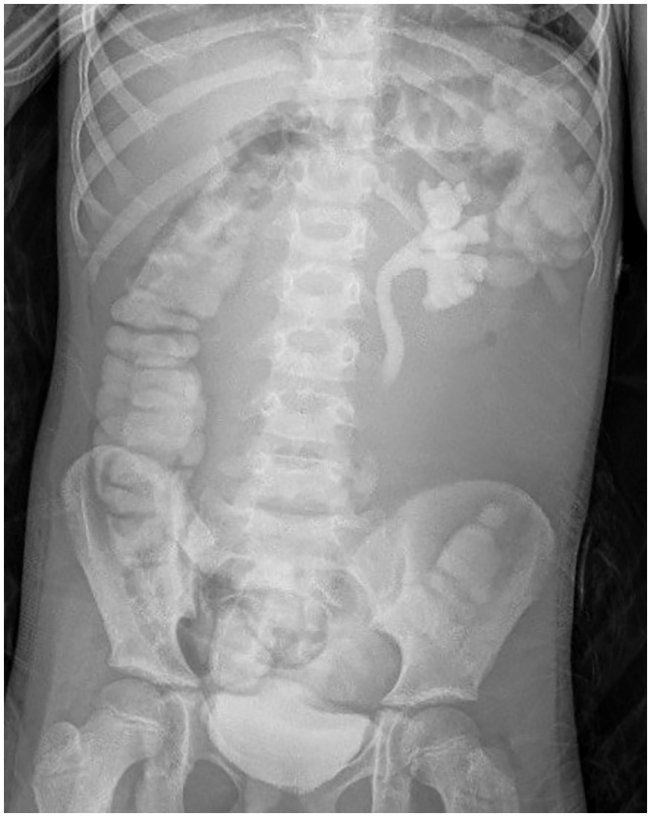

Fig. 1. Abdominal radiography illustrates contrast opacification in the right hemiabdomen, left upper quadrant, and left lower quadrant.

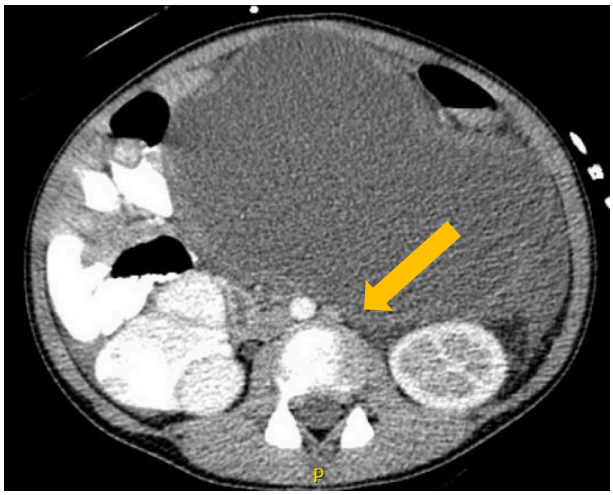

Fig. 2. Axial computer tomography image shows left-sided ureter compression (yellow arrow) and the giant fluid-filled mass, possibly ovarian cyst, occupying a majority of the abdomen. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

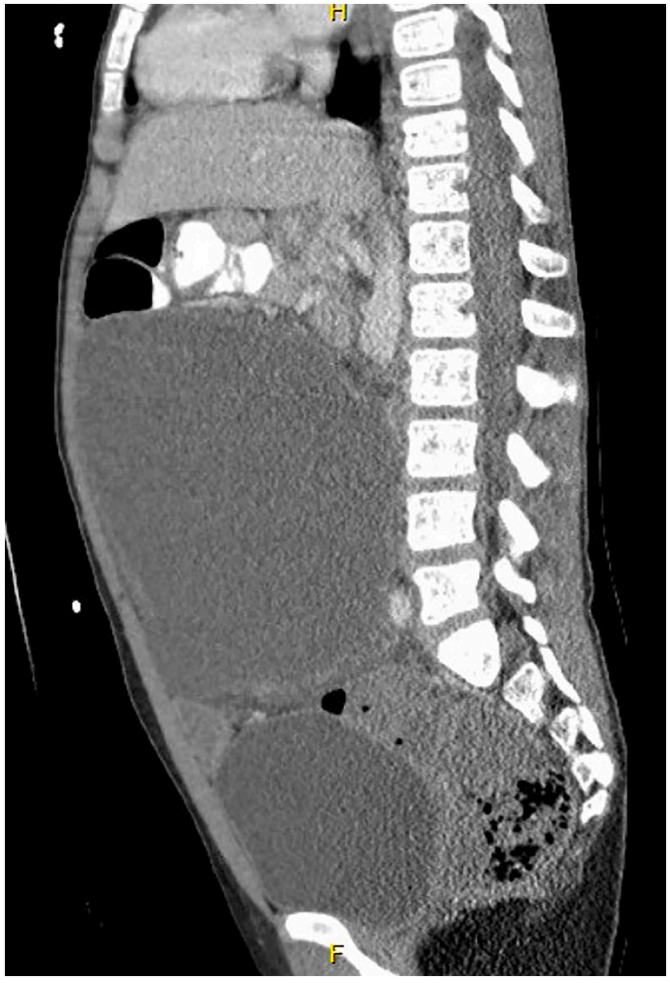

Fig. 3. Sagittal computed tomography imaging of the abdomen showing the large cyst displacing abdominal organs superiorly.

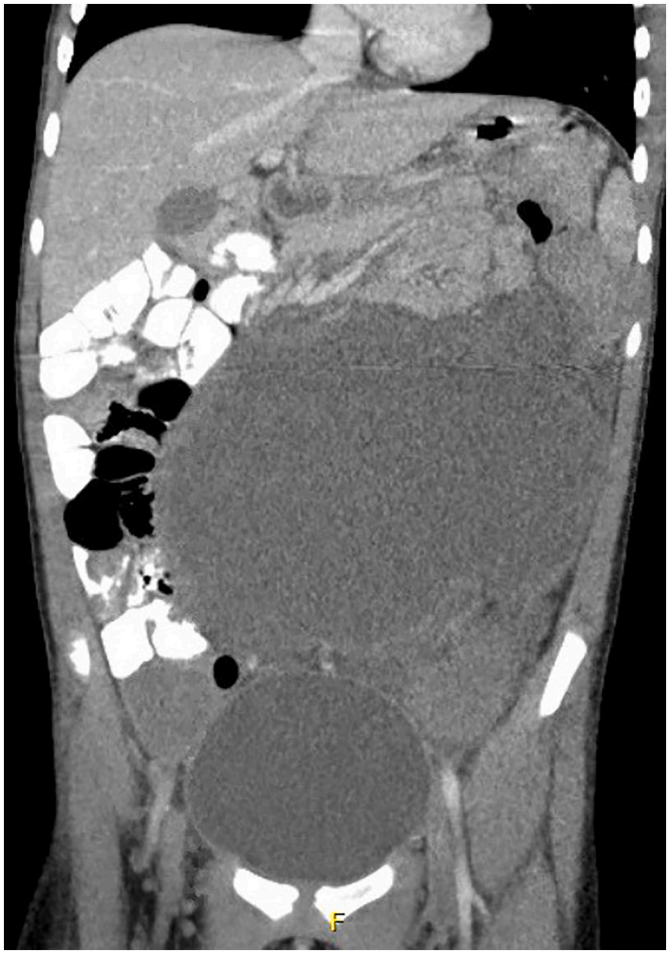

Fig. 4. Coronal computed tomography imaging illustrating the large cyst occupying most of the left hemiabdomen.

mass extending to the right upper quadrant. Peritoneal fluid was aspirated and sent for evaluation. To allow for easier mobilization, the cyst was decompressed, and a sample of the 800 mL of brown cystic fluid was sent to pathology for further evaluation. Next, a GelPOINT Mini® port (Applied Medical, Rancho Santa Margaritam, CA) containing two-5 mm trocars and one-12 mm trocar was placed to gain pneumoperitoneum and improve visualization of the mass. After observing the normal appearance of both ovaries, the origin of the mass was traced to the root of the mesentery in the retroperitoneum and extended to the ligament of Treitz. Due to the adherent nature of the mass to the mesentery and its massive size, the procedure was converted into an exploratory laparotomy by extending the umbilical incision superior and inferior.

Care was taken to dissect the mass using a combination of blunt dissection along with the Harmonic scalpel. The mass was eviscerated with careful attention to preserve all blood supply to the mesentery. A fresh intraoperative specimen en bloc was sent to pathology which showed no sign of malignancy (Fig. 5). The abdominal cavity was irrigated before a multilayer closure of the laparotomy ensued and the skin was close with glue. The patient was extubated and monitored overnight in in the pediatric intensive care unit.

Histopathological examination showed a thick fibrous cyst wall with extensive secondary changes including erosion of any lining and extensive mural fibrosis with prominent reactive changes. The lack of proliferation of lymphatic channels and the focal presence of smooth muscle bundles in the wall of the cyst suggests a mesenteric cyst of enteric origin as opposed to the more common lymphatic origin. Overall, due to the lack of epithelial lining, the exact origin cannot be further characterized except that it is clearly benign and of mesenteric origin per

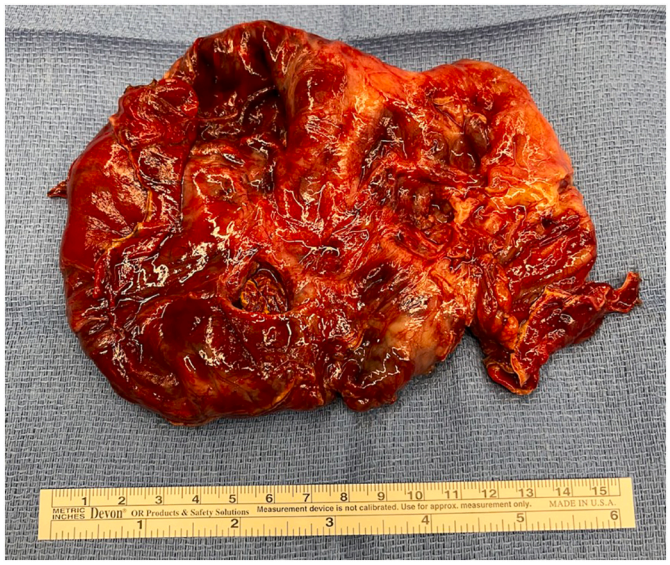

Fig. 5. Fresh pathologic mesenteric cyst specimen after intra-operative decompression.

visualization during surgery. Examination of the brown cystic fluid obtained during surgery revealed scattered, rare, polymorphonuclear leukocytes in a background of protein-rich debris without any evidence of atypia.

The patient's post-operative course was uneventful. She was discharged on post-operative day three after meeting discharge criteria. Follow up occurred at four weeks post operation. The patient was healing well, had returned to regular activity and there were no complications or adverse outcomes. Both the mother and patient were satisfied with the surgery and post-operative recovery.

3. Discussion

Mesenteric cysts are especially rare in the pediatric population occurring in 1/20,000 children [14] and mostly in Caucasians over 10 years old [15]. After reviewing 162 cases, Kurtz et al. [8] noted that patients under 10 years old compared to anyone older demonstrate a shorter duration of symptoms, higher incidence of emergent operations, varying location of the cyst, and lower number of recurrences. Some studies propose mesenteric cysts are more commonly seen in females [6,9,16,17], while other literature suggests males [18–20], and some postulate that there is no difference between sexes [21–23].

In a classification scheme suggested by Gross et al. in 1955, mesenteric cysts are divided into four types: developmental, traumatic, infective, and neoplastic [24]. Mesenteric cysts commonly represent ectopic lymphatic tissue, but can also be classified as mesothelial (simple mesothelial cyst, benign cystic mesothelioma, and malignant cystic mesothelioma), enteric (enteric cyst and enteric duplication cyst), urogenital, nonpancreatic pseudocysts (infectious and traumatic cysts), and mature cystic teratomas (dermoid cysts) as purposed by Perrot et al. in 2000 [25]. Furthermore, the exact etiology of mesenteric cysts is unclear. Some studies suggest ectopic tissue that failed to fuse [26], occult trauma, degeneration of lymph nodes, obstruction/degeneration of exiting lymphatic channels, or neoplasia [27,28].

This patient had a slightly increased CA-125, a biomarker of ovarian cancer [29] as well as prognostic indicator for other malignancies [30,31]. This marker can be used as useful adjuncts in the pediatric population to assess for ovarian neoplasms [32], pediatric lymphomas and leukemias [33,34], and germ cell tumors [35]. While the patient's CA-125 was elevated, she had not malignancy.

In our patient, the preoperative diagnosis was suspected to be an

ovarian cyst possible torsion, which prompted the need for surgery. Other causes of cystic abdominal masses in children include the following: gynecological (ovarian cysts, fallopian tube cyst), intestinal (duplication cyst), and urological (renal cysts) [19]. The preoperative diagnosis of mesenteric cysts is a challenge because of its rarity, lack of pathognomonic signs or symptoms, and varying size or location. Ultrasound proves to be a quick method for revealing the dimensions of the mass and could be correlated to clinical features that aid in diagnosis [1,36]; however, CT is the favored method [37] to better detect the mass's size, location, wall thickness, and fluid or sediment levels [9], along with showing cystic structure [38], or wall calcification [25,39]. Magnetic Resonance Imaging (MRI) is the most useful tool for diagnosis and preoperative planning [40].

There is ~3% risk of malignancy that increases with solid components in the cyst, found in adults [11]. The incidence of malignant cysts in children is unknown due to the small number of reports. In the case of an incidentally found asymptomatic mesenteric cyst, conservative treatment can ensue. While most are not malignant [9], the preferred treatment is complete resection of these tumors [41], requisite to avoid both potential malignant transformation [42] and the high recurrence rate [1] or infection rate associated with aspiration or marsupialization [9]. Imaging modalities can help assess if laparoscopy is feasible with the size and location of the tumor to facilitate a shorter hospital stay, less preoperative pain, and earlier return to normal activity [43,44]. While laparoscopic management of mesenteric cysts has more commonly occurred in adults due to its increased incidence in that population, there have been favorable outcomes with laparoscopy performed for removal of mesenteric cysts in children [45–50]. If the mesenteric cyst remains undetected due to an asymptomatic child [51,52], important rare complications to consider include intestinal obstruction, volvulus, peritonitis, shock, hemorrhage, and death [1]. Fortunately, with timely intervention and complete excision of the cyst, the prognosis is usually excellent with recurrence rare [53]. Lastly, there appears to be little benefit in long-term follow-up since recurrence, if it occurs, is typically early [12].

4. Conclusion

Mesenteric cysts remain an important differential to consider when evaluating a child who might be asymptomatic or present with abdominal pain, abdominal distention, asymptomatic, palpable abdominal mass, constipation, or acute abdomen. Other non-specific symptoms include nausea, vomiting, and fever combined with the ability for the tumor to grow to a massive size over a short period of time, should elicit watchful care over pediatric populations. Future work can consider investigating biomarkers of mesenteric cysts to aid physicians in the clinical diagnosis prior to any surgical procedure.

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Ethical approval

This is exempt from ethical approval.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authorship contribution

MAS, AM, DM, AR provided patient care and contributed to manuscript concept and development. BL, MAS contributed to the data collection, analysis, and interpretation. BL, MAS contributed to writing the manuscript. BL, MAS, MMW, AM, DM, AR contributed to critical reviewing and editing of the manuscript and its revisions.

Research registration

N/A.

Guarantors

Marla A. Sacks & Andrei Radulescu.

Provenance and peer review

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Declaration of competing interest

The authors have no financial, consultative, institutional, and other relationships that might lead to bias or conflict of interest.

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