RadioGraphics

Retroperitoneal Cystic Masses: CT, Clinical, and Pathologic Findings and Literature Review[1]

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Cystic lesions of the retroperitoneum can be classified as either neoplastic or nonneoplastic. Neoplastic lesions include cystic lymphangioma, mucinous cystadenoma, cystic teratoma, cystic mesothelioma, müllerian cyst, epidermoid cyst, tailgut cyst, bronchogenic cyst, cystic change in solid neoplasms, pseudomyxoma retroperitonei, and perianal mucinous carcinoma. Nonneoplastic lesions include pancreatic pseudocyst, nonpancreatic pseudocyst, lymphocele, urinoma, and hematoma. Because the clinical implications of and therapeutic strategies for retroperitoneal cystic masses vary depending on the cause, the ability to noninvasively differentiate between masses is important. Although there is substantial overlap of computed tomographic (CT) findings in various retroperitoneal cysts, some CT features, along with clinical characteristics, may suggest a specific diagnosis. CT may provide important information regarding lesion location, size, and shape; the presence and thickness of a wall; the presence of septa, calcifications, or fat; and involvement of adjacent structures. The most important clinical parameters include patient gender, age, symptoms, and clinical history. Familiarity with the CT and clinical features of various retroperitoneal cystic masses facilitates accurate diagnosis and treatment.

Abbreviation: H-E = hematoxylin-eosin

Index terms: Abdomen, CT, 87.1211 • Abdomen, cysts, 87.31 • Abdomen, neoplasms, 87.30 • Retroperitoneal space, CT, 87.1211 • Retroperitoneal space, diseases, 87.20, 87.30 • Retroperitoneal space, fluid • Retroperitoneal space, neoplasms, 87.30

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CT and Clinical Features of Retroperitoneal Cystic Masses

Type of Lesion	CT Features	Clinical Features
Neoplastic		
Cystic lymphangioma	Multilocular, crosses one or more retroperitoneal compartments*	Asymptomatic, more common in men
Mucinous cystadenoma	Unilocular	Asymptomatic, occurs in women
Cystic teratoma	Presence of fat and calcifications*	Asymptomatic, occurs in women
Cystic mesothelioma	Multilocular	More common in women, abdominal pain
Müllerian cyst	Unilocular or multilocular	Occurs in obese women who undergo hormonal therapy for menstrual irregularity*
Epidermoid cyst	Unilocular, occurs in presacral space	Occurs in women, constipation
Tailgut cyst	Multilocular,* occurs in presacral space*	More common in women, malignant change
Bronchogenic cyst	Occurs in subdiaphragmatic space*	Asymptomatic
Cystic change in solid neoplasm		
Paraganglioma	Usually thick wall	Hypertension*
Neurogenic tumor	Usually thick wall, usually occurs in presacral pelvic retroperitoneum	More common in women
Pseudomyxoma retroperitonei	Multicystic masses with thick walls or septa, curvilinear calcifications, occurs in right lower quadrant*	Palpable mass, abdominal pain
Perianal mucinous carcinoma	Multicystic masses surround the anus or rectum	History of anal fistula*
Nonneoplastic		
Pancreatic pseudocyst	Usually occurs in peripancreatic space	History of pancreatitis, high levels of amylase or lipase*
Nonpancreatic pseudocyst	Thick fibrous wall	Asymptomatic
Lymphocele	May have negative attenuation value due to fat within fluid*	Occurs after radical lymphadenectomy
Urinoma	Hydronephrosis	History of trauma
Hematoma	May manifest as hyperattenuating lesion within fluid*	History of trauma

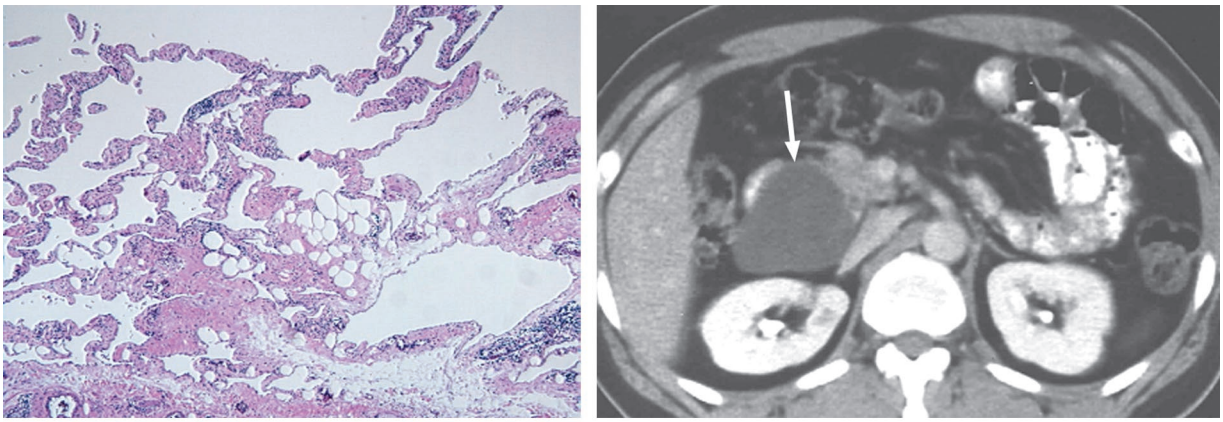
*Indicates feature that is particularly characteristic of retroperitoneal cystic masses.

Introduction

Retroperitoneal cystic masses, which arise within the retroperitoneal space but outside the major organs within that compartment, are uncommon. However, the widespread use of computed tomography (CT) for evaluating abdominal and retroperitoneal diseases has increased the detection rate for retroperitoneal cystic lesions. Because the clinical implications of and therapeutic strategies for retroperitoneal cystic masses vary depending on the cause, the ability to noninvasively differentiate between cystic masses is important.

CT is ideal for the assessment of retroperitoneal disease because it provides discrete sectional images of the organs and retroperitoneal compartments. Some case reports of different types of retroperitoneal cystic masses have been published; to our knowledge, however, no large series focusing on retroperitoneal cystic masses has been reported. Furthermore, many overlapping characteristics have been shown to exist among the various retroperitoneal cystic masses, which has led to a long list of disease entities in the differential diagnosis.

In some cases, however, familiarity with the most relevant radiologic features, in combination with clinical information, allows adequate lesion characterization. In this article, we review the relevant literature and discuss the CT and clinical features (Table) as well as the histopathologic appearances of different types of retroperitoneal cystic masses. These masses are divided into neoplastic (cystic lymphangioma, mucinous cystadenoma, cystic teratoma, cystic mesothelioma, müllerian cyst, epidermoid cyst, tailgut cyst, bronchogenic cyst, cystic change in solid neoplasms, pseudomyxoma retroperitonei, perianal mucinous



a. b.

Figure 1. Retroperitoneal cystic lymphangioma in a 37-year-old man. **(a)** Photomicrograph (original magnification, ×40; hematoxylin-eosin [H-E] stain) shows variable-sized thin-walled cystic spaces in the stroma that are lined with endothelial cells and contain lymphoid aggregation. **(b)** Contrast material–enhanced CT scan shows a low-attenuation mass in the right anterior pararenal space (arrow).

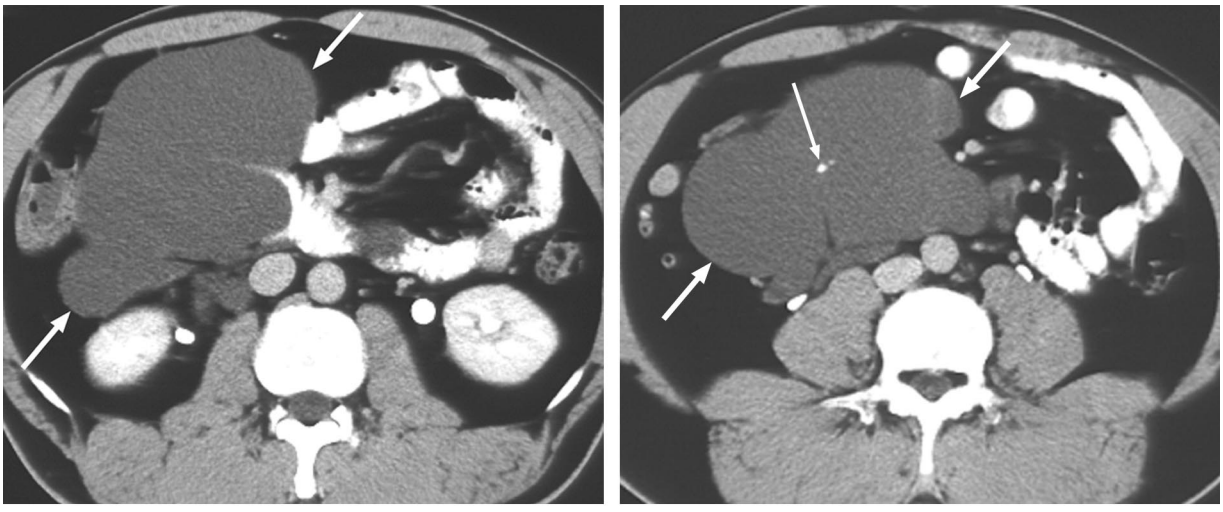


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Figure 2. Retroperitoneal cystic lymphangioma in a 41-year-old man. Contrast-enhanced CT scans show a lobulated cystic mass (thick arrows) with tiny mural calcifications (thin arrow in **b**) in the anterior pararenal space. The third portion of the duodenum is compressed by the mass.

carcinoma) and nonneoplastic (pancreatic pseudocyst, nonpancreatic pseudocyst, lymphocele, urinoma, hematoma) lesions.

Neoplastic Cysts

Cystic Lymphangioma

Cystic lymphangiomas are uncommon, congenital benign tumors and occur due to failure of the developing lymphatic tissue to establish normal communication with the remainder of the lymphatic system (1). Most cystic lymphangiomas occur in the head or neck; a retroperitoneal location is unusual (1–3). At pathologic analysis, cystic lymphangiomas are unilocular or multilocular cysts containing clear or milky fluid and lined with a single layer of flattened endothelium (Fig 1a) (1). Cystic lymphangiomas can occur anywhere in the perirenal, pararenal, or pelvic extraperitoneal spaces (1). They may cross more than one compartment of the retroperitoneum. Cystic lymphangiomas are more common in men and can occur at any age (1,2).

At CT, cystic lymphangioma typically appears as a large, thin-walled, multiseptate cystic mass (1,2). Its attenuation values vary from that of fluid to that of fat (Figs 1, 2). An elongated shape and a crossing from one retroperitoneal compartment to an adjacent one are characteristic of the mass (1). Rarely, cystic lymphangiomas may have wall calcification (1). Surgical excision is the treatment of choice (2).

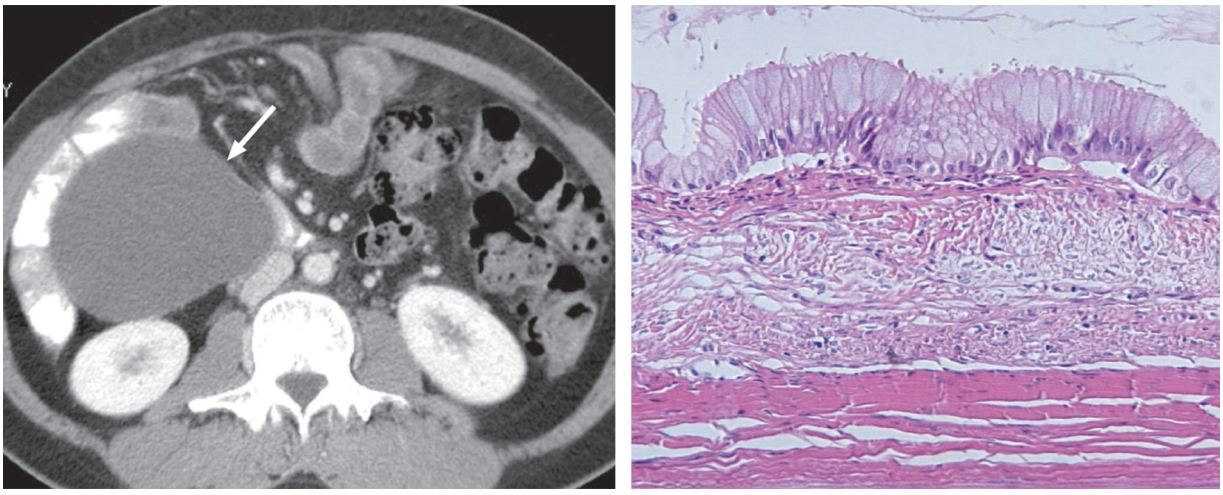

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Figure 3. Retroperitoneal mucinous cystadenoma in a 41-year-old woman. **(a)** Contrast-enhanced CT scan shows a homogeneously hypoattenuating mass in the right anterior pararenal space (arrow). **(b)** Photomicrograph (original magnification, ×40; H-E stain) shows a single layer of mucin-containing tall columnar epithelial cells.

Mucinous Cystadenoma

Primary mucinous cystadenomas are rare retroperitoneal cystic lesions that occur in women with normal ovaries. The histogenesis remains unclear, although four main hypotheses have been advanced with regard to the formation of retroperitoneal mucinous tumors (4,5). According to the first three hypotheses, the tumor arises either from ectopic ovarian tissue, from a teratoma in which the mucinous epithelium has overridden all other components to survive as a single cell component, or from remnants of the embryonic urogenital apparatus. Recently, a fourth theory has gained wide acceptance. This theory suggests coelomic metaplasia as the causal agent, whereby tumors arise from invagination of the peritoneal mesothelial layer that undergoes mucinous metaplasia with cyst formation. Early diagnosis of primary mucinous cystadenomas is important because of their malignant potential (4).

Primary retroperitoneal mucinous cystadenoma usually manifests as a homogeneous, unilocular cystic mass at CT (Figs 3, 4). Differentiating this mass from cystic mesothelioma, cystic lymphangioma, and nonpancreatic pseudocyst is difficult. Although aspiration is a good method for delineating the nature of the cyst, cytologic analysis of the aspirated fluid frequently fails to reveal the type of epithelial cells lining the cyst. Therefore, exploratory laparotomy with complete excision of the cyst is usually indicated for both diagnosis and treatment (5). At microscopic analysis, the cyst is lined by a single layer of tall columnar epithelial cells with pale cytoplasm and basal nuclei (Fig 3b).

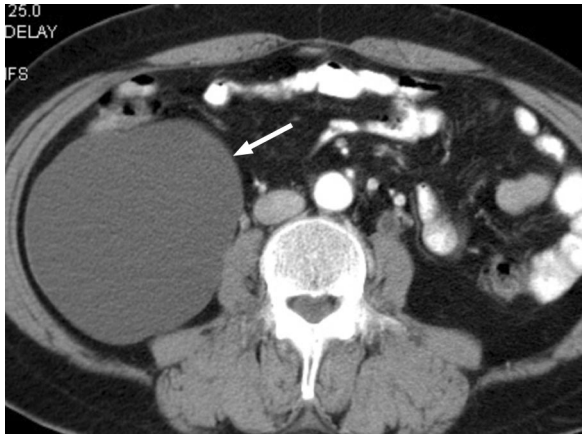
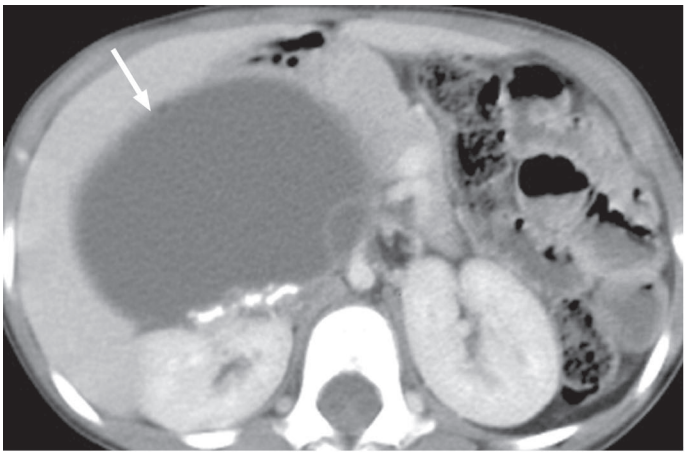


Figure 4. Retroperitoneal mucinous cystadenoma in a 56-year-old woman. Contrast-enhanced CT scan shows a homogeneously hypoattenuating mass in the right retroperitoneal space (arrow). The ascending colon is displaced anteriorly. Note the dilatation of the left ureter, which is caused by a ureteral stone.

Cystic Teratoma

Retroperitoneal cystic teratomas are cystic tumors composed of well-differentiated derivations from at least two of the three germ layers (ectoderm, mesoderm, endoderm). Most patients are female, and the tumor is commonly diagnosed in newborns, who are usually asymptomatic (6). A cystic



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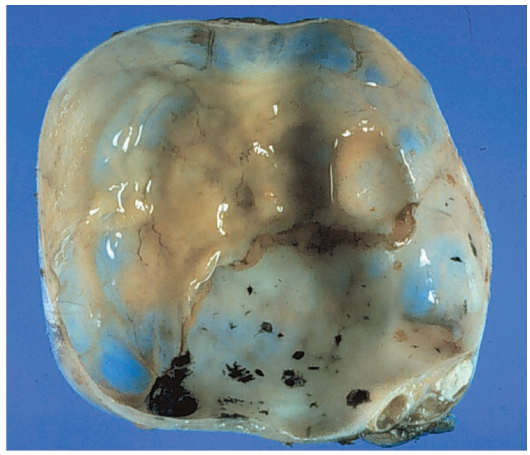

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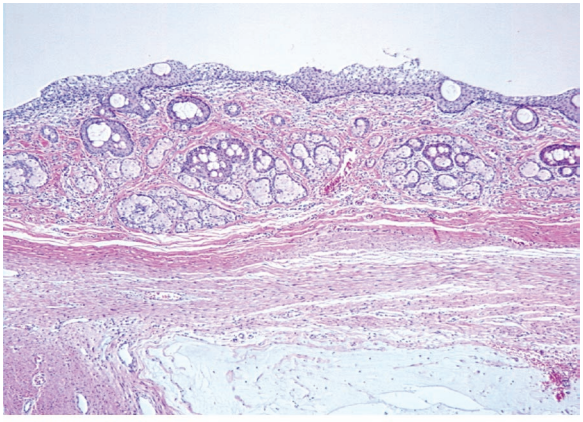


c.

Figure 5. Cystic teratoma in a 3-year-old girl. **(a)** Contrast-enhanced CT scan shows a well-defined hypoattenuating mass with internal septa and calcifications in the right anterior pararenal space (arrow). **(b)** Photograph of the gross specimen shows the cyst wall as an irregular and protruding solid area. **(c)** Photomicrograph (original magnification, ×40; H-E stain) demonstrates skinlike tissue.

teratoma is likely to be benign, whereas a solid teratoma is likely to be malignant (6).

At CT, a mature teratoma of the retroperitoneum manifests as a complex mass containing a well-circumscribed fluid component, adipose tissue, and calcification (Fig 5) (6). The presence of hypoattenuating fat within the cyst is considered highly suggestive of cystic teratoma. With the presence of calcifications in the cyst wall, cystic teratoma is even more likely.

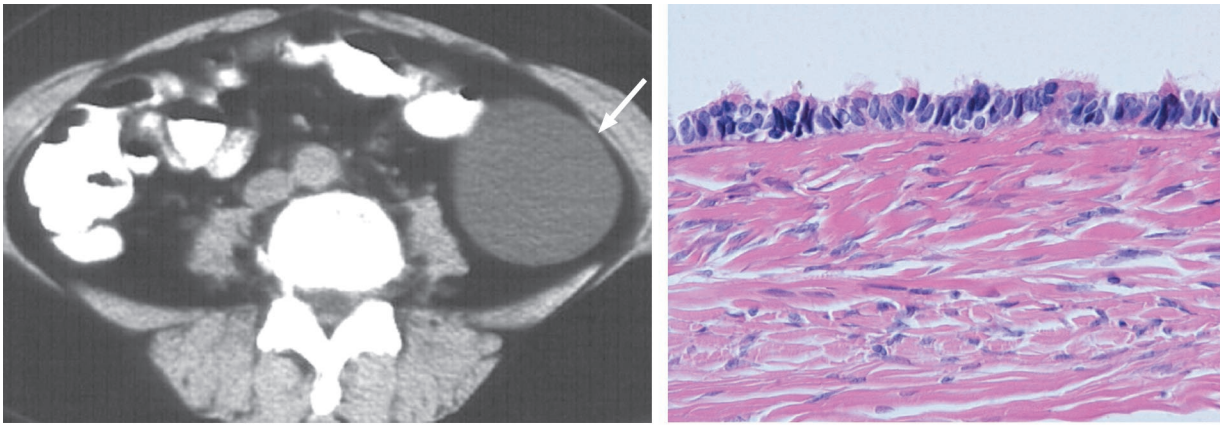
Cystic Mesothelioma

Cystic mesotheliomas are rare benign neoplasms with a mesothelial origin that originate in the serous lining of the pleural, pericardial, or peritoneal space (7,8). Cystic mesothelioma usually occurs in the surfaces of the pelvic viscera but may occur in the retroperitoneum (8). Unlike malignant mesothelioma, cystic mesothelioma is not related to prior asbestos exposure. It does not metastasize but may recur locally and occurs more frequently in women. Abdominal pain is the most common symptom. Pathologic analysis demonstrates a unilocular or multilocular thin-walled cyst containing watery secretions.

Cystic mesotheliomas usually appear as nonspecific, thin-walled, multilocular cystic lesions at CT (7,8). They may be radiologically indistinguishable from lymphangiomas and other retroperitoneal cysts.

Müllerian Cyst

Urogenital cysts arise from vestiges of the embryonic urogenital apparatus and can be classified into pronephric, mesonephric, metanephric, and müllerian types based on their embryonic lines (9). Müllerian cyst of the retroperitoneum is an extremely rare disease that is thought to be a subtype of urogenital cyst (9). It is a benign condition that can be cured with surgical resection. Müllerian cyst of the retroperitoneum occurs in women from 19 to 47 years of age (9,10). With respect to pathogenesis, the retroperitoneal tissue may have an aberrant müllerian duct remnant, which might have a capacity for growth in the case of abnormal hormonal stimuli. Lee et al (9) asserted that hormonal stimuli influenced the growth of müllerian cyst because most patients received several hormone shots for menstrual irregularities.



a. b.

Figure 6. Müllerian cyst in a 57-year-old woman. **(a)** Contrast-enhanced CT scan shows a well-defined cystic mass in the left retroperitoneal space (arrow). **(b)** Photomicrograph (original magnification, ×40; H-E stain) shows the cyst lined by ciliated, cuboidal to low columnar epithelial cells resembling fallopian tube epithelium.

At CT, müllerian cyst manifests as a unilocular or multilocular thin-walled cyst containing clear fluid (Fig 6a) (9). The differential diagnosis includes cystic mesothelioma and cystic lymphangioma (9). Clinical history may be useful for differentiating müllerian cyst from other retroperitoneal cystic masses because the former usually occurs in obese patients with menstrual irregularities (9). At microscopic analysis, the cyst is lined with cuboidal to columnar epithelial cells with cilia (Fig 6b), and the cyst wall consists of thicker smooth muscle.

Epidermoid Cyst

Epidermoid cysts are rare congenital lesions of ectodermal origin and can occur anywhere from the head to the foot. Epidermoid cysts that develop in the presacral space are quite rare, usually occurring in middle-aged women (11,12). Although most patients are asymptomatic, they may present with symptoms resulting from local mass effect (eg, constipation, lower abdominal pain) (11).

At CT, epidermoid cysts generally appear as thin-walled, unilocular cystic masses with fluid attenuation (Fig 7a) (11,12). These findings are not specific enough to allow differentiation of epidermoid cysts from other retroperitoneal cystic masses. However, the location of epidermoid cysts can be helpful in making the diagnosis because these lesions usually occur at the presacral retroperitoneal space (11). At histologic analysis, epidermoid cysts are known to have a component of stratified squamous epithelium with a mixture of desquamated debris, cholesterol, keratin, and water (Fig 7b).

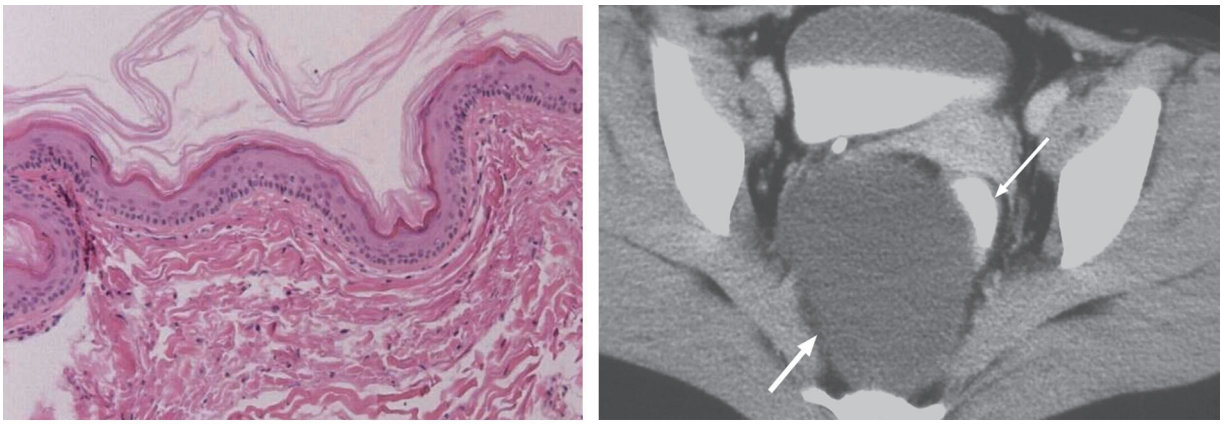
Tailgut Cyst

Tailgut cysts are rare congenital multicystic lesions that arise from vestiges of the embryonic hindgut and occur between the rectum and sacrum. These cysts are typically lined by several different types of epithelium (Fig 8a). Tailgut cyst is more common in women and usually appears in middle age (13).

At CT, tailgut cyst appears as a well-defined multicystic mass with attenuation values varying from that of water to that of soft tissue (Fig 8b) (13). If secondarily infected, the cyst may be thick walled with surrounding inflammatory changes (13). Rare cases of associated thin calcifications have been reported. Although most reported lesions have been benign, malignant degeneration has also been reported (14) and results in adenocarcinoma. If malignant degeneration is present, CT may show a loss of discrete margins and involvement of contiguous structures (13). Complete surgical excision is indicated to establish the diagnosis and avoid complications.

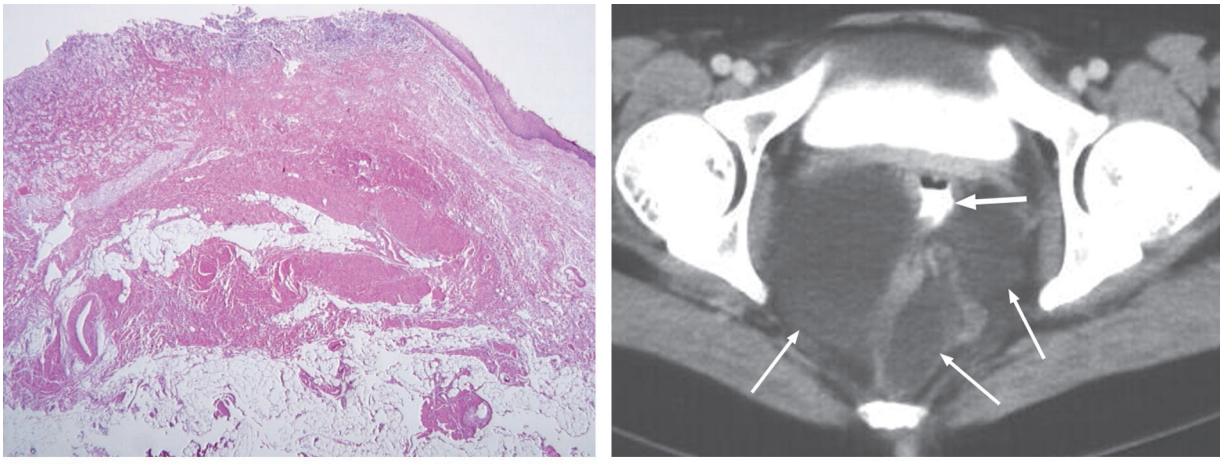
Bronchogenic Cyst

Bronchogenic cysts are rare benign congenital anomalies that result from abnormal budding of the developing tracheobronchial tree, with separation of the buds from the normal airways (15).



a. b.

Figure 7. Epidermoid cyst in a 30-year-old woman. **(a)** Photomicrograph (original magnification, ×100; H-E stain) shows fibrous tissue lined by stratified squamous epithelium that contains keratinous materials. **(b)** Contrast-enhanced CT scan shows a well-defined hypoattenuating mass in the pelvic retroperitoneum (thick arrow). The rectum is anteriorly displaced (thin arrow).

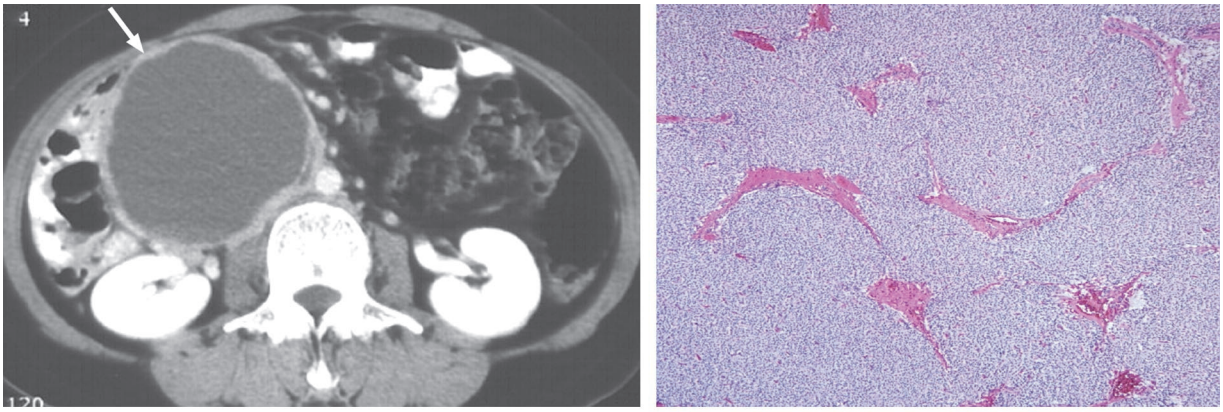


a. b.

Figure 8. Tailgut cyst in a 30-year-old woman. **(a)** Photomicrograph (original magnification, ×40; H-E stain) shows a cyst wall lined with stratified squamous epithelium. **(b)** Contrast-enhanced CT scan shows well-defined, thin-walled multicystic masses in the presacral space (thin arrows). The rectum is compressed and anteriorly displaced (thick arrow).

Bronchogenic cysts are lined by respiratory epithelium with bronchial glands, smooth muscle, and cartilage. Although bronchogenic cysts frequently occur in the mediastinum, they may also occur in the retroperitoneum (15,16). Most of the reported cases have been diagnosed incidentally (15,16). Bronchogenic cysts are usually asymptomatic, unless they become secondarily infected, perforated, or large enough to compress adjacent organs (16). A case of adenocarcinoma arising in a retroperitoneal bronchogenic cyst has been reported (17).

At CT, bronchogenic cysts manifest as rounded, well-circumscribed hypoattenuating cysts without enhancement (15). If bronchogenic cysts manifest as retroperitoneal masses, they are usually located at the subdiaphragmatic space (15,16). They can be misdiagnosed as solid masses because they appear hyperattenuating owing to the protein contents of the lesion (16). In addition, bronchogenic cysts may have calcifications (16).



a. b.

Figure 9. Cystic change in paraganglioma in a 38-year-old woman with hypertension. **(a)** Contrast-enhanced CT scan shows a cystic mass with irregular walls in the right anterior pararenal space (arrow). **(b)** Photomicrograph (original magnification, ×200; H-E stain) shows that the tumor consists of nests of monotonous round to polygonal cells with amorphous and granular cytoplasm and has a delicate capillary network.

Cystic Change in Solid Neoplasm

On rare occasions, other types of solid retroperitoneal neoplasms (eg, paraganglioma, neurogenic tumor) can be cystic (18,19). Retroperitoneal paragangliomas arise from specialized neural crest cells distributed along the aorta in association with the sympathetic chain (18), often giving rise to clinical symptoms because of the catecholamines they produce. The diagnosis is confirmed with assays of urine and blood for catecholamines and their metabolites (18). At CT, retroperitoneal paragangliomas usually have homogeneous soft-tissue attenuation or central areas of low attenuation. Rarely, these masses demonstrate internal hemorrhage with subsequent liquefaction and formation of a fibrous capsule, thereby mimicking cystic masses (Fig 9) (18).

Neurilemoma is an encapsulated tumor that arises from the neural sheaths of peripheral nerves. It usually occurs in young to middle-aged adults, and women are affected twice as often as men (19). Retroperitoneal neurilemoma is usually located in the paravertebral space or presacral pelvic retroperitoneum (19). It may show prominent cystic change resulting from secondary degenerative change caused by an inadequate blood supply to the center of the tumor (Fig 10) (19,20).

Chemotherapy reduces the bulk of the soft-tissue tumor and induces tumor necrosis and cystic hemorrhage (21,22). Hepatic metastases from gastrointestinal stromal tumors that respond to treatment with STI-571 (Gleevec; Novartis, Basel, Switzerland) may appear as simple cysts at contrast-enhanced CT (22). In our patient with retroperitoneal leiomyosarcoma, the soft-tissue masses in the retroperitoneum had markedly decreased attenuation after chemotherapy (20 vs 65 HU). Although pathologic correlation was not performed, we believe that this finding was due to necrosis or cystic hemorrhage of the tumor resulting from chemotherapy (Fig 11).

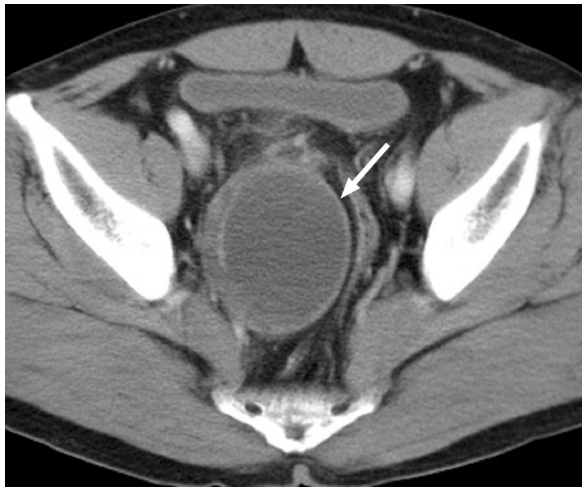


Figure 10. Cystic change in neurilemoma in a 50-year-old man. Contrast-enhanced CT scan shows a cystic mass in the pelvic retroperitoneum (arrow).

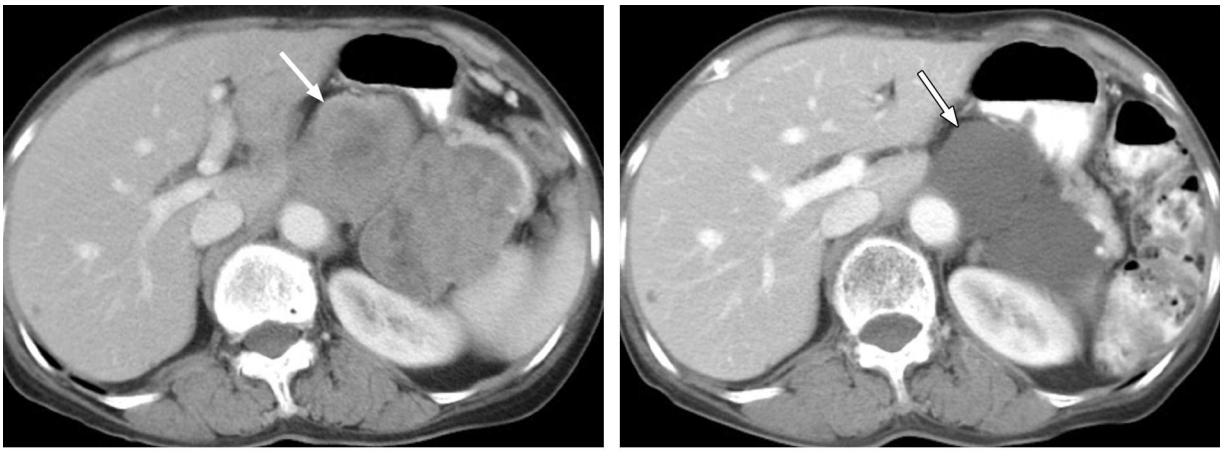


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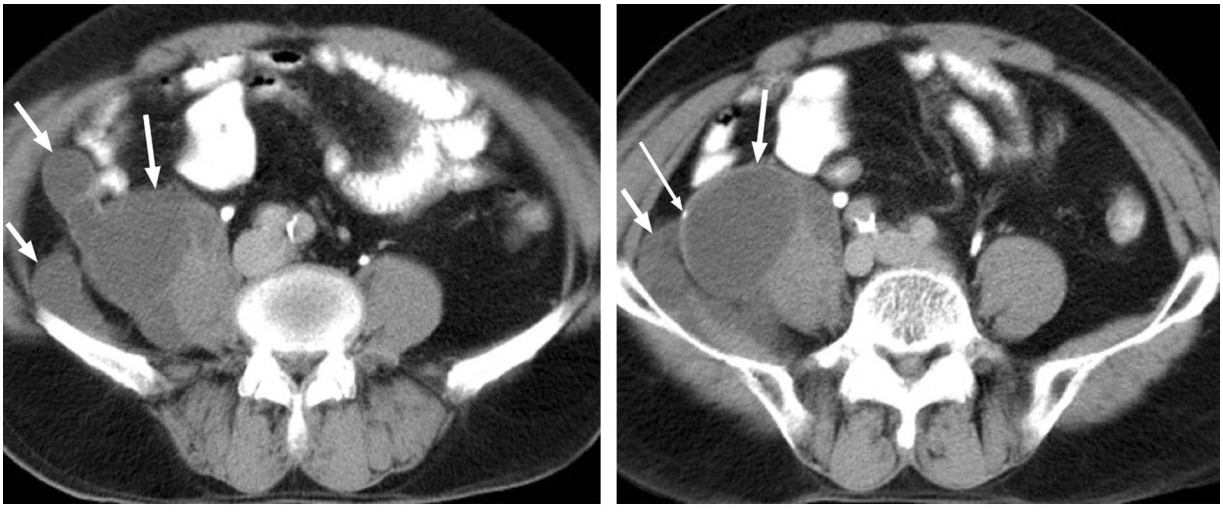
Figure 11. Cystic change in retroperitoneal leiomyosarcoma caused by chemotherapy in a 63-year-old woman. **(a)** Contrast-enhanced CT scan obtained before chemotherapy shows a large, lobulated soft-tissue mass with an attenuation value of 65 HU in the left anterior pararenal space (arrow). **(b)** On a contrast-enhanced CT scan obtained 6 months after chemotherapy, the mass (arrow) is hypoattenuating (20 HU) and decreased in size.



a. b.

Figure 12. Pseudomyxoma retroperitonei resulting from rupture of a mucinous cystadenocarcinoma of the appendix in a 64-year-old man. Contrast-enhanced CT scans show lobulated hypoattenuating masses in the right lower quadrant (arrows in **a**, thick arrows in **b**), mass effect on the right psoas muscle and right ureter, and a tiny wall calcification (thin arrow in **b**).

Pseudomyxoma Retroperitonei

Pseudomyxoma peritonei is a rare condition that is characterized by intraperitoneal accumulation of gelatinous material owing to the rupture of a mucinous lesion of the appendix or ovary (23). Although pseudomyxomas usually arise in the peritoneal cavity, they may occur in the retroperitoneum (24,25). Pseudomyxoma retroperitonei is caused by the rupture of a mucinous lesion in the retrocecal appendix and fixation of the lesion to the posterior abdominal wall (24).

The imaging findings in pseudomyxoma retroperitonei are similar to those in pseudomyxoma peritonei. At CT, pseudomyxoma retroperitonei appears as multicystic masses with thick walls or septa that displace and distort adjacent structures (Fig 12) (24,25). Curvilinear or punctate mural calcifications may also occur.

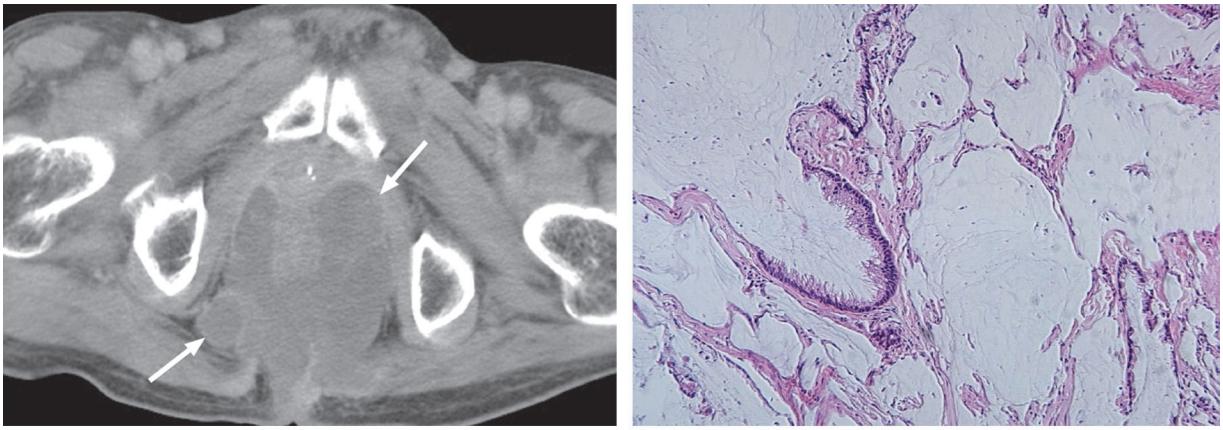


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Figure 13. Perianal mucinous adenocarcinoma in a 79-year-old man with a 20-year history of anal fistula. **(a)** Contrast-enhanced CT scan shows large, lobulated cystic masses in the perianal region (arrows). These hypoattenuating lesions proved to contain mucin at surgery. **(b)** Photomicrograph (original magnification, ×100; H-E stain) shows well-differentiated neoplastic glands associated with large lakes of mucin.

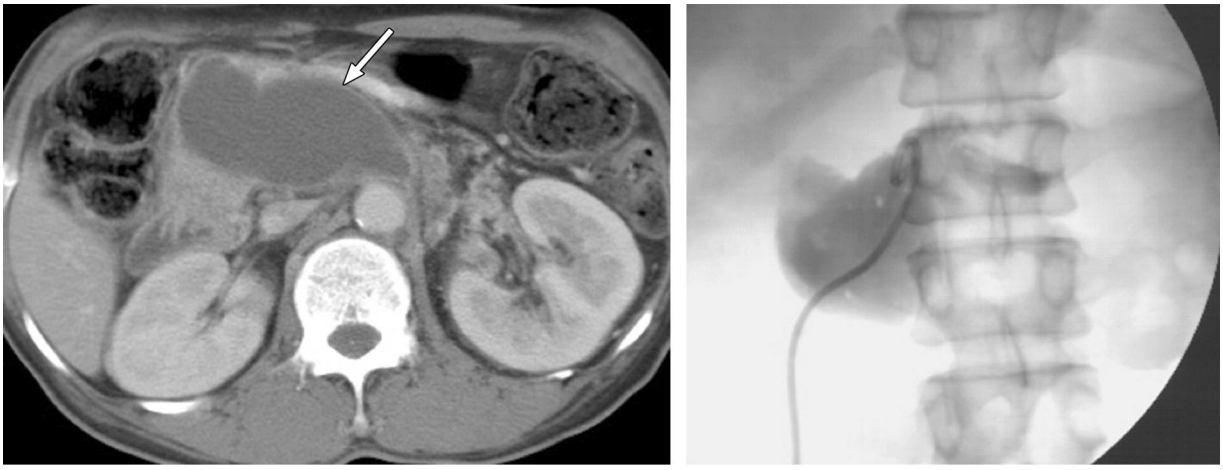

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Figure 14. Pancreatic pseudocyst in a 49-year-old man with a history of chronic alcoholism. **(a)** Contrast-enhanced CT scan shows a thin-walled fluid collection in the anterior pararenal space (arrow). Percutaneous drainage of retroperitoneal fluid was performed, and 90 mL of dark yellowish fluid was removed. **(b)** Fluoroscopic image shows a cavity filled with contrast material, which had been injected through a catheter.

Perianal Mucinous Carcinoma

Perianal mucinous carcinoma is a rare disease that may arise from an anal fistula, an anal duct, or a duplicated duct (26). It spreads around the anal canal and extends into the perianal soft tissue. The overlying anorectal mucosa remains intact. Mucinous carcinoma is characterized by abundant mucin production with organized mucinous pools and infiltration into the perianal soft tissues (26).

Although several reports have described the pathologic features of perianal mucinous carcinoma, there is a paucity of information regarding its imaging features (26,27). In a study by Nishimura et al (27), this neoplasm appeared at CT as a calcified, perirectal mass with displacement of the rectum. In our patient with a 20-year history of anal fistula and pathologically confirmed perianal mucinous carcinoma, multiple conglomerated cystic masses, which proved to represent mucinous pools at histopathologic analysis, surrounded the anus and rectum at CT (Fig 13).

Nonneoplastic Cysts

Pancreatic Pseudocyst

Pancreatic pseudocysts, which are round or oval encapsulated collections of pancreatic fluid, are most often peripancreatic in location but may also be seen in the abdomen, mediastinum, and pelvis. Clinical symptoms are related to the underlying inflammatory pancreatic disease. Elevated amylase levels in the serum and urine are helpful for diagnosis of this condition.

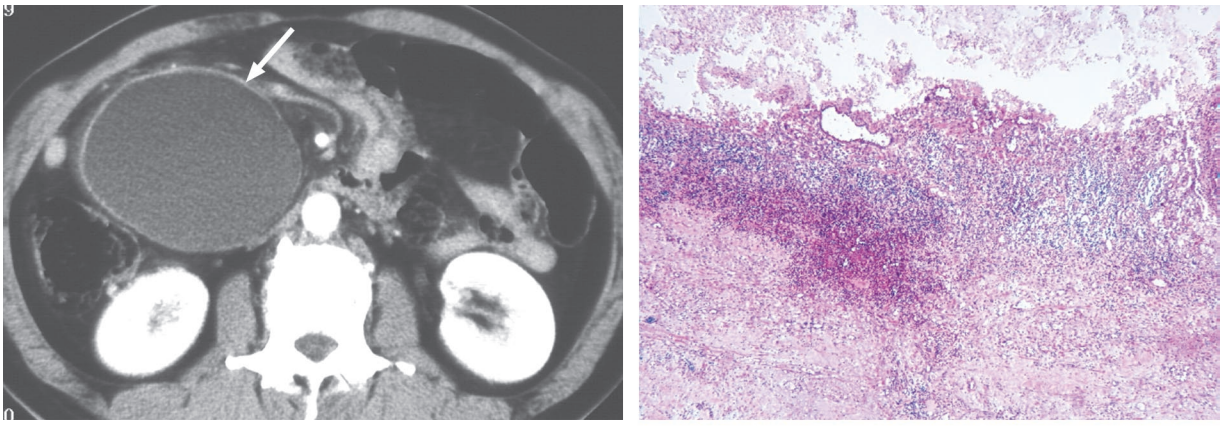

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Figure 15. Nonpancreatic pseudocyst in a 53-year-old man. **(a)** Contrast-enhanced CT scan shows a well-defined cystic mass anterior to the right kidney (arrow). **(b)** Photomicrograph (original magnification, ×40; H-E stain) shows the cyst wall, which consists of connective tissue, along with severe chronic inflammation and hemorrhage. No cell lining is present.

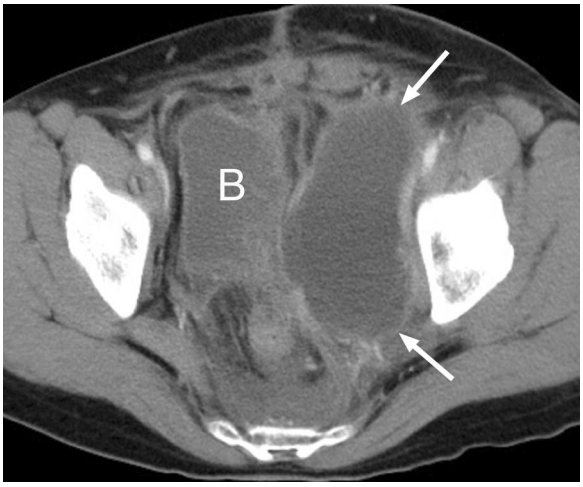


Figure 16. Lymphocele in a 51-year-old woman who presented with fever and low abdominal pain. The patient had undergone radical hysterectomy for cervical cancer 3 months earlier. Contrast-enhanced CT scan shows a hypoattenuating cystic mass located in the obturator space (arrows) and compressing the urinary bladder *(B)*.

A pancreatic pseudocyst manifests at CT as a round or oval fluid collection with a thin or thick wall (Fig 14) (28). The CT diagnosis of pancreatic pseudocyst in the retroperitoneum is not difficult when other signs of acute pancreatitis are present.

Nonpancreatic Pseudocyst

Nonpancreatic pseudocysts are rare lesions that usually arise from the mesentery and omentum (29,30). They usually have a thick, fibrous wall and contain hemorrhage, pus, or serous fluid. Unlike pancreatic pseudocysts, they are not associated with high levels of amylase or lipase in the cystic fluid. At microscopic analysis, the cyst wall is seen to contain fibrous tissue without an epithelial lining. Nonpancreatic pseudocysts manifest at CT as unilocular or multilocular fluid-filled masses with thick walls (Fig 15) (29).

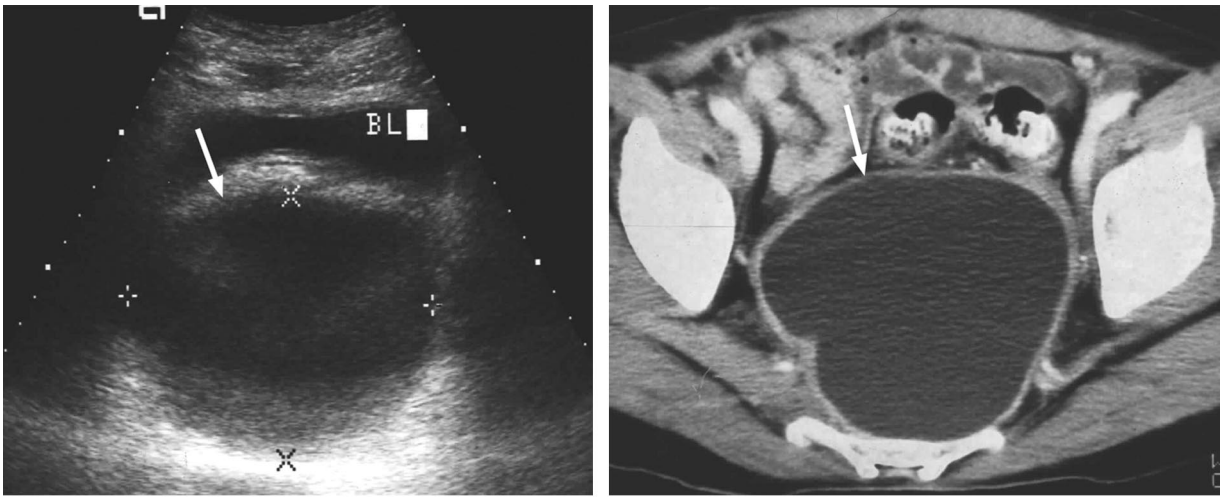
Lymphocele

Lymphoceles are fluid-filled cysts without an epithelial lining that occur after pelvic or retroperitoneal lymphadenectomy or renal transplant surgery. They occur in 12%–24% of patients who undergo radical lymphadenectomy. Retroperitoneal lymphoceles may cause venous obstruction, with subsequent edema and thromboembolic complications.

At CT, a lymphocele manifests as a low-attenuation mass (Fig 16) (31). Negative attenuation values due to fat within the fluid are rare but are highly suggestive of a lymphocele (31). Calcification of the lymphocele wall may be seen on rare occasions. Although lymphocele may be confused with urinoma, hematoma, or abscess, clinical history can be helpful in making the diagnosis.

Urinoma

A urinoma is an encapsulated collection of chronically extravasated urine. Both obstructive causes and nonobstructive causes (including abdominal trauma and injury to the collecting system during surgery or diagnostic instrumentation) can lead to urinary extravasation (32). Although a urinoma is typically located in the perirenal space, it may be seen in other locations, possibly as a result of disruption of a part of the ureter inferior to the perirenal space. Moderate or severe hydronephrosis is present in most patients (32).



a. **b.**

Figure 17. Urinoma in a 49-year-old woman who had undergone radical hysterectomy for cervical cancer. **(a)** Abdominal ultrasonographic image shows a well-defined cystic mass posterior to the urinary bladder (arrow and cursors). **(b)** Contrast-enhanced CT scan shows a large fluid collection with ring enhancement in the presacral space (arrow). The diagnosis was confirmed with CT-guided percutaneous aspiration and drainage.

At unenhanced CT, urinoma usually manifests as a fluid collection with water attenuation. However, the attenuation can increase progressively after intravenous administration of contrast material because contrast-enhanced urine enters the urinoma (Fig 17) (32). Percutaneous aspiration and drainage may allow confirmation of the diagnosis and treatment.

Hematoma

Retroperitoneal hematoma may be associated with trauma, ruptured abdominal aortic aneurysm, anticoagulation therapy, or blood dyscrasia. The CT appearance of a retroperitoneal hematoma (Fig 18) depends on the time elapsed between the traumatic event and imaging. Acute or subacute hematoma has a higher attenuation value than does pure fluid due to clot formation. However, chronic hematoma has decreased attenuation because of the breakdown of blood products.

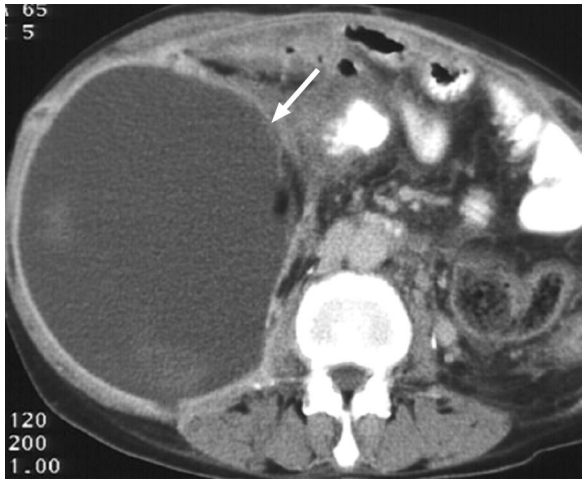


Figure 18. Hematoma in a 51-year-old woman. Contrast-enhanced CT scan shows a huge cystic mass with thin walls in the right retroperitoneal space (arrow). Ultrasonography-guided percutaneous aspiration revealed flank hematoma.

Conclusions

In patients with retroperitoneal cystic masses, CT may provide important information regarding the anatomic location, size, and shape of the lesions and involvement of adjacent structures. However, there is substantial overlap of CT findings in various retroperitoneal cysts. Although CT is nonspecific for distinguishing between many types of retroperitoneal cysts, clinical history and certain details seen at CT can assist in making the correct diagnosis. Familiarity with the CT features of retroperitoneal cysts facilitates accurate diagnosis and treatment.

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