Nonovarian Cystic Lesions of the Pelvis: What to look for?

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Learning objectives

Describing the key imaging features of nonovarian pelvic cystic lesions.

Background

Cystic disease in the female pelvis is common and the majority of cystic pelvic masses originate at the ovaries. A cystic pelvic mass is nonovarian if it is separated from the normal ovaries. The different types of cystic pelvic masses may have similar imaging appearances. It is important to understand the relationship of a mass with its anatomic location, identify normal ovaries, and relate imaging findings to the patient's clinical history to avoid misdiagnosis.

Mimics of ovarian cystic masses include: peritoneal inclusion cyst, paraovarian cyst, mucocele of the appendix, obstructed fallopian tube (hydrosalpinx, pyosalpinx, hematosalpinx), uterine pathology (leiomyoma, adenomyosis, unicorionate uterus), lymphoceles, cystic degeneration of lymph nodes, hematoma and abscess.

We have retrospectively reviewed the case of several patients with nonovarian pelvic cystic lesions who have been subject to different imaging techniques at our hospital. In this paper, we will identify the more relevant radiological findings related to nonovarian cystic lesions.

Imaging findings OR Procedure details

PERITONEAL INCLUSION CYST

It is a nonmalignant entity. Reactive mesothelial proliferation of peritoneal cells resulting from insult to the peritoneum (endometriosis, pelvic inflammatory disease, previous abdominal or pelvic surgery). Incidentally found in premenopausal women. Cysts conform to the shape of the peritoneal cavity and they may recur. The ovaries are entrapped by, but clearly separated from. Uni or bilateral. Hemorrhage occasionally may be seen (high signal intensity at T1-weighted MR imaging, and low signal intensity at T2).

PARAOVARIAN CYST
It represents 10-20% of all adnexal masses and typically affects women in the 3rd and 4th decades. The ipsilateral ovary is not affected. The average size at diagnosis is 8 cm. Bilateral and multiple unilateral cysts have been documented. It may rarely be complicated by torsion or hemorrhage. Presence of soft tissue within the cyst may indicate a benign or malignant neoplasm (cystadenoma or cystoadenocarcinoma). CT and MR are recommendable for studying their complications.

**MUCOCELE OF THE APPENDIX**

An obstructed, dilated appendix filled with mucin.

It is a rare condition (prevalence of 0.2-0.3%) and more common in middle-aged women. There are four histologic subtypes:

- Retention cyst, mucosal hyperplasia, cystadenoma and cystadenocarcinoma (the two latter are mucin secreting tumors)

It is important to identify it prior to surgery to avoid rupture at surgery, which may lead to pseudomyxoma peritonei. In addition, it is important to determine the likelihood of malignant (mucoceles may have elevated carcinoembryonic antigen level and CA 19-9 and CA 125).

At US:

- "jellylike" content (heterogeneous low-level echoes and through-transmission)

CT features:

- Calcified walls (porcelain appendix)
- Cyst wall thickness does not seem to correlate with malignancy, however, focal enhancing nodules on the walls does it (are suggestive of cystadenocarcinoma)

**FALLOPIAN TUBE CYST**

**HYDROSALPINX**

Hydrosalpinx is caused by adhesions at the fimbriated end of the fallopian tubes, being the most common causes pelvic inflammatory disease and endometriosis.

At US:
• Tubular or corkscrew-shaped structure
• Usually separated from the ovaries
• "Cogwheel sign" (specific)
• "Waist sign" (specific)
• "Beads-on-a-string sign" in patients with chronic hydrosalpinx

MR:
• When US findings are equivocal

CT:
• Ingested oral contrast material recommended, because the small bowel may mimic dilated fallopian tubes

**PYOSALPINX**

Imaging features are similar to those of hydrosalpinx.

Differential diagnosis:
• More likely to be bilateral
• Fallopian tube wall and uterosacral ligaments thickening
• Edema of the presacral fat
• Clinical-radiologic correlation (features of sepsis)

**HEMATOSALPINX**

It is common in the context of endometriosis, ectopic pregnancy, pelvic inflammatory disease, adnexal torsion, malignancy and trauma. High attenuation at CT, and high signal intensity at T1-weighted fat-suppressed MR. Blood products may cause adhesions which pull the ovaries toward the midline ("kissing ovary" sign), or to encase the ovary, resulting in an appearance similar to that of a complex cystic solid mass. Hematosalpinx and pyosalpinx have similar imaging characteristics at US and CT. MR imaging findings are more specific.

**UTERINE LEIOMYOMA**

It is difficult to distinguish a uterine lesion from a cystic adnexal mass if it is pedunculated with cystic degeneration. It is the most common benign gynecologic tumor, affecting 40% of women over the age of 35.
ADENOMYOSIS

Presence of heterotopic endometrial glands and stroma within the myometrium, with adjacent smooth muscle hyperplasia. It is a common, nonneoplastic condition. It affects menstruating women. "Brindging-vessel" is indicative of a uterine origin (similar to a pedunculated leiomyoma). Both, degenerating pedunculated leiomyoma and cystic adenomyosis may manifest with abdominal pain and elevated CA-125 levels (DDx with endometriosis and malignancy). Cystic adenomyosis is a rare variation of adenomyosis caused by extensive menstrual bleeding into the ectopic endometrium.

LYMPHOCELE

It is a common complication of lymphadenectomy (it occurs in 12-24% of patients undergoing radical lymphadenectomy, and it is usually detectable 3-8 weeks after surgery). It is important to differentiate from other postoperative complications such as hematoma, seroma, abscess, and cystic tumor recurrence, because the clinical management is different. They are typically unilocular, occur at the lymph node dissection site, and follow the course of pelvic lymph node chains. Lymphoceles always retain their lateral relationship to adjacent pelvic vessels after pelvic surgery. Enhancing soft tissue is indicative of tumor recurrence.

HEMATOMA

Pelvic hematoma results from trauma, surgery, and coagulopathy and may be intra or extraperitoneal. It is important to know the date of surgery or the onset of bleeding because the imaging appearance of blood products varies according to the age of the hematoma.

At US:

- Echogenic area that becomes hypoechoic over time
- Septa and thick walls may or may not be present

At CT:

- Acute hematoma appears as a high-attenuation area (50-80 HU)
- After 2-3 weeks, it becomes hypoattenuating (differential diagnosis with a simple cyst)

At MR imaging:
• Acute and subacute hematoma appear as high signal intensity on T1-weighted fat-suppressed images
• Over time, a dark peripheral rim may be seen on both T1 and T2-weighted images with a bright inner ring on T1-weighted images (concentric ring sign)

Subacute hematoma may have an imaging appearance similar to that of recurrent tumor; however, hematoma is not enhanced by the administration of contrast material, and it decreases in size over time.

PELVIC ABSCESS

A vast range of disorders can cause pelvic abscess, including appendicitis, diverticulitis, inflammatory bowel disease, postoperative anastomotic leak, infected hematoma, lymphocele, seroma and urinoma. It may be intra or extraperitoneal. The patient presentation ranges from practically asymptomatic to moribund.

Imaging features:
• Thick walls
• Simple or complex fluid collections
• Fat-stranding
• Free fluid
• Inflammation of surrounding organs
• Air from gas-forming organisms or fistulization with adjacent bowel

OTHERS

RETRORECTAL DEVELOPMENTAL CYST

BLADDER DIVERTICULUM

NEOBLADDER

Images for this section:
Fig. 1: Peritoneal inclusion cyst in a 38-year-old woman with a history of pelvic surgery (descend colon adenocarcinoma) and left iliac fossa mass. Control transabdominal US image shows a hypoechoic cystic mass conforming to the peritoneum. The left ovary (arrow) is entrapped by, but clearly separated from the lesion. At previous surgery (left colon resection), the left fallopian tube was adhered to the tumor and endometriosis of the posterior face of the uterus was identified in intraoperative biopsia.
**Fig. 2:** Paraovarian cyst in a 26-year-old woman with elevated CA 125 tumor marker, a history of multiple benign masses, and Cowden syndrome diagnosed in 2000. Axial contrast-enhanced CT image shows a simple cystic structure adjacent to the right broad ligament. The uterus is displaced posteriorly and laterally. The right ovary (arrow) is clearly separated from the cyst as well as posterior to it.
Fig. 3: Sagital T2-weighted MR images show thin-walled, fluid-filled high-signal-intensity lesion adjacent to the rectum lateral wall.
**Fig. 4:** Appendiceal mucocele in a 60-year-old woman with abdominal pain. Transabdominal US image shows a large tubular structure with thin walls, low echogenicity and internal low-level echoes in lower areas of the image (a finding suggestive of mucin).
Fig. 5: Axial contrast-enhanced CT image, obtained at a lower level as CT image, shows a large abdominal cystic mass with thin walls. Ascending and descending colon are displaced posteriorly.
Fig. 6: Axial T2-weighted MR image showing a cross-sectional view of the lesion lower than the one shown in CT. Note the presence of free fluid.
**Fig. 7:** Sagital T2-weighted MR image shows the huge size of the tumor. The left ovary is separated from the appendiceal mucocele, a finding indicative of its nonovarian origin.
Fig. 8: Cystadenoma in a 71-year-old woman with right iliac fossa pain. Axial contrast-enhanced CT image shows a small low-attenuation cystic mass with thick walls arising from the cecum, in the theoretical location of the appendix. Note the presence of a small calcified focus (a finding suggestive of appendicolith or wall focal calcification) and free fluid in pelvis. Ruptured appendiceal mucocele was suspected. A diagnosis of cystadenoma was made at biopsy.
Fig. 9: Hydrosalpinx in a 35-year-old woman with pelvic pain and fever. Contrast-enhanced CT image shows a tubular shaped lesion in pelvis, adjacent to right ovary and posterior to the uterus.
**Fig. 10:** Hematosalpinx in a 40-year-old woman with endometriosis. Axial T1-weighted fat-saturated MR image shows intermedial-signal-intensity at the left ovary, with high-signal-intensity areas indicative of blood products.
Fig. 11: Coronal T2-weighted MR image shows high-signal-intensity. Findings are suggestive of endometriosis. The left ovary is surrounding by a tubular structure that shows high-signal-intensity in both T1 and T2-weighted MR images. This last finding is suggestive of hematosalpinx.
**Fig. 12:** Pedunculated focal adenomyosis in a 35-year-old woman with suprapubic pain and a prior history of episodic acute obstructive uropathy. Axial (Fig. 12) and sagittal (Fig. 13) contrast-enhanced CT images shows a large well-defined cystic mass in lower abdomen, with multiple septa and enhancing thick walls. The mass is located at the vagina and the surrounding organs are displaced but not infiltrated by the lesion. Note the collapsed bladder anterior to the mass (arrow). Pedunculated submucose leiomyoma with cystic degeneration was presumed. At an anatomopathological study of the lesion, the presence of pedunculated adenomyosis originated at the vagina was confirmed.
Fig. 13: Pedunculated focal adenomyosis in a 35-year-old woman with suprapubic pain and a prior history of episodic acute obstructive uropathy. Axial (Fig. 12) and sagittal (Fig. 13) contrast-enhanced CT images shows a large well-defined cystic mass in lower abdomen, with multiple septa and enhancing thick walls. The mass is located at the vagina and the surrounding organs are displaced but not infiltrated by the lesion. Note the collapsed bladder anterior to the mass (arrow). Pedunculated submucose leiomyoma with cystic degeneration was presumed. At an anatomopathological study of the lesion, the presence of pedunculated adenomyosis originated at the vagina was confirmed.
Fig. 14: Lymphocele in a 70-year-old man with prostate cancer who underwent retroperitoneal and pelvis lymph node dissection. Coronal T2-weighted fat-saturated MR image (Fig. 14) and axial T2-weighted MR image (Fig. 15) show a rounded fluid-filled cystic structure at the location of the left common iliac lymph node dissection. The left common iliac vessels are immediately medial to the lymphocele. The left iliopsoas muscle is immediately lateral to the lymphocele.
**Fig. 15:** Lymphocele in a 70-year-old man with prostate cancer who underwent retroperitoneal and pelvis lymph node dissection. Coronal T2-weighted fat-saturated MR image (Fig. 14) and axial T2-weighted MR image (Fig. 15) show a rounded fluid-filled cystic structure at the location of the left common iliac lymph node dissection. The left common iliac vessels are immediately medial to the lymphocele. The left iliopsoas muscle is immediately lateral to the lymphocele.
Fig. 16: Pelvic abscess in a 88-year-old woman with fever and left iliac fossa pain. Contrast-enhanced CT image shows a well-defined, low-attenuation cystic mass with thick enhancing walls and air inside. A pelvic abscess due to perforated acute diverticulitis was confirmed.
**Fig. 17:** Coronal reconstruction CT image of the same patient shows the abscess with inflammatory stranding of the surrounding mesenteric fat. Inflammation changes of surrounding organs (small bowel) are also seen.
Fig. 18: Retrorectal developmental cyst in a 40-year-old woman with a breast cancer who underwent pelvic MR in order to improving staging. Axial T2-weighted fat-saturated MR image shows a rounded high-signal-intensity cystic mass in the ischioanal left area. The mass is isolated form the rectum.
Fig. 19: Bladder diverticulum in a 80-year-old man with benign prostatic hyperplasia. Transabdominal US image shows a large diverticulum in the posterior wall of the bladder.
Fig. 20: Contrast-enhanced CT shows a homogeneous low-attenuation mass with thick wall within the pouch of Douglas. The mass is communicated with the bladder.
**Fig. 21:** Neobladder reconstruction surgery in a 63-year-old man with a bladder recurrence cancer who underwent radical cystectomy.
Conclusion

Not all the cystic disease in female pelvis originate at the ovary, it is important to consider nonovarian disease processes that may mimics those of the ovaries, because a misdiagnosis can seriously affect patient management. Radiologic evaluation plays an essential role in the diagnosis of nonovarian cystic lesions of the pelvis, radiologist should be well acquainted with imaging findings and the patient's clinical history to avoid misdiagnosis.

References


Personal Information