Case 15389

Eurorad

Pelvic inflammatory disease with tubo-ovarian complex

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Section: Genital (female) imaging
Area of Interest: Pelvis
Procedure: Diagnostic procedure
Procedure: Contrast agent-intravenous
Imaging Technique: Ultrasound
Imaging Technique: Ultrasound-Colour Doppler
Imaging Technique: CT
Special Focus: Infection Case Type: Clinical Cases
Authors: Ana Coutinho Santos1, Mariana Horta2
Patient: 25 years, female

Clinical History:

A 25-year-old woman presented at the emergency department with right lower quadrant abdominal pain lasting 24 hours, associated with nausea, vomiting and fever. She had no relevant medical history. Laboratory workup excluded pregnancy and documented elevated inflammatory parameters, namely leukocytosis with neutrophilia and elevated serum C-reactive protein.

Imaging Findings:

Transvaginal ultrasound (TVUS) revealed the presence of a tubular complex lesion located on the right lower quadrant with internal echoes, fluid/fluid layering and incomplete, thick-wall and hypervascular septa (Figs. 1 and 2). The right ovary was partially visualised contiguous to the lesion and showed hypervascularisation (Fig. 3). A similar lesion was identified adjacent to the left ovary, which had normal dimension and morphology (Fig. 4). The patient referred tenderness at ultrasound (US) examination. The uterus evaluation was normal.
A contrast-enhanced computed tomography (CT) was also performed and showed bilateral serpiginous multilocular adnexal masses with internal fluid, thick-enhancing walls and internal septa. A small amount of free fluid on right lower quadrant and paracolic gutter and pelvic fat stranding were also noted (Fig. 5). Abnormalities of the gastrointestinal and urinary tract were ruled out. The patient was treated with intravenous antibiotherapy with clinical and laboratory improvement.

Discussion:

Pelvic inflammatory disease (PID) refers to a spectrum of acute sexually transmitted infections of the upper genital tract [1, 2]. It is a common cause of acute pelvic pain in reproductive-aged women [3], typically caused by Neisseria gonorrhoeae and Chlamydia trachomatis, although 30-40% of infections are polymicrobial [1-4].
PID is an ascending infection, usually beginning as cervicitis and extending upwards to the endometrium, the fallopian tubes and, if untreated, can ultimately cause a tubo-ovarian complex or abscess (TOA) [1, 3].
PID generally presents as acute pelvic pain, vaginal discharge, cervical motion tenderness, fever, and leukocytosis [1, 3, 4]. Patients may develop right upper quadrant pain due to intraperitoneal spread of infection along the paracolic gutters (perihepatitis or Fitz-Hugh-Curtis syndrome) [2, 4]. Imaging has a crucial role in doubtful cases and in the evaluation of disease extent [3, 4]. The modality of choice is TVUS with colour or power Doppler. CT is useful as a complementary and problem-solving modality, especially in cases of complications such as TOA or peritonitis,

and for drainage guidance [2-4].
The imaging findings depend on disease severity, early and uncomplicated cases are typically subtle [1-3].
On US, endometritis manifests as endometrial heterogeneous thickening, increased vascularity and fluid or gas in the endometrial cavity [1, 3, 4]. Salpingitis is characterised by tube distension with fluid, wall thickening, incomplete septa with increased vascularity and oophoritis by ovarian enlargement with polycystic appearance and fluid with internal echoes. In pyosalpinx there is a thick-walled, tubular adnexal mass with low-level echoes or layering echogenic fluid with a “cogwheel” appearance. TOA are complex thick-walled, multilocular cystic adnexal collections, with internal echoes or fluid-fluid levels, hypervascular walls and septations. Usually TOA are bilateral with breakdown of adnexal architecture. In tubo-ovarian complexes some ovarian tissue is preserved [1, 3].
On CT, early findings include thickening of the uterosacral ligaments and pelvic fat haziness. Abnormal endometrial enhancement and endometrial fluid, enhancement and thickening of the fallopian tubes, and abnormal enhancement, enlargement, and reactive polycystic change of the ovaries indicate, respectively, endometritis, salpingitis and oophoritis. Pyosalpinx shows fluid-filled tubular tortuous lesions, with thick enhancing walls and interdigitating mural septa. TOA appears as a low-attenuation, multilocular, thick-walled adnexal mass with a serpiginous structure.
Without effective treatment, PID can lead to infertility, ectopic pregnancy, and chronic pelvic pain [2, 3].
PID is a common disease with nonspecific symptoms. Its early diagnosis, management and treatment are essential to avoid long-term complications such as infertility.
Differential Diagnosis List: Pelvic inflammatory disease with tubo-ovarian complex, Ovarian cancer, Acute appendicitis complicated with abscesses, Acute diverticulitis complicated with abscesses, Haemorrhagic cyst, Ruptured ovarian cyst, Ectopic pregnancy

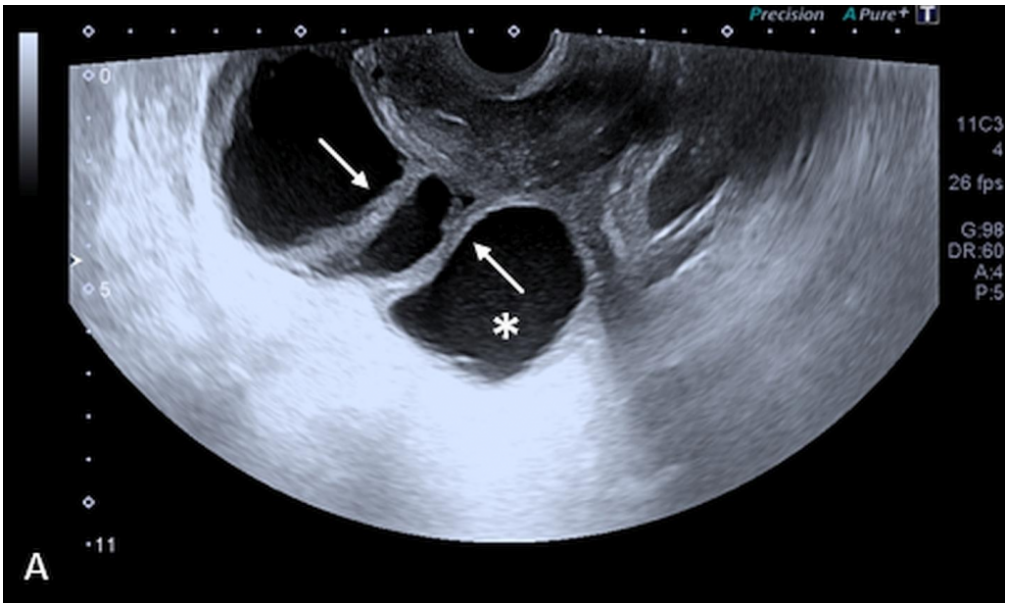
Final Diagnosis: Pelvic inflammatory disease with tubo-ovarian complex

References:

Cicchiello LA, Hamper UM, Scoutt LM (2011) Ultrasound Evaluation of Gynecologic Causes of Pelvic Pain. Obstet Gynecol Clin N Am 38(1):85-114 (PMID: 21419329)
Hamm B, Forstner R (2007) MRI and CT of the Female Pelvis. Berlin Springer 356-360
Vandermeer FQ, Wong-You-Cheong JJ (2009) Imaging of Acute Pelvic Pain. Clin Obstet Gynecol 52(1):2-20 (PMID: 19179858)
Amirbekian S, Hooley RJ (2014) Ultrasound Evaluation of Pelvic Pain. Radiol Clin North Am 52(6):1215-35 (PMID: 25444102)

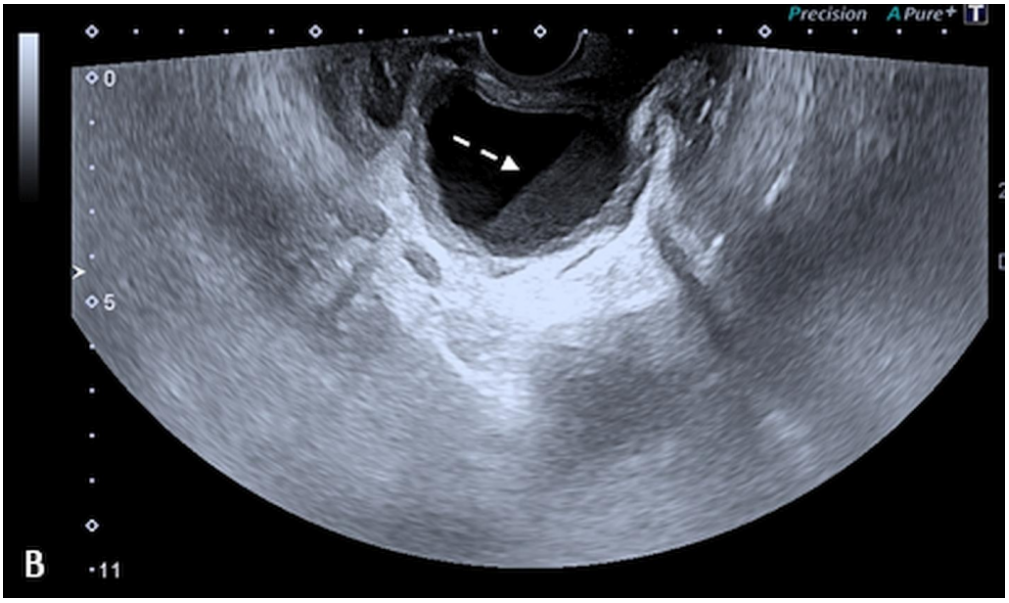
Figure 1

a



Description: A. A complex, dilated tubular and multiloculated lesion with thick irregular septa (arrows) and internal low-level echoes (*) is noted. **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

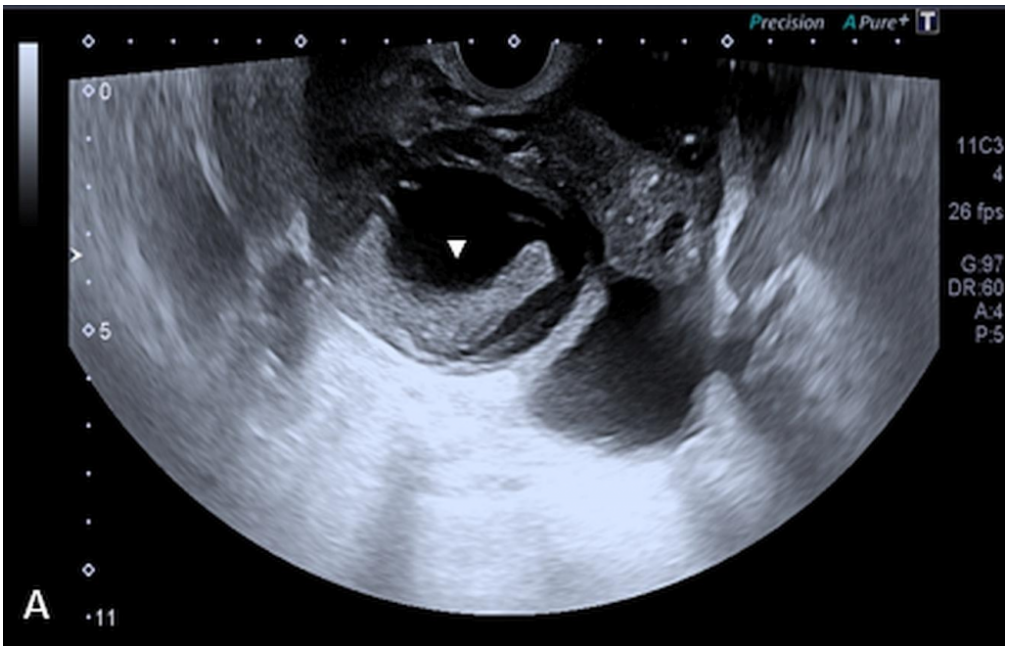
b



Description: B. Some locules demonstrate fluid/fluid layering (dashed arrow). **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

Figure 2

a



Description: Locules of the right adnexal lesion in detail on B-mode (A) and colour Doppler (B) on transvaginal ultrasound. The locules have thick walls (arrowhead on A) that show hypervascularity on Doppler evaluation (B). **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

b

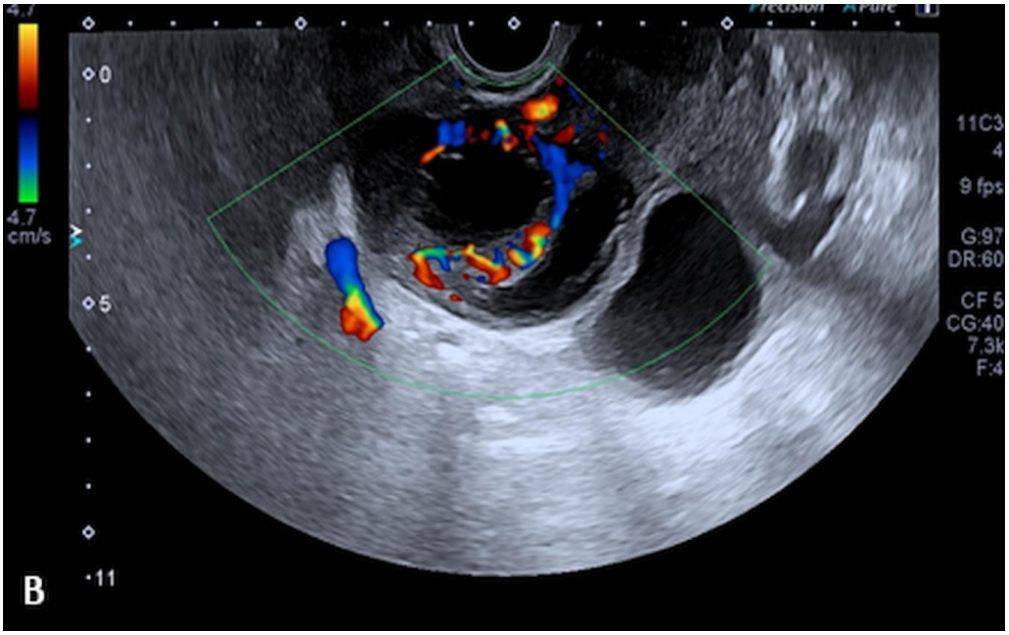


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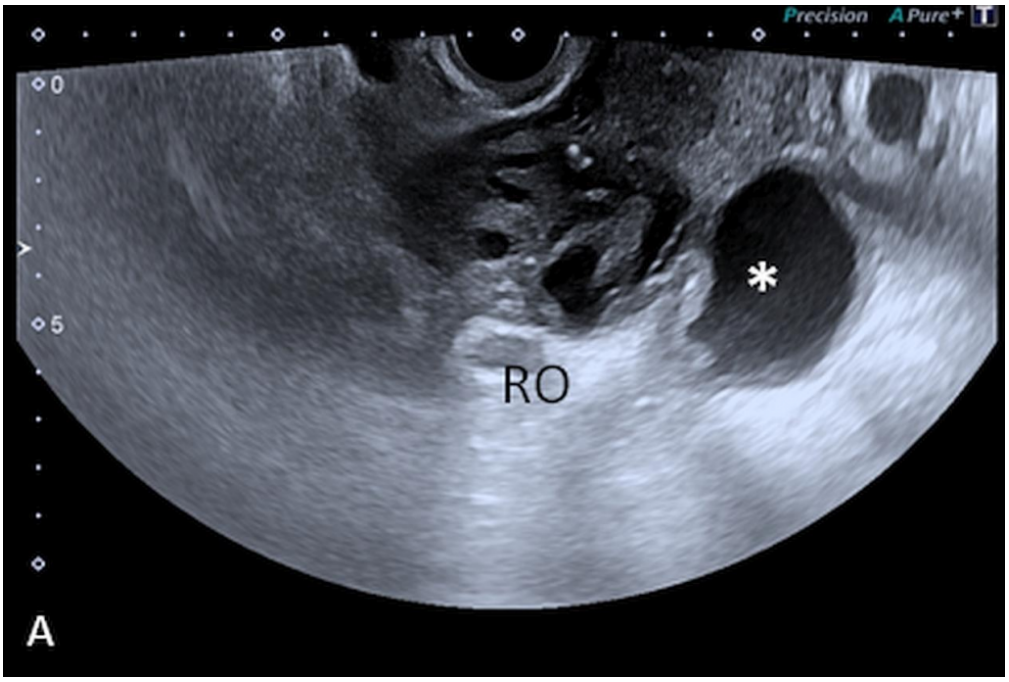
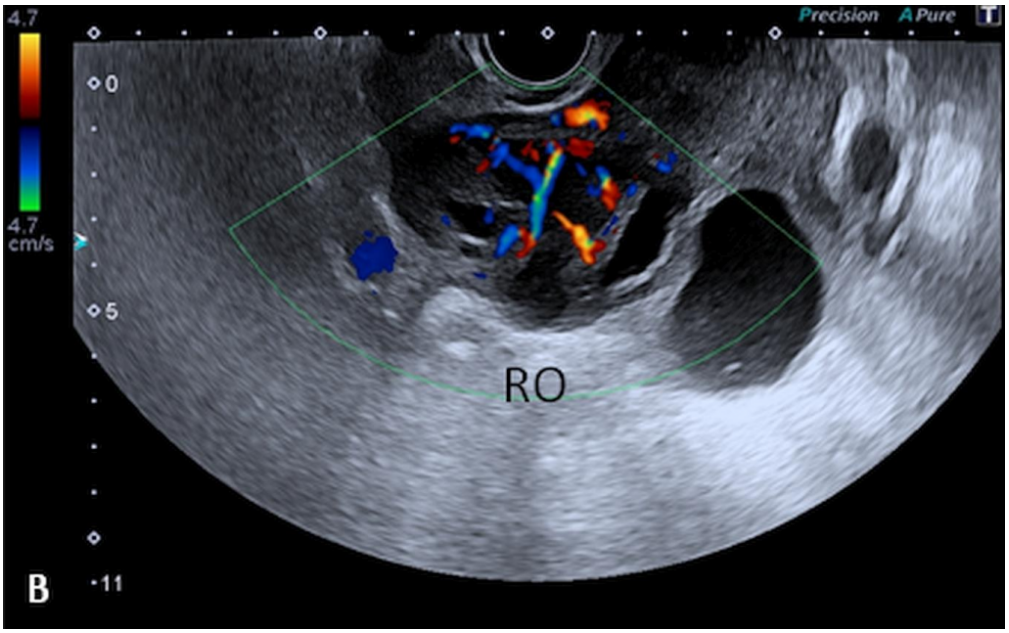
Figure 3

a



Description: A. The right ovary (RO) is partially visualised and contiguous to the lesion (*). **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

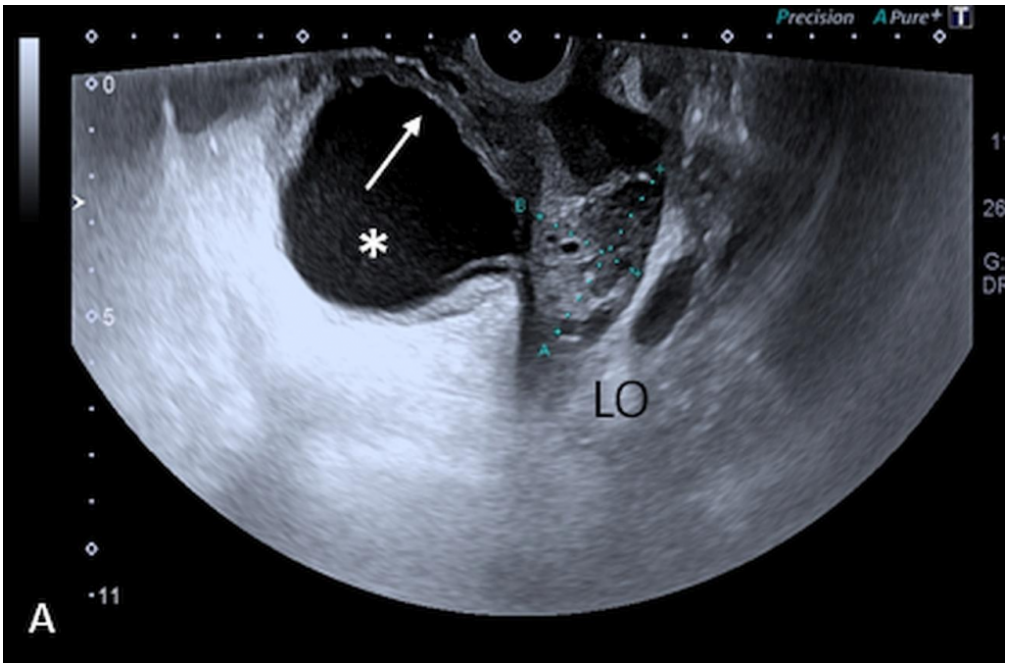
b



Description: B. The same image on colour Doppler depicts hypervascularity of the right ovary. **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

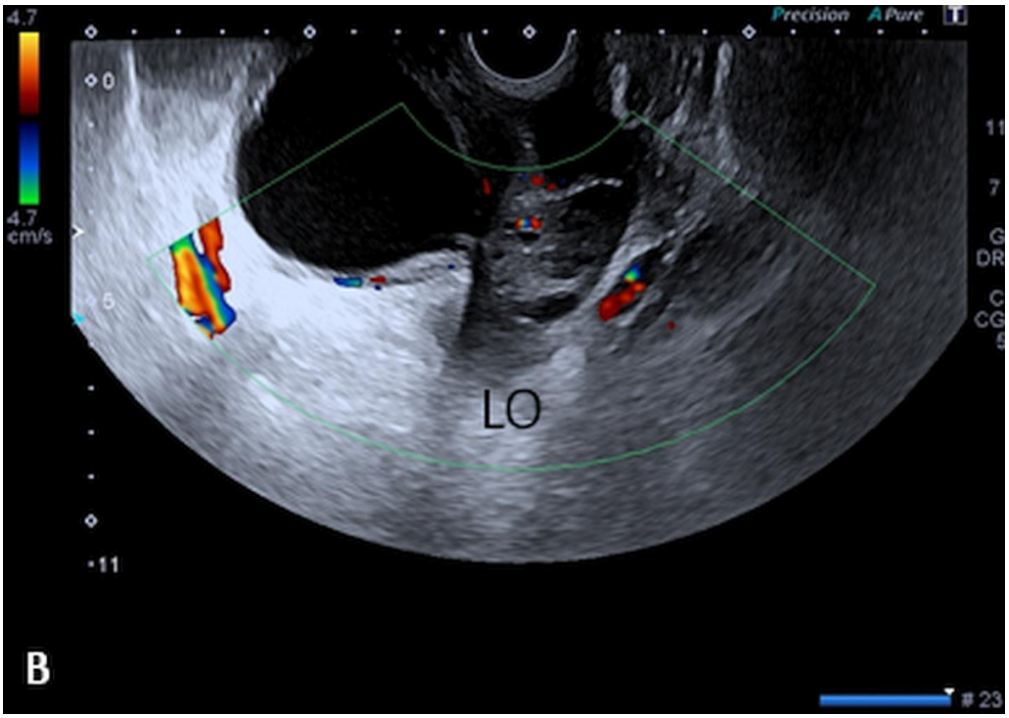
Figure 4

a



Description: A. A complex cystic lesion with thick and irregular walls (arrow) and low-level echoes (*) in dependent position is noted adjacent to the left ovary (LO), which has normal dimension and structure. **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

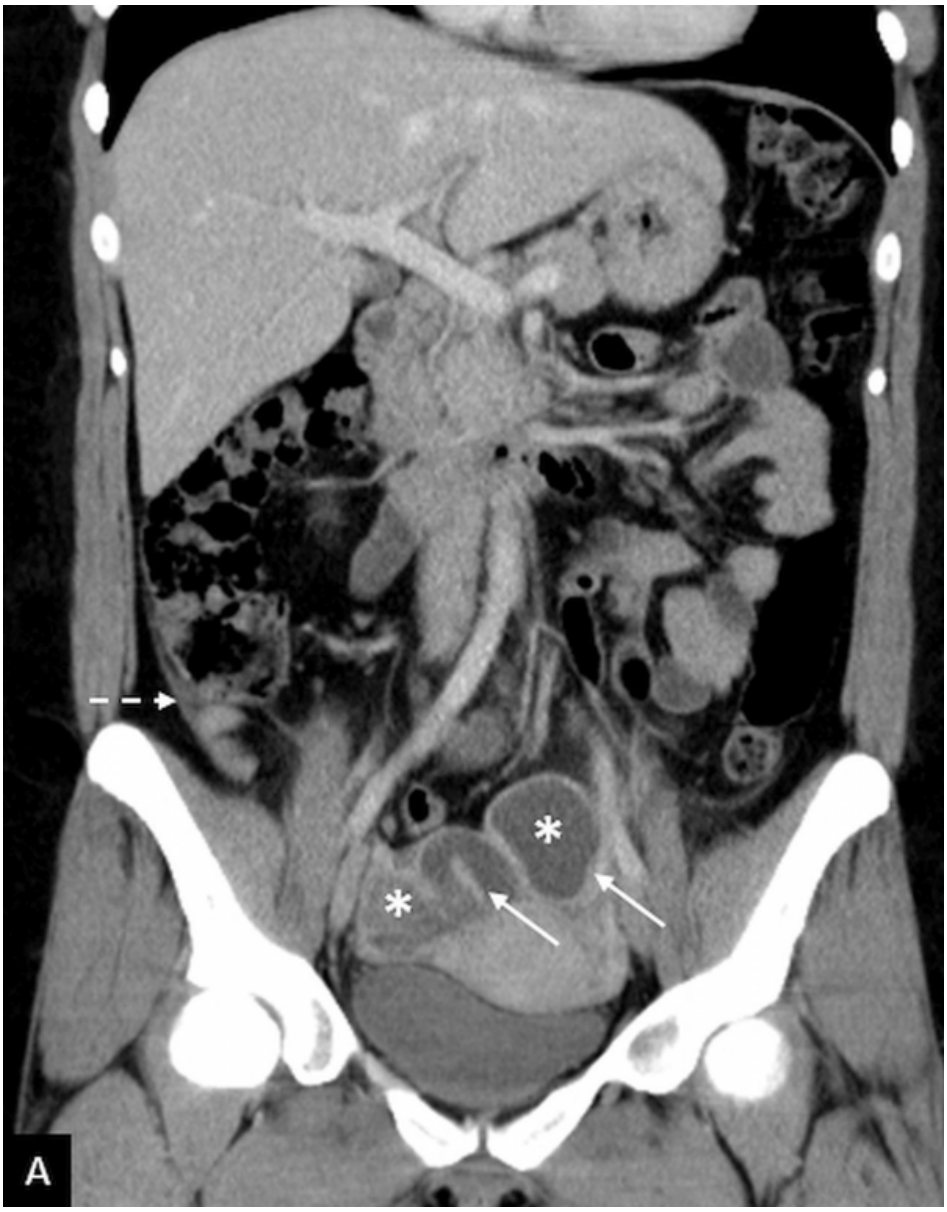
b



Description: B. On colour Doppler, the left ovary has normal vascularity. **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

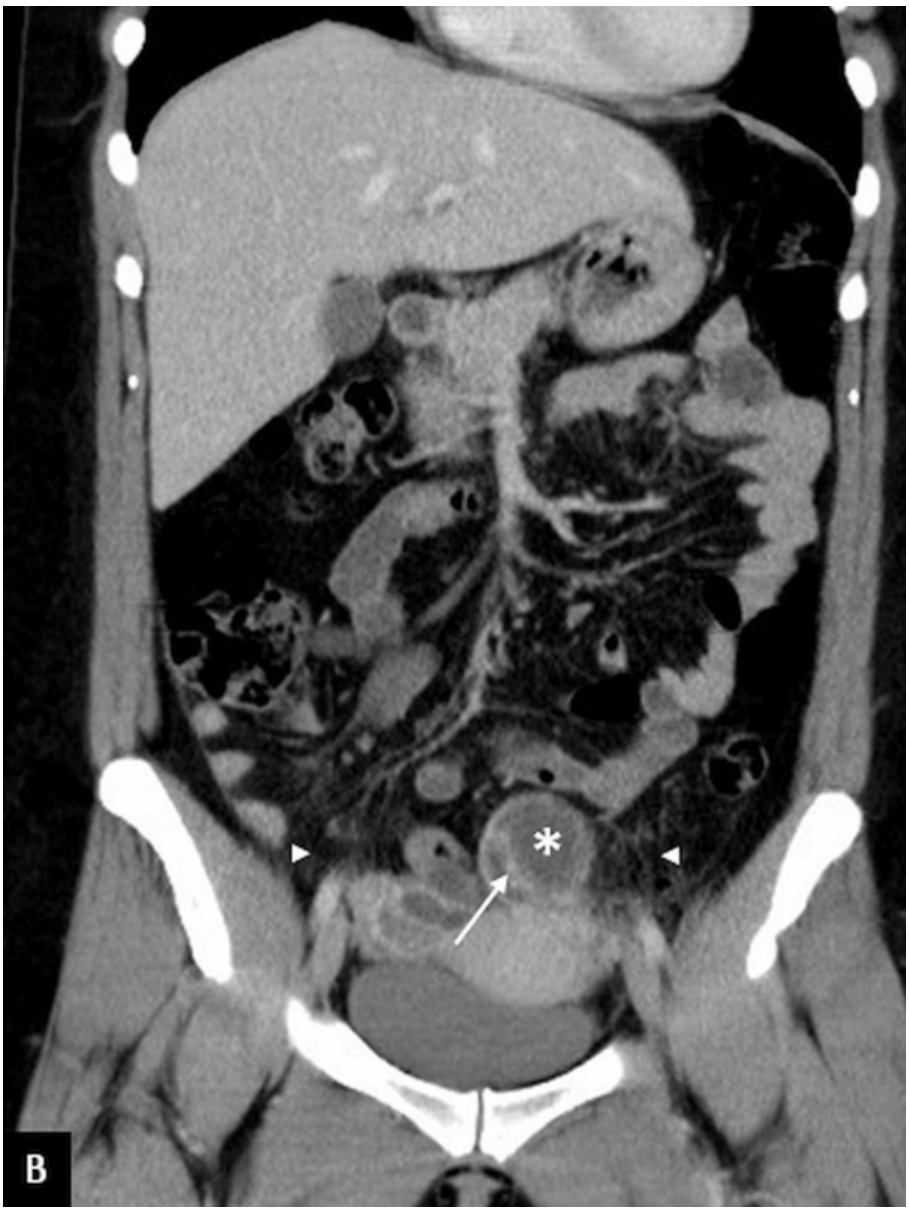
Figure 5

a



Description: A. The lesions are serpiginous and multiloculated with internal ?uid (*) and enhancing walls and septations (arrows). Small amount of free fluid on right paracolic gutter (dashed arrow) is also depicted. **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

b



Description: B. The lesions are serpiginous and multiloculated with internal ?uid (*) and enhancing walls and septations (arrows). Pelvic fat stranding (arroweads) is also depicted. **Origin:** Radiology Department, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal