Case Report

Sigmoid cancer mimicking ovarian echotexture on transvaginal ultrasound: Case report with literature review

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\section*{Abstract}

Ultrasound is a first line imaging modality for the evaluation of female pelvic pain. Pelvic pain constitutes one of the most common reasons for presentation to the emergency department with increasing use of point of care ultrasound. Infrequently, point of care or formal ultrasound evaluation may lead to misdiagnosis of extraovarian disease. This can have serious consequences, especially if an extraovarian malignancy is mistaken for a normal ovary or an ovary with a benign process. We present a case of a 41-year-old female who presented to the emergency department for a chief complaint of pelvic pain and vaginal bleeding. Transvaginal ultrasound demonstrated a left adnexal mass, later characterized as a sigmoid colon cancer on MRI and pathology, simulating ovarian echotexture with peripheral hypoechoic components resembling follicles. This article will review the literature of various cases of extraovarian pathology misidentified as ovarian processes and highlight the importance of considering these extraovarian mimickers to prevent potential morbidity and mortality of a missed diagnosis.

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\section*{Introduction}

Gynecologic and obstetric applications of ultrasound originated in the 1950s and 1960s with further advances in sonographic techniques and clinical use evolving by the 1970s [1]. The 1958 seminal paper by Donald et al. [2] explored the earliest application of ultrasound in the field of gynecologic and obstetric and included the first images of pelvic masses.

\emph{DISCLAIMER:} The views expressed are those of the authors and do not reflect the official views or policy of the Department of Defense or its Components.

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Early indications for pelvic sonograms included evaluation of cystic and solid masses with subsequent incorporation of sonography for the evaluation of early pregnancy, ovarian malignancy, ascites, and nonpalpable pelvic masses [1]. The first transvaginal ultrasound probe was developed in the 1960s with the practical use of endovaginal sonographic techniques gaining ground with the development of real-time imaging in the 1970s [3–6]. The early 1990s saw the gradual introduction of endovaginal sonographic techniques into the general ultrasound pelvic exam with further studies in the 2000s exploring various pelvic pathologies through the use of transvaginal technique [3,7,8]. The clinical applications of transvaginal ultrasound have transformed the evaluation and management of acute and chronic pelvic pain in the primary care and subspecialty settings, including the emergency department (ED). Studies in the past 20 years evaluating the application of transvaginal ultrasound for pelvic pain have expanded the uses of sonographic exams while acknowledging its limitations [9–16]. We present a case of a colon cancer simulating ovarian echotexture, which could have been misinterpreted as a normal ovary and was correctly characterized on magnetic resonance imaging (MRI). Through literature review, the authors will discuss various pelvic pathologies arising within and outside the genital tract which can mimic a normal or abnormal ovary. Given the increasing prevalence of point of care transvaginal ultrasound among ED providers, we present this case as a teaching opportunity and also discuss the nonovarian differential considerations when evaluating an adnexal mass.

**Case presentation**

**Presentation**

A 41-year-old female presented to the ED for the evaluation of 10 days of sharp right lower quadrant and right hip pain radiating to her right lower extremity. She reported a gradual onset of pain without trauma or other known inciting events. The patient noted irregular menstrual bleeding for several months prior to presentation, endorsing dysmenorrhea and metromenorrhagia. Physical exam was significant for tenderness on palpation of the right lower quadrant without rebound tenderness or guarding. The patient’s past medical and surgical history was significant for obesity, ruptured ectopic pregnancy status post bilateral salpingectomy, cesarean section, and appendectomy. She denied personal history of prior malignancy or a family history of gynecologic or gastrointestinal malignancy.

**Imaging**

Pelvic ultrasound performed at the radiology department during the ED visit showed an oval, heterogeneous hypoechoic and isoechoic, oval, solid mass in the left adnexa measuring 2.5 × 3.1 × 2.1 cm (Fig. 1). This mass demonstrated a frond-like internal architecture with a resultant artifactual appearance of hypoechoic ovarian follicles. Internal Doppler vascular flow was present in a branch-like pattern (Fig. 2). The sonographer presented the mass to the interpreting radiologist as a normal left ovary. The uterus and a 1.9 cm right ovary had a normal sonographic appearance. After a second review of the images, the radiologist identified a normal 3 cm left ovary separate from the mass originally identified as the left ovary. There was no free fluid in the pelvis.

The patient was referred for a follow-up contrast-enhanced MRI of the pelvis, which demonstrated a 3 cm mass arising from the wall of the sigmoid colon in the left lower abdomen (Fig. 3). The mass had isointense T1 signal to the adjacent bowel wall and slight T2 hyperintensity without abnormal enhancement. The ovaries had a normal appearance on MRI.

**Colonoscopy and pathology**

Subsequent colonoscopy demonstrated a 3 cm, pedunculated polyp within the sigmoid colon, as well as additional 2-6 mm polyps in the sigmoid and transverse colon (Fig. 4). All visu-
Fig. 2 – Forty one-year-old-woman undergoing evaluation of pelvic pain and vaginal bleeding. (A, B) Transvaginal Doppler sonographic images demonstrate a left adnexal mass with branching vascularity (arrowheads). This mass was later proven to be a sigmoid colon adenocarcinoma.

Fig. 3 – Forty one-year-old-woman undergoing evaluation of pelvic pain and vaginal bleeding. (A) Axial T2 MR image with fat saturation demonstrates a mildly hyperintense endoluminal sigmoid colon mass (arrowhead). (B) Axial T1 MR image demonstrates an intermediate intensity mass at the same location (arrowhead). This mass was later proven to be a sigmoid colon adenocarcinoma.

Fig. 4 – Forty one-year-old-woman undergoing colonoscopy for a sigmoid colon mass. (A) An endoscopic photo shows a polypoid mass arising from the sigmoid colon wall (arrowhead). (B) A gross specimen photo shows the mass after after snare biopsy and resection (arrowhead).
alized polyps were removed during the colonoscopy via hot snare polypectomy. There were no complications.

On histologic analysis, the 3 cm sigmoid polyp revealed a villous morphology with extensive low-grade dysplasia and a focal mucin lake. The mucin lake contained free-floating strips and fragments of epithelium, yielding a diagnosis of adenocarcinoma arising in a villous adenoma (Figs. 5 and 6). The malignant epithelial fragments had a cribriform architecture, but were otherwise deceptively bland (Fig. 7). The remaining polyps were all tubular adenomas. The patient’s young age and the presence of multiple tubular adenomas prompted consideration for an inherited condition such as
Lynch syndrome. Microsatellite instability testing via immunohistochemistry of the malignant polyp revealed retained protein expression of MLH1, PMS2, MSH2, and MSH6 (Fig. 8). Genetic testing was subsequently performed, and was negative for the MLH1, PMS2, MSH2, MSH6, and EPCAM mutations of Lynch syndrome. Additionally, no MUTYH mutations were found, excluding the possibility of MutYH-associated polyposis.

CT chest/abdomen/pelvis was negative for metastatic disease. Subsequent sigmoidoscopies, including biopsies at the
Table 1 – Cases of ovarian mimics secondary to infectious etiologies.

| Diagnosis                                                                 | Number of cases |
|---------------------------------------------------------------------------|-----------------|
| Tuberculosis (15), echinococcosis (6), or actinomycosis (5)              | 26              |
| Ovarian tuberculosis                                                      | 1               |
| Genital tuberculosis                                                      | 1               |
| Cocciidiomycosis                                                          | 1               |
| Peritoneal tuberculosis(1) and schistosomiasis(1)                         | 2               |
| Peritoneal tuberculosis(1)                                               | 3               |
| Dovanosis                                                                 | 1               |
| Mycobacterium bovis peritonitis                                           | 1               |
| Chlamydia peritonitis                                                    | 1               |
| Liver fluke                                                               | 1               |

Table 2 – Gynecologic mimics of ovarian malignancy.

| Cases(s) | Diagnosis                      |
|----------|--------------------------------|
| Su et al. [56] | 1 Ovarian pregnancy         |
| Chen et al. [59] | 1 Pyomyoma                 |
| Salman et al. [62] | 1 Broad ligament lipoleiomyoma |
| Yadav et al. [63] | 2 Broad ligament lipoleiomyoma |
| Agarwal et al. [64] | 1 Broad ligament lipomyosarcoma |

Discussion

The prevalence of chronic pelvic pain has been extensively studied [17–24]. One early study demonstrated a 3-month prevalence of 15% amongst women aged 18–50 and with other literature reporting prevalence as high as 27% [17]. Common non-neoplastic causes of chronic pelvic pain include ovarian cysts, endometriosis, pelvic inflammatory disease, pelvic congestion syndrome, and interstitial cystitis [25–31]. Nongynecologic causes include gastrointestinal and genitourinary disorders while sometimes psychosomatic factors are contributory [32–34]. Acute pelvic pain differs in time course but may have similar physical exam findings to chronic pelvic pain. Acute causes also include ectopic pregnancy, ovarian torsion, ruptured ovarian cyst, and appendicitis [35,36]. Due to the high volume of patients presenting for pelvic pain, transvaginal point of care ultrasound for ED physicians has been a source of ongoing discussion and research [37,38,41]. Nonradiologists performing ultrasound may be more focused on the uterus and ovaries as typical sources of pelvic pain and may incorrectly assign abnormal pelvic ultrasound findings to the reproductive organs. Recent studies have highlighted nonovarian pathology can be mis-assigned to the ovary on transvaginal ultrasound [39,40,42].

The accuracy and limitations of pelvic ultrasound differ amongst pelvic pain etiologies. For example, ultrasound is helpful in evaluation of ovarian torsion, but more limited in diagnosing conditions such as endometriosis [43–47]. Nono-
Table 3 – Cases of ovarian mimics secondary to various nongynecologic malignant etiologies.

| Diagnosis                                                                 | Number of cases | Source                                                                 |
|---------------------------------------------------------------------------|----------------|------------------------------------------------------------------------|
| Appendiceal adenocarcinoma                                                | 5              | Gehrig et al. [52]                                                     |
| Malignant mesothelioma                                                    | 7              | Merino et al. [53]                                                     |
| Primary peritoneal carcinoma(1) and benign adnexal mass (1)              | 3              | Paun et al. [55]                                                       |
| Multicystic mesothelioma(4), malignant mesothelioma(3)                   | 7              | Mani et al. [56]                                                       |
| Melanoma                                                                  | 1              | Pietzner et al. [57]                                                   |
| Waldenstrom’s macroglobulinemia                                           | 1              | Eulitt et al. [67]                                                     |
| Multiple myeloma                                                          | 1              | Struver et al. [68]                                                    |
| Desmoplastic small round blue cell                                        | 1              | Bland et al. [71]                                                      |

Table 4 – Nongynecologic findings on transvaginal ultrasound described in the literature.

| Diagnosis                                                                 | Source                                                                 |
|---------------------------------------------------------------------------|------------------------------------------------------------------------|
| Appendiceal mucocele                                                      | Malave et al. [74], Ferdinand Sanchez et al. [75], Gehrig et al. [52], Pitiakoudis et al. [76], Kalu et al. [77], Papoutsis et al. [78], Balci et al. [79], Kanasugi et al. [80], Souei-Mhiri et al. [81] |
| Other neoplasms(rectal, bladder, colon, lymphoma)                         | Damani et al. [95], Dhamanaskar et al. [86], Berdov et al. [96], Bennacerraf et al. [97] |
| Appendicitis                                                              | Ohngemach et al. [41], Al-Roubaie et al. [90], Caspi et al. [91], Scinaeux et al. [92], Pelsang et al. [93], Whitford et al. [94] |
| Diverticulitis                                                            | Ohngemach et al. [41], Pradel et al. [85], Zielke et al. [87], Wilson et al. [89] |
| Obstructing ureteral stone                                                | Ohngemach et al. [41], Laing et al. [83], Damani et al. [95] |
| Pelvic kidney                                                             | Ohngemach et al. [41], Sherer et al. [84] |
| Enteritis                                                                 | Ohngemach et al. [41] |
| Small bowel obstruction                                                   | Ohngemach et al. [41] |
| Thrombosis(Common femoral vein and uterine vein)                         | Ohngemach et al. [41], Mavrelas et al. [98] |
| Epiploic appendagitis                                                     | Savage et al. [88] |
| Crohn disease                                                             | Damani et al. [95] |

Fig. 9 – A flowchart illustrating differential considerations for extraovarian adnexal mass.

Peritoneal mesothelioma can be a masquerader of ovarian carcinomatosis as well as other peritoneal processes which can simulate primary ovarian disease.

A flowchart to arrive at a reasonable differential diagnosis for an extraovarian adnexal mass is shown in Fig. 9. One should first consider whether genital tract or non-gential tract etiologies are more likely. Then, a further division can occur in categories such as infectious vs noninfectious and malignant versus nonmalignant etiologies based on clinical presentation and patient risk factors. Considering this simple schema when evaluating an adnexal mass on transvaginal ultrasound can assist in identifying the need for further imaging, tissue sampling, and treatment.

Regarding the present case with a mass arising from the enteric tract, differential considerations include adenocarcinoma, lymphoma, and metastasis. On transvaginal ultra-
sound, bowel wall tumors are often solid, localized, and round [95]. Malignant lesions can be hypoechoic or heterogeneous in echogenicity. Colonic adenocarcinoma can also demonstrate a pseudokidney or targetoid appearance, although these features are often noted in the annular configuration of carcino-omatous tumors [95,101]. Compared to appendiceal mucoceles and rectal cancer, transvaginal ultrasound appearance of colonic malignancies has been underreported in literature.

Our case demonstrates concordant radiological-pathological correlation with sonographic features reflective of the primary tubulovillous morphology of colon cancer. Tubulovillous structure was demonstrated by the frond-like internal echotexture on transvaginal ultrasound secondary to papillary projections of the mass. These papillary projections extended to the unaffected adjacent bowel wall mucosa giving the appearance of an ovarian follicular pattern. Application of pressure with a transvaginal probe and resultant collapse of the surrounding bowel walls likely contributes to this ovarian echotexture (Fig. 10). In discussion with the interpreting radiologist, the central branching hypervascular component corresponding to the tubular stalk was a significant reason for raising the suspicion for a non-ovarian mass and subsequent MRI recommendation. Our literature search revealed that many of the masqueraders of ovarian cancer, whether infectious, inflammatory, or malignant, demonstrated imaging features that were nonspecific yet concerning for ovarian malignancy. Our case demonstrated a malignancy masquerading as a potentially normal left ovary. We believe that a tubulovillous colon cancer when evaluated with transvaginal ultrasound can mimic ovarian echotexture due to potential similar size, oval or round shape due to surrounding collapsed bowel wall, and a peripheral frond-like morphology simulating ovarian follicles.

**Conclusion**

This case report discusses a unique instance of non-ovarian malignancy masquerading as a normal ovary on pelvic ultrasound. Previous literature has shown extraovarian diseases, including infections, inflammatory processes, and extraovarian malignancy can mimic ovarian pathology but not specifically normal ovarian anatomy. This case should be a reminder that nongynecologic pathologies should be considered in the ultrasound evaluation of pelvic pain. Pelvic pain is one of the most common ED presentations and is being increasingly evaluated with point of care transvaginal ultrasound. It is important for clinicians who perform pelvic ultrasound and radiologists to consider these extraovarian mimickers to prevent potential morbidity and mortality of a missed diagnosis.

**Informed consent statement**

Formal consents are not required for the use of entirely anonymized images from which the individual cannot be identified—for example, x-rays, ultrasound images, pathology slides, or laparoscopic images, provided that these do not contain any identifying marks and are not accompanied by text that might identify the individual concerned.
REFERENCES

[1] Levi S. The history of ultrasound in gynecology 1950-1980. Ultrasound Med Biol 1997;23(4):481–552. doi:10.1161/s0301-5629(96)00196-2.

[2] Donald I, Mavcar J, Brown TG. Investigation of abdominal masses by pulsed ultrasound. Lancet 1958;1(7032):1188–95. doi:10.1016/s0140-6736(58)91905-6.

[3] Campbell S. A short history of sonography in obstetrics and gynaecology. Facts Views Vis Obgyn 2013;5(3):213–29.

[4] Robinson HP, Shaw-dunn J. Fetal heart rates as determined by sonar in early pregnancy. J Obstet Gynaecol Br Commonw 1973;80(9):805–9. doi:10.1111/j.1471-0528.1973.tb11222.x.

[5] Marsil K. Fetal breathing movements. Characteristics and clinical significance. Obstet Gynecol 1978;52(4):394–401.

[6] Marsil K, Cennerse G, Lindström K. Real-time ultrasonography for quantified analysis of fetal breathing movements. Lancet 1976;2(7988):718–19. doi:10.1016/s0140-6736(76)90011-8.

[7] Goldstein SR. Incorporating endovaginal ultrasonography into the overall gynecologic examination. Am J Obstet Gynecol 1990;162(3):625–32. doi:10.1016/0002-9378(90)90791-w.

[8] Fleischer AC, Andreotti FF. Color Doppler sonography in obstetrics and gynecology. Expert Rev Med Devices 2005;2(5):605–11. doi:10.1586/17434440.2.5.605.

[9] Fraser MA, Agarwal S, Chen I, Singh SS. Routine vs. expert-guided transvaginal ultrasound in the diagnosis of endometriosis: a retrospective review. Abdom Imaging 2015;40(3):587–94. doi:10.1007/s00261-014-2453-5.

[10] Abrao MS, Conçalves MO, Dias JA, Podgaec S, Chami LP, Blasbalg R. Comparison between clinical examination, transvaginal sonography and magnetic resonance imaging for the diagnosis of deep endometriosis. Hum Reprod 2007;22(12):3092–7. doi:10.1093/humrep/dem187.

[11] Piessens S, Edwards A. Sonographic evaluation for endometriosis in routine pelvic ultrasonics. J Minim Invasive Gynecol 2020;27(2):265–6. doi:10.1016/j.mij.2019.08.027.

[12] Taipale P, Tarjanne H, Ylostalo P. Transvaginal sonography in suspected pelvic inflammatory disease. Ultrasound Obstet Gynecol 1995;6(6):430–4. doi:10.1002/1096-0860(199512)6:6<430::AID-UOG315>3.0.CO;2-8.

[13] Guerriero S, Ajossa S, Lai MP, Mais V, Paoloetti AM, Melis GB. Transvaginal ultrasonography in the diagnosis of pelvic adhesions. Hum Reprod 1997;12(12):2649–53. doi:10.1093/humrep/12.12.2649.

[14] Holland TK, Yazbek J, Cutner A, Saridogan E, Hoo WL, Jurkovic D. Value of transvaginal ultrasound in assessing severity of pelvic endometriosis. Ultrasound Obstet Gynecol 2010;36(2):241–8. doi:10.1002/uog.6768.

[15] Guerriero S, Ajossa S, Gerada M, D’aquila M, Piras B, Melis GB. “Tenderness-guided” transvaginal ultrasonography: a new method for the detection of deep endometriosis in patients with chronic pelvic pain. Fertil Steril 2007;88(5):1293–7. doi:10.1016/j.fertnstert.2006.12.060.

[16] Nezhati C, Santolaya J, Nezhat FR. Comparison of transvaginal sonography and bimanual pelvic examination in patients with laparoscopically confirmed endometriosis. J Am Assoc Gynecol Laparosc 1994;1(2):127–30. doi:10.1016/s1074-3804(05)80775-3.

[17] Mathias SD, Kuppermann M, Liberman RF, Lipschutz RC, Steege JF. Chronic pelvic pain: prevalence, health-related quality of life, and economic correlates. Obstet Gynecol 1996;87(3):221–7. doi:10.1016/s0029-7844(95)00458-0.

[18] Zondervan KT, Yudkin PL, Vessey MP, Dawes MG, Barlow DH, Kennedy SH. Prevalence and incidence of chronic pelvic pain in primary care: evidence from a national general practice database. Br J Obstet Gynaecol 1999;106(11):1149–55. doi:10.1111/j.1471-4125.1999.tb08140.x.

[19] Zondervan KT, Yudkin PL, Vessey MP, et al. The community prevalence of chronic pelvic pain in women and associated illness behaviour. Br J Gen Pract 2001;51(468):541–7.

[20] Pitts MK, Ferris JA, Smith AM, Shelley JM, Richters J. Prevalence and correlates of three types of pelvic pain in a nationally representative sample of Australian women. Med J Aust 2008;188(3):138–43.

[21] Latthe P, Latthe M, Say L, Gülmezoglu M, Khan KS. WHO systematic review of prevalence of chronic pelvic pain: a neglected reproductive health morbidity. BMC Public Health 2006;6:177. doi:10.1186/1471-2458-6-177.

[22] Zondervan KT, Yudkin PL, Vessey MP, Dawes MG, Barlow DH, Kennedy SH. The prevalence of chronic pelvic pain in women in the United Kingdom: a systematic review. Br J Obstet Gynaecol 1998;105(1):93–9. doi:10.1111/j.1471-0528.1998.tb09357.x.

[23] Ayorinde AA, Bhattacharya S, Druce KL, Jones GT, Macfarlane GJ. Chronic pelvic pain in women of reproductive and post-reproductive age: a population-based study. Eur J Pain 2017;21(3):445–55. doi:10.1002/ejp.938.

[24] Ahangari A. Prevalence of chronic pelvic pain among women: an updated review. Pain Physician 2014;17(2):E141–7.

[25] Moore J, Kennedy S. Causes of chronic pelvic pain. Baillieres Best Pract Res Clin Obstet Gynaecol 2000;14(3):385–402. doi:10.1016/s0958-1266(00)00020-7.

[26] Hooker AB, Van moorst BR, Van haastert EP, Van ootegeem NA, Van dijkken DK, Heres MH. Chronic pelvic pain: evaluation of the epidemiology, baseline demographics, and clinical variables via a prospective and multidisciplinary approach. Clin Exp Obstet Gynecol 2013;40(4):492–8.

[27] Chung MK, Chung RP, Gordon D. Interstitial cystitis and endometriosis in patients with chronic pelvic pain: The “Evil Twins” syndrome. JSLS 2005;9(1):25–9.

[28] Stanford EJ, Koziel J, Feng A. The prevalence of interstitial cystitis, endometriosis, adhesions, and vulvar pain in women with chronic pelvic pain. J Minim Invasive Gynecol 2005;12(1):43–9. doi:10.1016/j.mij.2004.12.016.

[29] Sand PK. Chronic pain syndromes of gynecologic origin. J Reprod Med 2004;49(3 Suppl):230–4.

[30] Stanford EJ, Dell JR, Parsons CL. The emerging presence of interstitial cystitis in gynecologic patients with chronic pelvic pain. Urology 2007;69(4 Suppl):53–9. doi:10.1016/j.urology.2006.05.049.

[31] Porpora MG, Konincxk PR, Piazzé J, Natili M, Colagrande S, Cosmi EV. Correlation between endometriosis and pelvic pain. J Am Assoc Gynecol Laparosc 1999;6(4):249–34. doi:10.1016/s1074-3804(99)00066-1.

[32] Osorio FL, Carvalho AC, Donadon MF, Moreno AL, Polli-neto O. Chronic pelvic pain, psychiatric disorders and early emotional traumas: Results of a cross sectional case-control study. World J Psychiatry 2016;6(3):339–44. doi:10.5498/wjp.v6.i3.339.

[33] Latthe P, Mignini L, Gray R, Hills R, Khan K. Factors predisposing women to chronic pelvic pain: systematic review. BMJ 2006;332:749–55. doi:10.1136/bmj.37848.697465.55.

[34] Coelho LS, Brito LM, Chein MB, Mascarenhas TS, Costa JP, Nogueira AA, Poli-Neto OB. Prevalence and conditions associated with chronic pelvic pain in women from São
[35] Kruzkas P, Kruzkas S. Evaluation of acute pelvic pain in women. Am Fam Physician 2010;82(2):141-7.

doi: 10.1097/01.AOG.0000128111.90367.f2.

[52] Gehrig PA, Roggess JF, Ollila DW, Groben PA, Van Le L. Appendix cancer mimicking ovarian cancer. Int J Gynecol Cancer 2002;12(6):768-772.
doi: 10.1046/j.1525-1438.2002.00136.x.

[53] Merino MJ. Malignant mesothelioma mimicking ovarian cancer. Int J Surg Pathol 2010;18(3 Suppl):1785-1805.
doi: 10.1111/j.1066-8969.10370880.x.

[54] Drayer SM, Shank JJ. Infectious diseases mimicking ovarian carcinomatosis. Gynecol Oncol Rep 2018;26:29-31
Published 2018 Aug 28. doi: 10.1016/jGOR.2018.08.008.

[55] Fâun I, Mögöş D, Fâun M, et al. Alfeccioni mimând cancerul ovarian epitelial in stadiu avansat [Diseases mimicking advanced-stage epithelial ovarian cancer]. Chirurgia (Bucur) 2010;105(4):541-544.

[56] Mani H, Merino MJ. Mesothelial neoplasms presenting as, and mimicking, ovarian cancer. Int J Gynecol Pathol 2010;29(6):523-528. doi: 10.1097/PGP.0b013e3181e6a3ee.

[57] Pitzner K, Noske A, Cho CH, Kieckfer F, Sehouli J. Amelanotic metastasis of melanoma mimicking ovarian cancer: a case report and review of the literature. Anticancer Res 2008;28(1B):563-566.

[58] Barroso LF, Wispelwey B. Donovanosis presenting as a pelvic mass mimicking ovarian cancer. South Med J 2009;102(1):104-105. doi: 10.1097/SMJ.0b013e3181f9f82.

[59] Chen JR, Yang TL, Lan FH, Lin TW. Pyomyoma mimicking advanced ovarian cancer: a rare manifestation in a postmenopausal virgin. Taiwan J Obstet Gynecol 2014;53(1):101-103. doi: 10.1016/j.tjog.2013.06.011.

[60] Stout JE, Woods CW, Alvarez AA, Berchuck A, Dukes Hamilton C. Mycobacterium bovis peritonitis mimicking ovarian cancer in a young woman. Clin Infect Dis 2001;33(4):E14-E16. doi: 10.1086/321908.

[61] Gojayev A, English DP, Macer M, Azodi M. Chlamydia peritonitis and ascites mimicking ovarian cancer. Case Rep Obstet Gynecol 2016;2016:8547173. doi: 10.1155/2016/8547173.

[62] Salman MC, Atak Z, Usutbun A, Yuce K. Lipoleiomyoma of broad ligament mimicking ovarian cancer in a postmenopausal patient: case report and literature review. J Gynecol Oncol 2010;21(1):62-64. doi: 10.3802/jgo.2010.1.6.2.

[63] Yadav S, Maheshwari B, Sagar N, Mallya V, Khurana N, Gupta S. Broad ligament lipoleiomyoma masses: two curious cases masquerading as ovarian carcinomas. Sultan Qaboos Univ Med J; 2017;17(4):e477-e480. doi: 10.18295/sumj.2017.04.018.

[64] Agarwal U, Dahiya P, Sangwan K. Leiomyosarcoma of the broad ligament mimicking carcinoma—a case report. Arch Gynecol Obstet 2003;269(1):55-56. doi: 10.1007/s00404-002-0418-0.

[65] Imperiale L, Marchetti C, Salerno I, et al. Nonabsorbable suture granuloma mimicking ovarian cancer recurrence at combined positron emission tomography/computed tomography evaluation: a case report. J Med Case Rep 2014;8:202. doi: 10.1186/1752-1947-8-202.

[66] Cormio L, Cormio G, Di Fino G, et al. Surgicel® granuloma mimicking ovarian cancer: A case report. Oncol Lett 2016;12(2):1083-1084. doi: 10.3892/ol.2016.4689.

[67] Eulitt P, Fabian D, Kelly C, Hammingen J, William BM. Waldenström’s macroglobulinemia masquerading as ovarian cancer with peritoneal carcinomatosis, ascites, and elevated CA-125. Hematol Oncol Stem Cell Ther 2019;12(1):54-59. doi: 10.1016/j.hemonc.2017.02.004.

[68] Stuver R, Petersen A, Guerrero-Garcia TA, Matulonis U, Richardson P, Singh P. Multiple myeloma masquerading as ovarian carcinomas: a case report and review of the approach to multiple myeloma screening and diagnosis. Case Rep Hematol 2018:2018:302965. doi: 10.1155/2018/3029650.
[69] Rabesalama S, Mandeville K, Raherison R, Rakoto-ratsimba H. Isolated ovarian tuberculosis mimicking ovarian carcinoma: case report and literature review. Afr J Infect Dis 2011;5(1):7–10. doi:10.4314/ajid.v5i1.66508.

[70] Yazici G, Dilek UT, Karabacak T, Ertunc D, Korkmaz M, Dilek S. Adnexal fasciitis masquerading as ovarian cancer. Gynecol Oncol 2005;99(1):236-238. doi:10.1016/j.ygyno.2005.06.016.

[71] Bland AE, Shah AA, Piscitelli FT, Bentley RC, Secrett AA. Desmoplastic small round cell tumor masquerading as advanced ovarian cancer. Int J Gynecol Cancer 2008;18(4):847-850. doi:10.1111/j.1525-1438.2007.01110.x

[72] Ozat M, Altinkaya SO, Gungor T, et al. Extraovarian conditions mimicking ovarian cancer: a single center experience of 15 years. Arch Gynecol Obstet 2011;284(3):713-719. doi:10.1007/s00404-010-1705-9.

[73] Shetty M. Imaging and Differential Diagnosis of Ovarian Cancer. Semin Ultrasound CT MR 2019;40(4):302-318. doi:10.1053/j.sult.2019.04.002.

[74] Malave C, Wynn G, Nussbaum MS, Kaunitz AM. Incidental diagnosis of appendiceal mucocoele with vaginal ultrasonography and computed tomography. Obstet Gynecol 2011;117(2 Pt 2):479-481. doi:10.1097/ AOG.0b013e318203ea37.

[75] Fernández Sánchez J, Bücklein W. Mukozele der Appendix. Sonographische, computertomographische und radiologische Eigenschaften [Mucocoele of the appendix. Sonographic, computed tomographic and radiologic characteristics]. Radiologie 1990;30(1):15-18.

[76] Pitiakoudis M, Tsaroucha AK, Mimidis K, Polychronidis A, Minopoulos G, Simopoulos C. Mucocoele of the appendix: a report of five cases. Tech Coloproctol 2004;8(2):109-112. doi:10.1007/s10151-004-0067-3.

[77] Kalu E, Croucher A. Appendiceal mucocoele: a rare differential diagnosis of a cystic right adenexal mass. Arch Gynecol Obstet 2005;271(1):86-88. doi:10.1007/s00404-004-0663-5.

[78] Papoutsis D, Protopappas A, Belitssos P, et al. Mucocoele of the vermiform appendix misdiagnosed as an adenexal mass on transvaginal sonography. J Clin Ultrasound 2012;40(8):522-525. doi:10.1002/jcu.20858.

[79] Balci O, Özdemir N, Mahmoud AS. Appendiceal mucocoele mimicking a cystic right adenexal mass. Taiwan J Obstet Gynecol 2009;48(4):412-414. doi:10.1016/S1028-4559(09)60333-8.

[80] Kanasugi T, Kikuchi A, Omi H, Ikeda M, Fukushima A, Sugiyama T. Appendiceal mucocoele and peritoneal inclusion cyst mimicking right adenexal masses: a diagnostic challenge in gynecologic practice. J Med Ultrasound 2001;40(1):51-55 2013. doi:10.1007/s10396-012-0379-2.

[81] Souei-Mhiri M, Tilli-Gräies K, Ben Cherifa L, et al. Les mucoceles appendicales. Etude retrospective à propos de 10 cas [Mucoceles of the appendix. Retrospective study of 10 cases]. J Radiol 2001;82(4):463-468.

[82] Jansen E, Fransis S, Ahmad S, Timmerman D, Van Holbeke C. Imaging in gynaecological disease: clinical and ultrasonic characteristics of mucocele of the appendix. A pictorial essay. Facts Views Vis Obgyn. 2013;5(3):209-212.

[83] Laing FC, Benson CB, DiSalvo DN, Brown DL, Frates MC, Loughlin KR. Distal ureteral calculi: detection with vaginal US. Radiology 1994;192:545–8. doi:10.1148/radiology.192.2.8029429.

[84] Sherer DM, Rideout J. Transvaginal sonography of pelvic kidney. J Clin Ultrasound 1994;22(3):214-215. doi:10.1002/jcu.1870220315.