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Journal

UCLA Radiological Sciences Proceedings, 4(2)

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Publication Date

2024

DOI

10.5070/RS44261768

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Tarlov Cysts Mimicking Adnexal Masses: Two Case Reports

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UCLA Radiol Sci Proc. 2024;4(2):23-26

Abstract: Tarlov cysts are cystic structures of neurogenic origin that arise most commonly in the roots of the sacrococcygeal nerves. Prompt and correct identification can prevent unnecessary biopsy of the cysts, a procedure which can cause significant pain because they contain nerve fibers and ganglion cells. We report two cases of Tarlov cysts mimicking adnexal masses on ultrasound evaluation. The first case was misidentified on an ultrasound before being diagnosed as a Tarlov cyst during follow-up magnetic resonance imaging. The second case was initially identified by the sonographer as an ovarian cyst but was properly identified through correlation with prior computed tomography imaging. In this case series, we discuss the pathologic and radiographic features, etiology, clinical considerations, and treatment of Tarlov cysts.

Keywords: *Tarlov cyst, spinal meningeal cyst, perineural cyst*

Case 1 Presentation

A 47-year-old woman presented to her outpatient physician for irregular menses. Initial pelvic ultrasound imaging showed a 5.5 cm right adnexal complex cyst with internal lacelike septations, which was initially believed to be a hemorrhagic cyst (Figure 1A). Upon a follow-up pelvic ultrasound, the cystic structure was recognized as separate from the right ovary and demonstrated apparent posterior communication with the anterior sacrum (Figure 1B). Follow-up MRI of the pelvis clearly showed the cystic structure's relationship to the anterior sacral foramina and confirmed the diagnosis of a right-sided sacral Tarlov cyst (Figures 2A, 2B).

Case 2 Presentation

A 50-year-old woman presented to the emergency department for acute pain in the left lower quadrant of her abdomen. Computed tomography (CT) of the abdomen and pelvis showed acute uncomplicated diverticulitis, a 1.8 cm cystic lesion

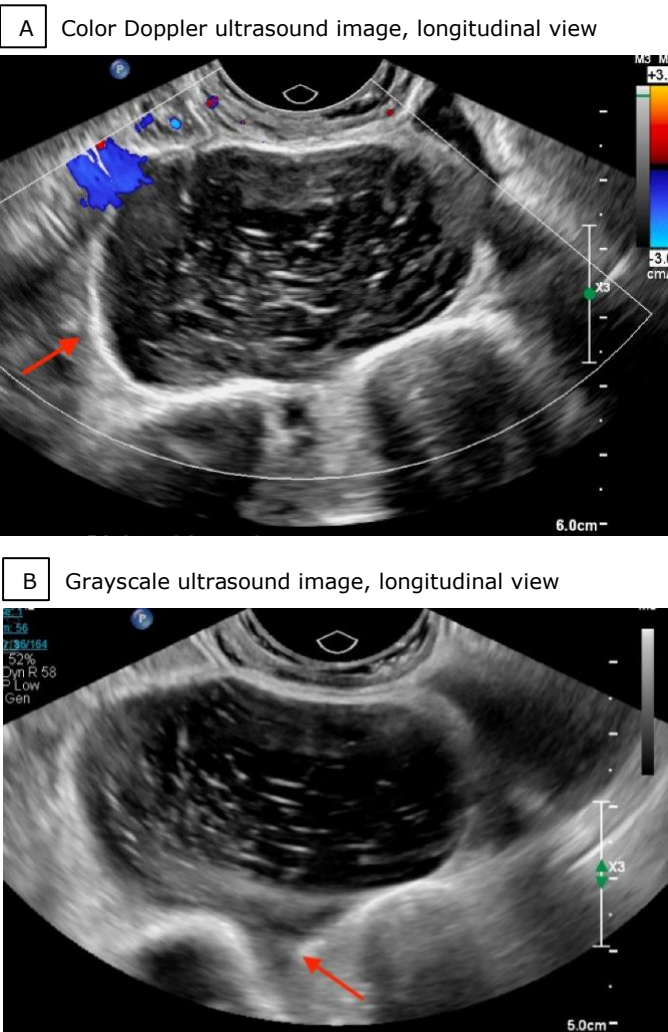
Key Points

- Tarlov cysts are sacrococcygeal cystic structures of neurogenic origin that contain nerve fibers and ganglion cells.
- Tarlov cysts are situated in the posterior pelvis and originate from the sacrum, which may predispose them to misidentification as adnexal masses on ultrasound.
- Familiarity with the relevant imaging features of Tarlov cysts may allow for accurate diagnosis and prevent unnecessary follow-up imaging or biopsy.

in the left adnexa (not shown), and bilateral sacral Tarlov cysts (Figure 3). The patient was treated conservatively with a course of amoxicillin-clavulanate for the diverticulitis and was discharged.

A pelvic ultrasound ordered one year later to evaluate the patient for the presence of uterine fibroids showed resolution of the left ovarian cyst, but a right-sided cystic structure was visualized (Figure 4). The cystic structure was initially identified by the sonographer as a right ovarian cyst, but a review of prior imaging by the

Figure 1. Ultrasound Images of the Right Adnexa of a 47-Year-Old Woman with a Tarlov Cyst.



(A) Color Doppler ultrasound imaging of the right adnexa shows a 5.5 cm complex right adnexal cyst with internal lacelike septations/linear internal echoes without evidence of significant blood flow (A, red arrow). (B) Grayscale ultrasound imaging shows that the cyst communicates posteriorly with an anterior sacral foramen (B, red arrow).

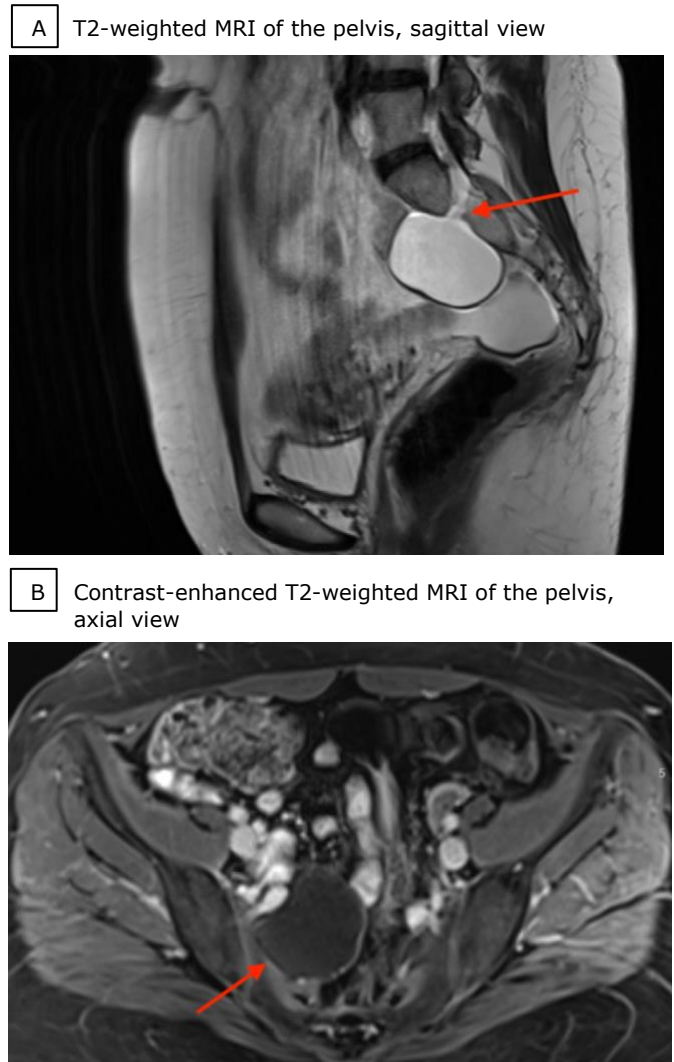
interpreting radiologist allowed for the correct identification of the cyst in question as the previously identified right-sided Tarlov cyst.

Discussion

Pathology and Radiographic Features

Tarlov cysts, also known as meningeal cysts or perineural cysts, are neurogenic cysts that contain cerebrospinal fluid, extensive fibrotic elements,

Figure 2. MRI of the Pelvis of a 47-Year-Old Woman with a Tarlov Cyst.



(A) T2-weighted MRI of the pelvis shows a right-sided fluid-filled structure in the posterior pelvis communicating with an anterior sacral foramen (A, red arrow), characteristic of a Tarlov cyst. (B) Contrast-enhanced T1-weighted fat-saturated MRI of the pelvis shows the right-sided Tarlov cyst's lack of enhancement (B, red arrow).

and, in some cases, evidence of old hemorrhage on histopathologic examination.¹ As type II spinal meningeal cysts,¹⁻³ they are differentiated from other spinal meningeal cysts, such as meningoceles and arachnoid cysts, by the fact that they are extradural and contain spinal nerve root fibers. Tarlov cysts can arise between the pia and arachnoid at the junction of the dorsal root ganglion and spinal nerve root and have been reported to most commonly occur at the second and third sacral nerve root levels.^{4,5} Posteriorly

located pelvic cysts that do not move with respiration or ultrasound probe compression should raise suspicion for a Tarlov cyst, with other considerations including abscess/fluid collection, hematoma, and pelvic lymphadenopathy.^{1,6-8}

Tarlov cysts may form unilaterally or bilaterally and can be seen as unilocular or multilocular cystic masses. They may also contain delicate, thin septations.⁹ In the cases presented in this report, thin septations within the Tarlov cysts were best seen on ultrasound rather than on MRI due to the higher spatial resolution of ultrasound for the targeted evaluation of cystic structures.

Figure 3. Contrast-Enhanced CT of the Pelvis of a 50-Year-Old Woman with Bilateral Tarlov Cysts, Axial View.



Contrast-enhanced CT of the pelvis shows bilateral sacral Tarlov cysts (red arrows), with the right-sided cyst measuring 4.1 cm.

Etiology

The mechanism of Tarlov cyst formation is unclear, but Tarlov proposed that these cysts were sequelae of post-traumatic hemorrhage.¹⁰ It has also been proposed that Tarlov cysts are congenital in origin.^{5,9} Others propose that stenosis of the ostium of the nerve root results in a ball-valve effect in which cerebrospinal fluid enters the cysts through systolic pulsations but is unable to exit.^{5,9,10}

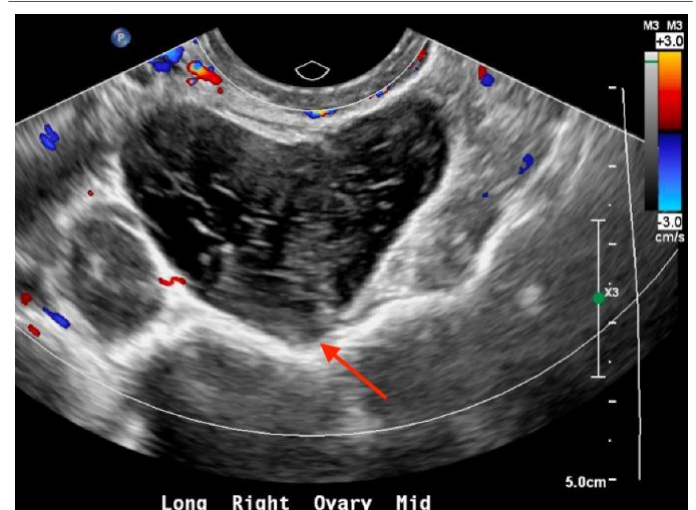
Clinical Considerations and Treatment

Tarlov cysts are most commonly discovered incidentally during MRI performed for lower back pain, which is typically resolved by the treatment of a spinal abnormality independent of the Tarlov

cyst.^{6,7,9} The prevalence of Tarlov cysts during lumbosacral MRI has been estimated to be 4.6%, which has been extrapolated to represent the prevalence in the general adult population.^{5,8} Retropelvic cysts identified on ultrasound should be followed up with MRI to identify possible Tarlov cysts.¹ Tarlov cysts may rarely cause pelvic symptoms such as abdominal or pelvic pain, lower back pain, or bowel or genitourinary dysfunction. Mild symptoms may be managed conservatively with anti-inflammatory drugs. In the instance that a cyst causes significant symptoms, however, surgical interventions such as cyst ablation or excision may be considered.^{1,7,8} In both cases discussed here, the Tarlov cysts caused no symptoms, and no treatment was pursued.

Tarlov cysts identified on pelvic ultrasound may be mistaken for adnexal masses, so awareness of the imaging features of Tarlov cysts can assist in accurate diagnosis and avoidance of unnecessary biopsy, which can cause painful neuropathic symptoms.^{1,7,9} Comparison with prior cross-sectional imaging allowed the image reader to correctly identify a Tarlov cyst in one of the two cases discussed.

Figure 4. Color Doppler Ultrasound of the Pelvis of a 50-Year-Old Woman with a Tarlov Cyst.



A longitudinal view image of the pelvis shows a 4.3 cm right adnexal cystic lesion with internal echoes originating from a sacral foramen (red arrow). This Tarlov cyst was initially misidentified as a right ovarian cystic lesion. Note: The difference in the size of the cyst as measured in the initial CT and the ultrasound performed one year later may be explained by the growth of the cyst or by differences in the imaging modalities.

Conclusion

We report two cases of Tarlov cysts mimicking adnexal masses on ultrasound, and which were subsequently confirmed primarily by cross-sectional imaging. Due to a Tarlov cyst's sacral origin and its usual lack of associated symptoms, it is likely to be misdiagnosed as an adnexal mass. Avoiding misdiagnosis may be possible by identifying the Tarlov cyst's sacral foraminal origin on ultrasound or by correlation with cross-sectional imaging.

Author Contributions

Conceptualization, J.N.D.; Acquisition, analysis, and interpretation of data, J.N.D.; Writing – original draft preparation, E.A.Z.; Review and editing, J.N.D. and E.A.Z.; Supervision, J.N.D.. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Disclosures

None to report.

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