

Tarlov's Cysts: Overview of a Common Space-Occupying Lesion of the Spine and Its Characteristics on MRI

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Introduction

Tarlov's cysts (Tarlov cysts, TCs, perineural cysts) are fluid-filled meningeal dilations of the posterior nerve root sheath, usually at the dorsal root ganglion. They are commonly viewed in the sacrum¹ but can also be observed in the lumbar, thoracic, and cervical spine. Dr. Isadore Tarlov first described the presence of perineurial cysts in 1931 while studying the histology of the filum terminale at the Royal Victoria Hospital in Montreal. Since then, this finding has borne his name. Despite its identification 70 years ago, scant scientific knowledge is available about this condition.

Studies have shown TCs to be present in 4.6-9% of the population.² Although they are usually considered a coincidental finding on MRI and predominantly asymptomatic, Tarlov's cysts have been attributed to being symptomatic up to 20% of the time³ and could pose a challenge to both the patient and the clinician.

Radiography

The advent of advanced diagnostic imagery, such as MRI and CT, has resulted in more frequent reports of TCs. It is rare for any diagnostic imaging procedure to be ordered for the sake of identifying a TC.

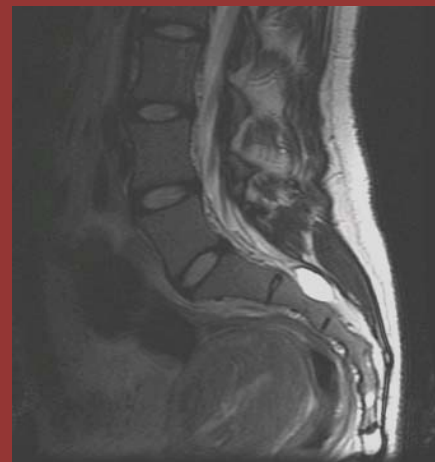
TCs are commonly found on MRIs taken for other diagnostic purposes. On MRI, they are typically seen as well-circumscribed and ovoid in shape. They tend to exist as singularities, and less often in clusters. T2 weighted MRI is the preferred medium to view TCs. In T2 weighted MRI, water density appears white; in T1 weighted MRI, water density structures appear black and may be harder for the less-experienced eye to visualize.

TCs can also be made visible with computer tomography (CT), particularly when intrathecal contrast enhancement is used. CT with enhancement is used to determine the degree of communication between the TC and the thecal sac. Bony erosion caused by TCs can be identified on plain film radiographs, but this is not the preferred medium for viewing this phenomenon.

Management

All practitioners who treat the spine should be able to identify a TC on an MRI and be able to determine if the cyst could be a source of the symptoms. As stated above, TCs are not typically considered a source of symptoms. If they are symptomatic, however, the provider needs to determine a management plan.

Tarlov's Cysts on MRI



This sagittal view of a T2 weighted MRI reveals a hyper-intense signal posterior to the S2 segment. Water densities have a high-intensity signal (with white appearance) on T2 weighted MRI. Tarlov's cysts appear white in T2 images.



In this T1 weighted view the TC appears dark.

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Non-surgical treatment options include CSF drainage,⁴ umboperitoneal shunts, percutaneous cyst drainage (though the cysts typically refill and the symptoms return), and drainage through cyst aspiration and injection of fibrin glue (one study showed high rates of aseptic meningitis as a result of this procedure).⁵ The results are so dismal that these treatments are seldom attempted.

Surgical treatment of symptomatic TCs includes excision of the cyst, laminectomy, or surgical cyst fenestration. The benefits of surgical intervention for treating symptomatic TCs are still controversial.

One study sought to identify a subgroup of patients with TCs that would have optimal outcomes from surgical intervention.⁶ The criteria were cysts that were greater than 1.5 cm and were associated with radicular pain and/or bowel or bladder dysfunction. On rare occasions, huge TCs develop, causing an obvious need for surgical intervention.

Simply identifying a TC does not warrant a consult to an interventional specialty. In fact, no treatment should be initiated unless there is compelling certainty that the cyst is responsible for symptoms. Interventional neuroradiologists (INR) may be the preferred practitioners to whom patients with symptomatic Tarlov's cysts should be referred. In the absence of an INR in your geographic region, you may consider referring the patient to an interventional radiologist or pain center.

Before referring to a spine surgeon, find out in advance if the surgeon characteristically dismisses TCs as asymptomatic or not surgically treatable. This could save the patient time, money, and aggravation. Even if there is compelling evidence that the TC is a source of symptoms, interventional treatments are usually withheld; the exceptions are severe pain, neurological signs such as weakness, bladder or bowel symptoms, or sexual dysfunction. If interventional treatment is not warranted, the use of conservative pain-relieving treatments should be employed. We should note that there is no compelling evidence that chiropractic, physical therapy, or any other conservative manual or physical treatment is particularly effective in treating symptomatic TCs.

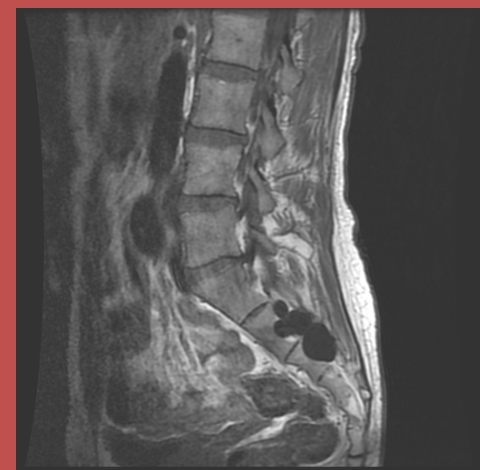
The lack of informed providers and the frustration of patients affected by TC have prompted the formation of a lay advocacy group. This advocacy group, the Tarlov Cyst Association (www.tarlovcyst.net/), promotes studies and education that support the belief that TCs do cause symptoms and infirmity.

Conclusion

TCs are commonly occurring fluid-filled expansions of the posterior nerve root sleeves. These lesions are most commonly observed in the sacrum, particularly at S2 and S3, but may be found at any spinal level. MRI is the preferred diagnostic medium for identifying TC, but CT with enhancement is a useful tool to determine if there is communication between the TC and the thecal sac. These lesions are gen-



This T2 weighted image reveals several expansive cystic lesions in the sacrum that have high signal intensity, appearing white. Note the erosion of bony material of the sacrum.



The same imagery slice, but in T1 weighted imagery. Note the dark color of the cysts which display a low intensity signal when viewed on a T1 weighted image.

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erally considered coincidental findings on MRI and rarely ascribed with clinical significance. It is accepted, however, that expansive TCs may produce pain and neurological symptoms. Management of symptomatic TCs remains an enigma. Despite a 70-year history in the literature, no well-defined consensus exists for managing symptomatic TCs. Nonetheless, virtually all spine practitioners will encounter TCs. All should therefore be versed in determining their clinical significance even without the existence of a clear algorithm of management. ■

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.

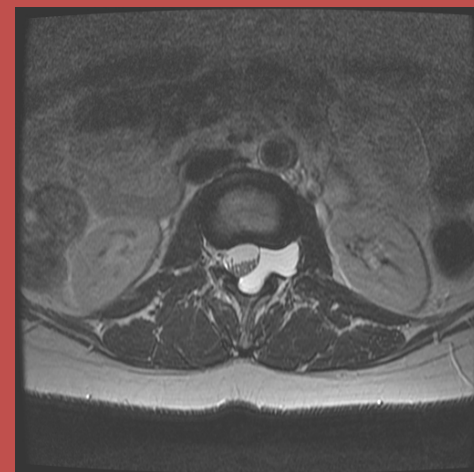
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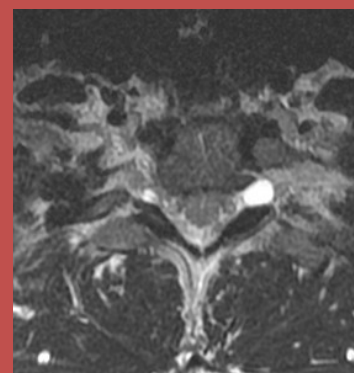
Tarlov's Cysts Outside of the Sacral Region



This axial view demonstrates a large TC displacing the thecal sac at L2-L3.



Sagittal image of the same TC



This T2 axial displays bilateral TC at C7.