**ABSTRACT:**  Tarlov cysts, or Type II meningeal cysts, are CSF-filled sacs located in the extradural space of the sacral spinal canal, commonly originating at the dorsal root ganglion. While they were first documented by Tarlov in 1938, their etiology remains uncertain, with theories suggesting trauma-induced bleeding or congenital abnormalities. These cysts, estimated to affect between 1% and 9% of the adult population, typically manifest as incidental findings but may lead to symptoms such as radiculopathies, sacral pain, and weakness in related sacral muscles. We present a case of a 63-year-old female presenting with recurrent left buttock pain and radiating leg discomfort. Physical examination revealed tenderness in the left buttock region, positive straight leg raise test, and mild sensory deficits in the S1 and S2 dermatomes. A provisional diagnosis of radiculopathy was made, prompting further evaluation with MRI, revealing a Tarlov cyst. Surgical intervention, consisting of sacral laminectomy with cyst excision and plication of the cyst wall, was recommended. However, the patient declined surgery and was managed conservatively. This case highlights the diagnostic challenges and therapeutic considerations in managing Tarlov cysts, emphasizing the importance of tailored treatment strategies.

**KEYWORDS:** *Tarlov Cysts, Type II spinal meningeal cysts, Radiculopathy*

***Key Clinical Message:*** *Tarlov Cysts are uncommon causes of sacral radiculopathy, with particular predilection to second and third sacral roots, requiring timely diagnosis with lumbo-sacral MRI, and surgical management if symptomatic.*

**INTRODUCTION**:

Tarlov cysts are CSF-filled sacs situated in the extradural space of the sacral spinal canal, forming within the nerve root sheath at the dorsal root ganglion. They were first reported by Tarlov in 1938 as incidental findings at autopsy, subsequently classified as Type II meningeal cysts. [1](https://paperpile.com/c/4C4vXE/M33h),[2](https://paperpile.com/c/4C4vXE/HUBf) Tarlov cysts typically develop at the junction of the posterior root and the dorsal ganglion, positioned between the perineurium and endoneurium. The definition of a Tarlov cyst is histopathological, requiring the presence of spinal nerve root fibers in the cyst wall or its cavity. [2](https://paperpile.com/c/4C4vXE/HUBf) Prevalence of these lesions have been estimated to affect between 1% and 9% of the adult population. [2–](https://paperpile.com/c/4C4vXE/HUBf+mHj6+z2bg)[5](https://paperpile.com/c/4C4vXE/qzJf) The incidence of Tarlov cysts does not significantly vary between sexes but is more common in younger individuals, with a prevalence of 4.0% in those under 50 years old compared to 1.3% in those over 50 years old. [2](https://paperpile.com/c/4C4vXE/HUBf)

**CASE REPORT**:

### ***Case history and examination:*** A 63-year-old female, presented to the ER with a chief complaint of recurrent mild pain in her lower back and left buttock, with radiation down her left lower limb. She reported that the pain had been present for more than 3 months and was progressively worsening, impacting her ability to walk and perform daily activities. Upon further inquiry, she described the pain as sharp and shooting, exacerbated by movement. She also noted occasional numbness and tingling sensations in her left lower limb, particularly in the toes. These symptoms worsened while coughing, standing or climbing up and down the stairs. She had been taking metformin and amlodipine-losartan for diabetes mellitus and hypertension regularly. Other than that, her past history was insignicant.

During the physical examination, tenderness was noted upon palpation of the left buttock region, with no signs of inflammation or skin abnormalities. Straight leg raise (SLR) test was positive on the left side, reproducing the patient's symptoms of pain radiating down the leg. Mild sensory deficits were noted in the region of the S1 and S2 dermatome, while motor functions remained intact with power in all limbs noted 5/5. Ankle jerk reflex was slightly reduced on the left side.

### ***Methods:*** Based on the clinical presentation and physical examination findings, a provisional diagnosis of radiculopathy was made, indicating compression or irritation of the nerve roots in the lumbar spine at the level of S2. Further diagnostic evaluation, with MRI scan, was recommended to identify the underlying cause of the radiculopathy and determine the appropriate course of treatment. MRI showed T1 hypointense, T2/STIR hyperintense cystic lesion of size approximately 8.5mm x 11mm x 12mm (anteroposterior x transverse x craniocaudal dimensions) along left neural foramen at S1-S2 level causing scalloping and effacement of anterior aspect of left neural foramen with narrowing of left exiting nerve roots (Figure 1 and Figure 2). Patient was advised regarding surgery. Plan was done for sacral laminectomy along with cyst excision and plication of the cyst wall, while retaining the nerve root.

### ***Conclusion and results:***

After explaining the surgical and conservative management options to the patient, the patient refused to undergo surgery and was medically managed with NSAIDs and pregabalin. At 3 months follow-up, she reported having significantly reduced symptoms and had improved functionality.

**DISCUSSION:**

Spinal meningeal cysts are categorized into three types: Type I, which are extradural cysts without spinal nerve root fibers; Type II, known as Tarlov cysts, which are extradural cysts with spinal nerve root fibers; and Type III, which are intradural meningeal cysts. [4](https://paperpile.com/c/4C4vXE/z2bg) Tarlov Cysts, filled with cerebrospinal fluid (CSF), typically maintain a constant size and are commonly found at the posterior sacral or coccygeal nerve roots, with a predilection for the second or third sacral roots. 3-7.

The exact cause of these cysts is still uncertain. One theory suggests they may result from trauma, leading to bleeding in the subarachnoid space. This bleeding could block the drainage of veins in the perineurium and epineurium, causing them to rupture and form cysts. Another theory proposes a congenital origin, where abnormal growths in the root sleeve obstruct normal cerebrospinal fluid (CSF) flow. The formation of cysts may also involve a "ball valve" mechanism, where CSF flows into the cyst but is restricted from flowing out, causing it to expand. Histological examination typically shows an outer wall of vascular connective tissue and an inner wall lined with flattened arachnoid cells, sometimes containing nerve fibers and ganglion cells.[3](https://paperpile.com/c/4C4vXE/mHj6)

Tarlov cysts have been associated with various symptoms, including coccygodynia, sacral pain, radiculopathies, sacral insufficiency fractures, weakness in related sacral muscles, and bowel and bladder issues. Specific radicular pain may result from nerve root distortion, compression, or stretching by the cyst. Symptoms may worsen with posture changes, coughing, valsalva maneuvers, standing, lifting, or climbing stairs, which increase CSF pressure, but can be alleviated by lying down. [3,8](https://paperpile.com/c/4C4vXE/mHj6+Fu5Q) Approximately only below 1% of sacral perineural cysts become large and cause symptoms related to local compression. [8](https://paperpile.com/c/4C4vXE/Fu5Q)

Lumbosacral MRI is considered the imaging study of choice in identifying tarlov cysts because these cysts are filled with CSF, a low signal is seen on T1 and a high signal is noted on T2. The majority of Tarlov cysts are incidental findings on MRI. [5](https://paperpile.com/c/4C4vXE/qzJf)

When MRI is unavailable, CT myelogram serves as an alternative for detecting perineurial cysts. CT scans, with or without intrathecal contrast, reveal these cysts as isodense with cerebrospinal fluid (CSF), often causing bone abnormalities. Post-myelography CT scans effectively show cyst communication with the spinal subarachnoid space and surrounding bone scalloping. Compared to CT, MRI offers superior tissue resolution, multiplanar views, and noninvasiveness. Myelography with water-soluble contrast fills the cyst more rapidly than oil-based contrast. Plain X-rays may display spinal canal or sacral foramina erosions. However, while imaging aids diagnosis, confirming a Tarlov cyst requires histopathological examination to differentiate it from similar spinal conditions. [3,4](https://paperpile.com/c/4C4vXE/mHj6+z2bg) [2](https://paperpile.com/c/4C4vXE/HUBf)

It is generally agreed that asymptomatic Tarlov cysts do not require treatment. [4](https://paperpile.com/c/4C4vXE/z2bg) Treatment options for sacral perineural cysts include conservative and surgical approaches. Conservative treatment involves pain medication, physical therapy focusing on McKenzie exercises, pelvic stabilizer and abdominal strengthening, and hamstring stretching. Due to the rarity and unclear nature of these cysts, there's no consensus on the best treatment. Patients with radicular pain initially undergo medical treatment with anti-inflammatory drugs and physical therapy.

Surgery is considered if conservative measures fail, particularly for patients with cysts larger than 1.5 cm, along with radicular pain or bowel/bladder dysfunction. [9](https://paperpile.com/c/4C4vXE/DqBc) Surgical options for sacral perineural cysts include laminectomy with cyst drainage and nerve root resection, as well as alternative procedures like cyst incision and drainage with nerve sheath imbrication or CT-guided percutaneous drainage. Surgery is typically recommended for patients with radicular symptoms aggravated by posture changes.[10](https://paperpile.com/c/4C4vXE/u21O) Surgical or drainage procedures for sacral perineural cysts carry risks such as nerve damage, urinary issues, infection, spinal headache, and CSF leakage due to nerve fibers in the cyst wall. Electrophysiological monitoring helps reduce damage to sacral nerve roots. Follow-up typically includes MRI scans at 6 months and 1 year postoperatively. [3,4,8](https://paperpile.com/c/4C4vXE/Fu5Q+mHj6+z2bg)

**CONCLUSION:**

Despite being an extremely rare cause of radiculopathy in elderly females, Type II spinal meningeal cysts also known as Tarlov cysts can sometimes cause significant morbidity in patients. Diagnostic difficulties might lead to challenges in management but these cysts should always be considered when mass of cystic nature is seen especially in the region of second or third sacral roots. Lumbosacral MRI is the gold standard of imaging, where possible for such cysts and conservative management is preferred for asymptomatic cases, whereas surgical management should be done for large cysts causing significant symptoms.

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## **AUTHOR CONTRIBUTIONS**

**Shritik Devkota** : Conceptualization; data curation; supervision; writing – original draft; writing – review and editing.

**Sugat Adhikari**: Data curation; writing – original draft ; writing – review and editing.

**Samiksha Lamichhane** : Conceptualization; data curation, writing - review

**Bishal Koirala**: writing – original draft; writing – review and editing.

**Arif Hussain Sarmast**: Conceptualization; data curation; supervision; supervision

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## **CONFLICT OF INTEREST STATEMENT:**

## The authors declare no conflict of interest in this study.

## **ETHICS STATEMENT:**

The patient has provided written informed consent for the publication of this case report.

## **CONSENT:**

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

1. [Nabors MW, Pait TG, Byrd EB, et al. Updated assessment and current classification of spinal meningeal cysts. *J Neurosurg*. 1988;68(3):366-377. doi:](http://paperpile.com/b/4C4vXE/M33h)[10.3171/jns.1988.68.3.0366](http://dx.doi.org/10.3171/jns.1988.68.3.0366)

2. [Lucantoni C, Than KD, Wang AC, et al. Tarlov cysts: a controversial lesion of the sacral spine. *Neurosurg Focus*. 2011;31(6):E14. doi:](http://paperpile.com/b/4C4vXE/HUBf)[10.3171/2011.9.FOCUS11221](http://dx.doi.org/10.3171/2011.9.FOCUS11221)

3. [Nadler SF, Bartoli LM, Stitik TP, Chen B. Tarlov cyst as a rare cause of S1 radiculopathy: A case report. *Arch Phys Med Rehabil*. 2001;82(5):689-690. doi:](http://paperpile.com/b/4C4vXE/mHj6)[10.1053/apmr.2001.22353](http://dx.doi.org/10.1053/apmr.2001.22353)

4. [Acosta FL Jr, Quinones-Hinojosa A, Schmidt MH, Weinstein PR. Diagnosis and management of sacral Tarlov cysts. Case report and review of the literature. *Neurosurg Focus*. 2003;15(2):E15. doi:](http://paperpile.com/b/4C4vXE/z2bg)[10.3171/foc.2003.15.2.15](http://dx.doi.org/10.3171/foc.2003.15.2.15)

5. [Langdown AJ, Grundy JRB, Birch NC. The clinical relevance of Tarlov cysts. *J Spinal Disord Tech*. 2005;18(1):29-33. doi:](http://paperpile.com/b/4C4vXE/qzJf)[10.1097/01.bsd.0000133495.78245.71](http://dx.doi.org/10.1097/01.bsd.0000133495.78245.71)

6. [Tarlov IM. PERINEURIAL CYSTS OF THE SPINAL NERVE ROOTS. *Arch NeurPsych*. 1938;40(6):1067-1074. doi:](http://paperpile.com/b/4C4vXE/kQcu)[10.1001/archneurpsyc.1938.02270120017001](http://dx.doi.org/10.1001/archneurpsyc.1938.02270120017001)

7. [Tarlov IM. Cysts of the sacral nerve roots; clinical significance and pathogenesis. *AMA Arch Neurol Psychiatry*. 1952;68(1):94-108. doi:](http://paperpile.com/b/4C4vXE/I7PL)[10.1001/archneurpsyc.1952.02320190100010](http://dx.doi.org/10.1001/archneurpsyc.1952.02320190100010)

8. [Ju CI, Shin H, Kim SW, Kim HS. Sacral perineural cyst accompanying disc herniation. *J Korean Neurosurg Soc*. 2009;45(3):185-187. doi:](http://paperpile.com/b/4C4vXE/Fu5Q)[10.3340/jkns.2009.45.3.185](http://dx.doi.org/10.3340/jkns.2009.45.3.185)

9. [Voyadzis JM, Bhargava P, Henderson FC. Tarlov cysts: a study of 10 cases with review of the literature. *J Neurosurg*. 2001;95(1 Suppl):25-32. doi:](http://paperpile.com/b/4C4vXE/DqBc)[10.3171/spi.2001.95.1.0025](http://dx.doi.org/10.3171/spi.2001.95.1.0025)

10. [Murphy KJ, Nussbaum DA, Schnupp S, Long D. Tarlov cysts: an overlooked clinical problem. *Semin Musculoskelet Radiol*. 2011;15(2):163-167. doi:](http://paperpile.com/b/4C4vXE/u21O)[10.1055/s-0031-1275599](http://dx.doi.org/10.1055/s-0031-1275599)