Policy Number	**SUR705.050**
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Treatment of Tarlov Cysts

Table of Contents

Related Policies (if applicable)
SUR702.015 Facet Joint Injections
SUR712.036 Lumbar Spinal Fusion
SUR712.041 Cervical Spinal Fusion

Disclaimer

Carefully check state regulations and/or the member contract.
Each benefit plan, summary plan description or contract defines which services are covered, which services are excluded, and which services are subject to dollar caps or other limitations, conditions or exclusions. Members and their providers have the responsibility for consulting the member's benefit plan, summary plan description or contract to determine if there are any exclusions or other benefit limitations applicable to this service or supply. **If there is a discrepancy between a Medical Policy and a member's benefit plan, summary plan description or contract, the benefit plan, summary plan description or contract will govern.**

Coverage

NOTE 1: This policy does not address treatment of synovial cysts. Refer to the Related Policies listed above as applicable.

Treatment of Tarlov cysts (perineural cyst, sacral perineural cyst, sacral meningeal cyst), cyst fenestration with fibrin glue injection **OR** a cervical, thoracic, lumbar, or sacral laminectomy **may be considered medically necessary** when the individual meets **ALL** the following criteria:

- Radiological evidence (computed tomography [CT], magnetic resonance imaging [MRI], computed tomography myelogram [CT-myelography]) confirms the presence of a Tarlov cyst that, by its anatomic location and size (>1.5 cm), correlates to the neurological signs and symptoms;
- Neurological conditions are attributable to the Tarlov cyst identified by radiologic imaging (e.g., urinary or fecal incontinence, cauda equina syndrome);
- Conservative, non-surgical treatment (physical therapy, non-steroidal anti-inflammatory agents [NSAIDs]) for at least 6 to 12 weeks has failed to alleviate symptoms.

Other procedures/treatments of Tarlov cysts, including but not limited to, reconstructive procedures, **are considered experimental, investigational and/or unproven.**

Reconstructive procedures of the bony architecture of the spine for the treatment of Tarlov cysts **are considered experimental, investigational and/or unproven.**

Policy Guidelines

None.

Description

First identified in 1938, Tarlov cysts (TC) are fluid-filled sacs between the perineurium (the protective sheath that surrounds a bundle of nerve fibers) and endoneurium (a layer of connective tissue around the myelin sheath of a peripheral nerve), arising near the dorsal root ganglion and affect the nerve roots of the spine. While commonly found in the sacral region, they can occur anywhere along the spine. They may also be known as sacral perineural cysts, perineural cysts, or sacral, lumbar, thoracic, or cervical nerve root cysts.

TC may be valved or nonvalved and can be distinguished from other spinal lesions by the presence of spinal nerve root fibers within the cyst wall or in the cyst cavity itself. The exact cause of TC is unknown, but it is thought they are caused by inflammatory processes within the nerve root sheath or that trauma injures the nerve root sheath, causing leakage of cerebrospinal fluid (CSF) into the area where a cyst forms. Some researchers believe that an abnormal congenital connection (communication) exists between the subarachnoid space, which contains CSF, and the area surrounding the affected nerves (perineural region). The connection may remain or eventually close, after allowing cerebrospinal fluid to leak out and cause a cyst. Because Tarlov cysts contain CSF, researchers have speculated that normal fluctuations in CSF pressure may lead to an increase in cyst size and a greater likelihood of developing symptoms.

Tarlov cysts appear to be rare. Women are at a higher risk of developing TC than men (7.01% vs. 4.05%). An estimated 4.27% of the global population has TC, while in the United States, it is estimated to be 3.82% of the population. Mostly asymptomatic, these cysts can present as chronic back pain in the sacral or coccyx area and individuals may have radiculopathy, leg weakness, bowel or bladder dysfunction, or sexual dysfunction. Approximately 15.6% of the cysts are symptomatic. (1)

TC may be diagnosed through a detailed clinical history with identification of characteristic symptoms and a neurological examination. Diagnosis may be confirmed with either magnetic resonance imaging (MRI) or computed tomography (CT). A myelogram may also be used, with the dye allowing structures such as the nerve roots and spinal canal to be more clearly seen on x-ray.

There is no specific, accepted therapy for individuals with symptomatic Tarlov cysts. Treatment is directed toward the specific symptoms and may include medication, surgery, or other techniques. Non-steroidal anti-inflammatory drugs (NSAIDs) may be prescribed to treat nerve irritation and inflammation. A transcutaneous electrical nerve stimulator or TENS may also be used to relieve nerve pain. These cysts may also be treated by draining the CSF from the cyst; however, results vary, and, in most cases, the cyst will eventually fill up with CSF again, with symptoms returning within hours. A non-surgical procedure uses a combination of substances that mimic blood clotting (fibrin glue). After the cyst is drained, fibrin glue is used to seal or glue the cyst closed preventing it from filling with CSF again.

Large cysts may necessitate surgical intervention. One technique is to expose the region of the spine where the cyst is located by removal of the overlying vertebral bone. The cyst is then sliced open with one or more thin cuts (fenestrations) and drained of fluid. The cyst wall is collapsed, then reinforced and sutured closed or the cavity is filled with another substance such as fat or tissue adhesive to prevent it from refilling with CSF. In another procedure, following exposure and drainage of the cyst, a flap of nearby muscle tissue is used to fill the cyst to prevent refilling. (2) Other surgical techniques may include decompressive laminectomy.

Rationale

This policy was developed in 2024 using a literature search in PubMed as of March 18, 2024.

In 2011, Neulen et al. reported on 13 patients (10 female, 3 male) with magnetic resonance imaging (MRI) detected sacral perineural cysts. (3) Ten patients had two or more cysts, and in seven of these, only the largest cysts thought to be responsible for the patient's symptoms were treated. Symptoms had been present for 6 months to 30 years. Postoperative follow-up was 2.5 to 20 months. All perineural cysts originated from the nerve roots S1, S2, or S3, with lumbosacral pain the most frequent symptom (10 of 13), followed by pain radiating into the buttocks (8 of 13), legs (7 of 13), groin and abdomen (4 of 13), genital pain (3 of 13), and bowel/bladder dysfunction (3 of 13). There was no history of trauma or infection any of the patients. Small and promptly filling cysts were not operated on. A sacral laminectomy was performed, exposing the thecal sac and cyst. The thecal sac was opened, and the nerve was followed intradurally through the dural sleeve of the nerve root into the cyst. Because of a valve mechanism, the cysts did not collapse even though the thecal sac was opened. Fibrous arachnoidal tissue obstructing the neck of the cyst was resected, establishing a communication between the cyst and the thecal sac. The dura was closed and where feasible, placation of the cyst was performed.

Five of the patients did not improve. Most patients were discharged from the hospital on postoperative day 10 (5 to 14 days). One patient had to be treated with a lumbar drain for 7 days due to a CSF fistula. One patient who initially improved experienced recurrent pain after 2 months. Postoperative imaging showed contrast filling of a recurrent cyst; however, the patient

did not benefit from reoperation. The five patients who did not improve had multiple cysts, with four patients having one or several small or promptly filling cysts there were untreated. In two of the patients who did not improve, the operated cysts were smaller than 1 cm. in diameter. Of the eight patients who benefited from surgery, three had single cysts (among these was the patient with recurrent symptoms and reoperation). Two patients had two cysts with delayed contrast filling of similar size each. In both patients both cysts were treated. Three patients had multiple cysts, and only large and delayed filling cysts were operated on. In all patients who improved, the operated cysts were >1 cm in diameter (1.2 cm to 3 cm). The best improvement was documented for pain radiating into the legs and buttocks, genital pain, and lumbosacral pain while improvement of bowel/bladder dysfunction and pain radiating into the groin and abdomen was observed less frequently. (3)

The authors concluded that in cases with multiple delayed filling cysts of similar size, all cysts should be treated surgically. They did not observe any difference in clinical outcomes for patients with single or multiple large (>1 cm) cysts with documented delayed contrast filling on post-myelographic computed tomography (CT) scans, if all cysts are treated surgically. If multiple cysts are present with one or several having a diameter of <1 cm, or one or several showing prompt contrast filling, patients should be informed about the risk of residual symptoms as they found five of eight patients in their study with multiple cysts did not significantly benefit from surgery. The authors also stated the data from this retrospective case collection should be interpreted with caution because of the relatively small size and the heterogenic nature of single or multiple cysts of various sizes. (3)

Tsitsopoulos et al. (2018) reported on a small sample of patients (n=7) treated surgically for symptomatic perineural cysts from 2013 to 2016. (4) Patients underwent a laminectomy at the level of interest, usually L5-S2, to expose the cyst which was opened and excised. Nerve roots were identified and when possible, the nerve roots were released from the cyst wall and surrounding tissue. If present, communication between the cyst and subarachnoid space was identified and sealed with packing and fibrin glue if neural elements were not included. When possible, the remaining cyst wall was sutured, however watertight closure could not be accomplished. Packing followed and fibrin glue was placed over the cyst wall. A local perforator fasciocutaneous flap was used to cover the area after the cyst was evacuated. The flap was either designed as a broad-based V to Y fashion with one edge transposed into the space created by cyst opening/ excision or as a flap isolated on the specific perforator and rotated into the defect (named a propeller flap). The tissue positioned into the defect was de-epithelialized and anchored info place. In patients with large cysts, large dural defects and unsecure closures, lumbar drains were placed. The lumbar drain typically drained for 3–5 days, then it was clamped, the wound was inspected for CSF leakage and removed if no leakage or symptoms of intracranial hypotension were observed. Patients were followed-up by consecutive visits to the treating physicians where a detailed neurological examination was undertaken, and post-operative MRI scans. Possible relapse of symptoms, complications, reoperations, and cyst recurrence were recorded. The mean follow-up period was 15.4 months. Symptoms improved in 4/7 patients; in two cases no clinical difference was noted while one

patient deteriorated. In two cases, a spinal cord stimulator was eventually implanted. In all seven cases, a significantly decreased cyst size was noted on MRI.

Yang et al. (2019) reported on retrospective review of patients with symptomatic sacral meningeal cysts who were surgically treated by a single surgeon from 2002 to 2017. (5) A total of 18 patients (7 male patients and 11 female patients, average age 42.3 years) were followed up for an average of 51.7 months. All patients had communicating holes linking the cysts and the dural sacs. The average preoperative neurological score was19.7 ± 2.2, and it was improved to 23.2 ± 2.8 at the most recent follow-up ($p < 0.01$). The diagnosis of sacral meningeal cyst was confirmed in all patients by MRI. Only patients who met the following criteria received surgery: 1) clinically, the patient had neurological signs and symptoms, including S1 radicular symptoms (S1 radicular pain, leg numbness or weakness, neurogenic claudication) or sacral plexus disorder (bowel and bladder dysfunction, sexual impotence, perineal/perianal pain); 2) MRI confirmed existence of a cyst; 3) other causes were excluded such as lumbar disc herniation or spinal stenosis. All patients underwent the same operation by incising the cyst wall and obstructing the communicating hole with muscle graft, while the cyst wall was left untreated instead of resected or imbricated. The obstruction was verified by doing a Valsalva-like maneuver (pressuring the patient's abdomen), during which time there should be no CSF flowing into the cyst. The residual space was filled with gel foam and/or fibrin glue, or a local pedicled sacrospinalis muscle flap for temporary equalization of the pressure between the cavity and dural sac.

Fletcher-Sandersjöö et al. (2019) reported on a population-cohort study conducted of adult patients ≥15 years of age with symptomatic perineural cysts between 2002 and 2018. (6) Thirty-nine patients were included, with the most common symptom of sciatica (n=22, 56%) followed by sensory deficit (n=7, 18%). Only one patient had bladder and/or gastrointestinal symptoms. Twenty-eight (72%) of the patients were female, and the median age was 53 years (range 15–75). Most of the cysts were located at the sacral level (n = 37), with the remainder located at the thoracic (n=1) and cervical (n=1) level. Measured at its widest point, the median cyst diameter was 20 mm (range 10–43), and 29 (74%) of the patients had multiple cysts. Patients with symptoms that could be attributed to perineural cysts were then referred for a myelography to determine the relationship between the cyst and subarachnoid space. Non-symptomatic perineural cysts, arachnoidal cysts, and other cysts with direct communication with the subarachnoid space were not included. Two patients were found to have a free communication between the cyst and the subarachnoid space, and consequently, no aspiration was performed. Following the myelography, the patients with symptomatic perineural cysts were categorized into group A (clinical improvement following cyst aspiration, n=24), group B (no clinical improvement following cyst aspiration, n=4), and group C (did not undergo cyst aspiration, n=11). Group A patients were initially offered surgery, group B patients were not offered surgery, and group C patients were offered surgery if their symptoms could not be explained by concurrent spinal pathology. Three patients from Group A were treated conservatively after showing spontaneous clinical improvement after the initial pre-operative work-up (myelography). Ten patients declined surgical treatment. Of the remaining 11 patients, one did not undergo cyst fenestration as the procedure was canceled intraoperatively due to

adhesions that made fenestration impossible without unacceptable risk to neural structures. The remaining patients in Group A underwent microsurgical cyst fenestration. Surgery was offered to and performed in 7 of the patients in Group C; the remaining were treated conservatively. A total of 17 (44%) of the included patients underwent microsurgical fenestration. The cysts were drained and the collapsed perineurium was sealed with fibrin glue. If there was a CSF leakage, a sealant patch was placed; and if the collapsed cyst created a void which could not collapse due to deformation of the surrounding bone, the space was filled with autologous fat. Post-operative period was uneventful, and no complications were reported that could be attributable to the surgical procedure.

Murphy et al. (2023) conducted a systematic literature review on the prevalence, diagnosis, clinical significance, and treatment of Tarlov Cysts. (7). Fibrin sealants have been used extensively in various surgeries for its hemostatic and adhesive properties. Initially, only cyst aspiration of CSF was performed, however pain relief was short-lived and multiple serial aspirations were required to maintain symptom resolution. Injection of fibrin sealing following fluid aspiration has been reported for symptomatic sacral Tarlov cysts and symptomatic sacral arachnoid cysts. Treatment results of the cohort studies, none randomized, are summarized in Table 1. In all studies, patients presented with multiple symptoms that had been present for years. Although treatment success was defined differently, all studies reported high rates of symptom improvement greater than 70% after aspiration-fibrin sealant injection. Follow-up with MRI imaging demonstrated that cysts had either disappeared or were substantially reduced in size in many cases.

Table 1. Treatment Outcomes for Cyst Aspiration and Fibrin Sealant Injection of Symptomatic Tarlov Cysts (7)

Author, Year, Country	Study Cohort, Investigations	Treatment Outcomes	Complications, Failures
Patel et al. (8) 1997 United States	• Consecutive series 4 patients (3 women, 1 man) with MRI documented sacral cysts, age range 40 to 62 years. • Symptomatic for years with severe low back pain (n = 3), back pain and urinary incontinence and urgency (n = 1), severe perineal pain with urinary difficulty (n = 1). • All underwent initial cyst aspiration later followed by fibrin	• Treatment successful in all cases within days of the procedure.	• No symptom recurrence in follow-up from 7 to 23 months. • Presumed cases of aseptic meningitis occurred with low-grade fever, headache, nausea, vomiting, meningismus (neck stiffness) and a lumbar puncture with negative cultures (n = 3).

	sealant injection on first recurrence.		
Hiers et al. (9) 2010 United States	• 130-patient consecutive cohort, retrospective review. • Symptomatic Tarlov cysts treated between 2005 and 2010. • Cysts NR. • Outcomes assessed by third-party review coupled with medical record reviews.	• Treatment success of 75% based on several criteria: improving signs and symptoms, not wanting further treatment, and willingness to undergo another procedure if needed.	• Initial 25% failure rate, a 5% failure rate occurred over time and patients not improving within 3 months; did not improve later. • No post-operative infections or nerve injuries. • Complications (n = 3, 3.8%). • Cutaneous allergic reaction (n = 1). • Substantial worsening of pain lasting 2 weeks then subsiding (n = 4).
Murphy et al. (10) 2011 United States	• 122-patient cohort (102 women, 20 men), mean and median age 54 years. • 100 patients treated between April 2004 and November 2007 for symptomatic MRI confirmed Tarlov cysts, 6 were not candidates for aspiration and refused surgery. • The majority experienced lower back and buttock pain and sacral dermatome radicular symptoms with pain and burning in the perineal region, buttocks, and lower extremities with 9 patients reporting bowel dysfunction.	• Improvement in symptoms (65%) and marked/total improvement (19%). • Those ineligible for cyst aspiration underwent surgical repair (n = 28), 63% improved symptoms.	• No postprocedural fevers, or aseptic meningitis. • Complication (n = 8, 6.6%). • Transient postprocedural sciatica (n = 6), rectal fullness (n = 1). • Postoperative urticarial resolving during overnight admission and discharged the following morning in good health (n = 1).

	• 34% presented with confounding conditions.		
Jiang et al. (11) 2015 China	• 42-patient cohort (22 women, 20 men) mean age 34.3 years (range, 22–56 years); mean disease duration, 20.8 months; range, 7–59 months. • Treated between June 2009 and August 2012 for symptomatic MRI confirmed sacral Tarlov cysts, evaluated in mean 24-month follow-up. • Majority (n = 31) had a solitary cyst located at L5-S1 (n = 5), S1-S2 (n = 21), and S2-S3 (n = 17). • Outcomes assessed pain index (VAS), functional improvement and imaging findings.	• +Recovery was rated as excellent (59.5%), good (26.2%), fair recovery (7.1%) and poor recovery (7.1%)— overall excellent/good recovery rating (85.7%). • Post-operatively the majority (85%) of patients had either no pain (n = 25) or mild (n = 11) pain as VAS scores (1–3). • During MRI imaging follow-up, cysts either disappeared (n = 25) or significantly decreased in size (n = 14) and did not increase in follow-up— 3 cysts no change in size during the follow-up.	• Failure rate (fair or poor recovery) 14.2%. • No symptom or cyst recurrences. • No postoperative infection, nerve damage, meningitis, or CSF leaks. • Sanguineous fluid was aspirated during the procedure (n = 6) but no adverse effects noted. • Complications (n = 7, 16.7%). • Headache, low-grade fever, nausea or vomiting without neck stiffness (n = 7) resolving with 2-day treatment of 20% mannitol 250 ml and dexamethasone 10 mg and one day of prophylactic antibiotics in addition to an average of 3 days (range, 2–4 days) of bed rest.
Murphy et al. (12) 2016 United States	• 213-patient cohort with symptomatic MRI-confirmed Tarlov cysts (n = 289). • Treated between 2003 and 2012 with 90.1% followed for 1 year and 83.1% followed for between 3 and 6 years. • Single nerve roots unilaterally (n = 113),	• ++Treatment overall outcomes were rated as excellent (54.2%) or good/satisfactory (27.6%) and 81% were satisfied at one year with treatment outcomes. • Improvements rated as excellent	• Treatment failures (18.2%). • Symptom recurrence (16.9%). • No documented infections, nerve injuries or aseptic meningitis. • Complications (n = 44, 20.7%). • Mild nonspecific allergic reaction

	single roots bilaterally (n = 78) and more than two roots bilaterally (n = 22). • Cyst locations at S2 (n = 142) and S3 (n = 120) sacral levels, with cyst size (2 to 4 cm). • Outcomes included pain and function assessed by Lumbar Spine Outcomes Questionnaire.	or good for individual presenting symptoms: local pain (75.7%), sciatica/neuropathy (74.8%), perineal pain/sensory loss (74.9%), bladder/sexual function (73.9%), bowel dysfunction (72.6%), plantar flexion weakness (73.6%) or paralysis (0%), dorsiflexion paralysis (0%), and rectal sphincter reduction (73.8%)	with systemic hives leading to overnight hospitalization resolving without incident (n = 1). • Elevated inflammation resolving without treatment (n = 3). • Spinal fluid leak requiring a blood patch for control (n = 7). • Increased sciatica post-operatively resolving within 3 months (n = 20) and increased sciatica persisting for 3 months eventually resolving (n = 1). • Severely increased local pain (n = 7) resolving (n = 6) within 3 months. • Increase in symptoms, including bowel and bladder dysfunction, immediately following injection, transient and resolving within 3 months (n = 3).
Jiang et al. (13) 2017 China	• 82-patient cohort (49 women, 33 men) mean age 45.2 years (range 19–74 years), mean symptom duration 35.4 months (range, 6– 360 months). • Treated between June 2003 and August 2015 for symptomatic MRI-	• Aspiration and fibrin sealant injection after 2009 (n = 56). • Significant reductions in baseline mean pain NRS scores with low postoperative mean pain NRS scores 1.3 ± 1.1.	• No postoperative infections, nerve damage, or CSF leaks. • No recurrences occurred. • Complications (n = 7, 8.5%). • Low-grade fever, nausea, and vomiting without neck stiffness (n = 7)

	confirmed Tarlov cysts. • Three treatment approaches over time: aspiration and fibrin sealant injection performed after 2009 (n = 56), open surgery performed before 2009 (n = 14) involving sacral laminectomy microsurgical partial cyst wall fenestration and imbrication followed by 2-day lumbar drainage, and those refusing surgical management were treated with conservative involving physical therapy, anti-inflammatory and neurotropic drugs (n = 12). • Cyst locations at L5-S1 (n = 21), S1-S2 (n = 46), S2-S3 (n = 17). • Outcomes included pain VAS scores, symptom, and neurological deficit resolution.	• All symptoms and neurological deficits had been either completely or substantially resolved immediately after operation or during follow-up visits. • MRI examinations in most patients showed that the cysts disappeared or decreased in size during follow-up visits.	resolving after effective treatments: 20% mannitol 250 mL and dexamethasone 10 mg for 2 days, prophylactic antibiotics for one day, and an average of 3 days bed rest.
		• Open surgery performed before 2009 (n = 14). • Significant reductions in baseline mean pain NRS scores with low postoperative mean pain NRS scores 3.4 ± 2.5. • All symptoms and neurological deficits had been either completely or substantially resolved immediately after operation or during follow-up visits.	• MRI-confirmed cyst recurrence (n = 3) with symptom recurrence (n = 3), one received a second operation with no symptom improvement and two others refused a second surgery for unknown reasons. • Complications (n = 3, 21.4%). • CSF leakage (n = 3), all undergoing an artificial dural patch in a second operation and postoperative lumbar drainage for about one week.

		• Conservative management (n = 12). • Baseline mean pain VAS scores remained unchanged at follow-up, 5.8 ± 2.1 to 6.1 ± 2.2. • Symptoms were aggravated over time in 9 patients. • Three patients achieved substantial relief of preoperative symptoms and neurological deficits.	• Treatment failure (75%). • Cysts persisted with MRI follow-up.

CM: centimeter; CSF: cerebrospinal fluid; MG; milligram; ML: milliliter; MRI: magnetic resonance imaging; NR: not reported; NRS: neurological symptoms; VAS: visual analog pain scale.
+Jiang et al. treatment recovery categories: excellent (returning to regular employment without any signs or symptoms), good (partial resolution of symptoms that did not interfere with return to work), fair (no improvement in pain or function but shrinkage of cyst), and poor recovery (no improvement in symptoms or cyst shrinkage).
++Murphy et al. treatment success categories: excellent outcome (complete pain relief, discontinuation of all pain medications, improvement or stabilization of cyst related neurological signs and symptoms, not requiring further treatment, satisfaction with results, and willingness to undergo another procedure if required, good/satisfactory outcome (pain improved on the Lumbar Spine Outcomes Questionnaire scale, discontinuation of narcotic analgesics, neurologic deficits commensurate with adequate function or no further progression, satisfied with treatment results, and not seeking further treatment. Treatment failures included all outcomes other than excellent or good/satisfactory even if some improvement was noted.

Open surgical approaches involving simple sacral bony decompression have also been largely found to be inadequate due to low clinical success. Laminectomy or laminoplasty to unroof the sacral canal is commonly followed by varying micro-neurosurgical techniques to aspirate CSF, decrease cyst size, block communication between the cyst and the subarachnoid space to prevent CSF re-accumulation, and close the wound. Reports on microsurgical strategies to decrease cyst size after opening the dural sac and draining cyst CSF have involved: partial cyst resection, full cyst resection, or cyst fenestration. Depending on the cyst size, either imbrication involving resection of excess cyst wall prior to suture closure, or plication involving folding the cyst wall upon itself without resection prior to suture closure have been employed. In addition, various materials such as gel foam, fat or muscle grafts, and fibrin sealant have been used to fill the cyst cavity, block communication between the cyst and subarachnoid space, and cover dural defects. Simple resection of cyst wall or clipping are less commonly practiced, as they are

considered a hazard to the sacral nerves within the cyst. Many surgical reports for symptomatic Tarlov cysts involved single cohort studies; there have been three comparative studies of surgical techniques, none involving randomization. The results of these comparative studies are detailed in Table 2. The studies involved a comparison of cyst fenestration versus nerve root imbrication, surgical approaches for cysts with or without spinal nerve root fibers, and cyst fenestration and nerve root imbrication versus cyst fenestration and partial cyst wall removal. In all studies, patients had diverse symptoms and neurological deficits, and treatment outcomes were assessed differently. Except for the Medani et al. (16) study, most patients in either group achieved successful resolution of various pain symptoms and neurological deficits; bowel and bladder dysfunctions however were less likely to improve. Adverse events, particularly CSF leaks occurred in all studies and was reported to be significantly higher in the fenestration than the imbrication group (42% vs 22%). (5)

Table 2. Comparative Surgical Procedures for Symptomatic Tarlov Cysts (7)

Author, Year, Country	Study Cohort	Study Design and Interventions	Treatment Outcomes
Xu et al. (14) 2012 United States	• 15-patient cohort (6 women, 9 men) mean age 37.8 years (range 23 to 60 years). • Between 1998 and 2010 treated MRI documented symptomatic sacral Tarlov cysts. • Symptoms included: low back pain or sacrococcygodynia (n = 12), sacral radiculopathy (n = 7), numbness (n = 6), sensory disturbance of the sacral dermatome (n = 9), claudication (n = 4), and bowel	• Prior to 2006, first surgery group included 6 patients (1 woman, 5 men) age range 23–52 years. • Surgical procedure included sacral laminectomy, microsurgical cyst fenestration and cyst wall imbrication with free autologous fat or muscle grafts over the closed wall. • Follow-up ranged from 13 to 124 months.	• In the first surgery group, patients experienced either complete remission (n = 3) or substantial relief (n = 2) of symptoms and neurological deficits immediately after surgery or during follow-up visits. • Symptom and cyst recurrence (n = 1) without improvement with second surgery. • Adverse events (n = 1), CSF leak fixed with artificial dural patch in second surgery and one-week lumbar drainage.

	and bladder dysfunction (n = 6). • Eligible criteria included cyst diameter more than 1.5 cm, neurological symptoms and signs attributed to sacral Tarlov cysts serious enough to warrant treatment, no or little response to medical and physical therapy and a positive trial of CT guided aspiration. • Tarlov cysts were surgically treated differently before and after 2006.	• Since 2006, second surgery group included 7 patients (3 women, 4 men) age range 23–59 years. • Surgical procedure included sacral laminectomies, after which the cyst wall was partially removed and fenestrated with a scalpel to drain CSF fluid and the CSF leak aperture was located and repaired with fat and fibrin sealant. • Follow-up ranged from 14 to 61 months. • Two patients, both women, refusing surgery underwent medical management including analgesics, nonsteroidal anti-inflammatories, and physical therapy, followed for 50 and 62 months.	• In second surgery group, six patients experienced complete remission (n = 5) or substantial relief (n = 2) of symptoms and neurological deficits immediately after surgery or during follow-up visits. • There were no recurrences. • Adverse events (n = 1) with worsening of preoperative bladder dysfunction, gradually returning to normal one month later. • No neurological deficits, CSF leaks, or surgical infections, postoperative lumbar drains were not placed. • Patients in the medical management group (n = 2) experienced aggravated symptoms and increased cyst growth over 4-year follow-up.
Sun et al. (15) 2013 China	• Between 2009 and 2012 consecutive 55 patient cohort (38 women, 17 men), mean age 40.4 ± 14.31 years (range 13 to 70 years) with mean follow-up 25.5 ± 12.6 months. • Symptoms were present at multiple locations (40%) with the most common	• After laminectomy the terminal thecal sac was identified and dissected free from the overlying cysts and cysts were dissected from surrounding structures to reveal its origin and relationships with nerve fibers. • Intraoperative neurophysiological	• Mean duration of prone position after surgery was 4.9 ± 2.16 days, mean hospital LOS 15.8 ± 5.35 days. • Mean post-operative IJOA cores (neurological function) significantly improved in both groups: cysts with nerves (18.9 ± 1.22 to 19.6 ± 0.59) vs cysts without nerves

	symptoms: pain (73%), numbness (9.1%), bowel/bladder and sexual dysfunction (3.6%), lower extremity weakness (1.8%) and tenesmus (1.8%) with symptom duration of 39.8 ± 51.55 months. • Cysts maximum diameter > 1.5 cm, mean number of cysts 1.5 ± 0.72. • Eligibility criteria included radiological findings consistent with Tarlov cysts and neurological symptoms attributable to cysts. • Tarlov cysts were surgically treated differently for sacral cysts having (n = 34) and not having (n = 21) spinal nerve root fibers within the cyst.	monitoring was used to differentiate nerve root fibers from other tissues, electrical stimulation verified absence of motor nerve fibers, and closure was reinforced with a local muscle flap. • Cysts without nerve root fibers tended to be significantly larger than cysts with nerve root fibers (4.9 cm ± 2.60 vs 3.3 cm ± 1.61) and tended to occur as single cysts (91% vs 47%). • For cysts without nerve fibers (n = 21), the neck of the cyst was transfixed, ligated and the remaining cyst wall resected distal to the ligation. If the cysts were associated with a tethered cord, then untethering was performed during the same procedure. • For cysts with nerve fibers (n = 34), cysts were partially resected, defects oversewn to prevent CSF leakage from the subarachnoid space, nerve root sheath reconstructed, and redundant cyst wall	(17.7 ± 2.17 to 19.5 ± 1.03), without significant group differences. • Lower extremity weakness improved in both groups (7/9 cases vs 8/9 cases), pre-operative sensation dysfunctions improved in all. • Although the majority had normal pre-operative bowel/bladder function – 9/15 patients with bowel/bladder dysfunction preoperatively did not improve (4 cysts with nerves, 5 cysts without nerves). • Wound healing was classified as well healed (86%), delayed healing (7%), and 7% (4 case) required further debridement and resuturing with two of these patients requiring a second operation due to worsening pseudomeningocoele 2 months post-operatively. • Cyst resolution was complete (55%), small residual cyst (16%) and cyst disappearance but large effusion into the canal cavity (29%).

		shrunk using bipolar cautery.	
Medani et al. (16) 2019 United States	• Between 2007 and 2013 consecutive 36-patient cohort (31 women, 5 men), mean age 51 years (range 26–84 years). • Symptoms included low back pain (n = 34), sensory dysfunction (n = 25), bladder and/or bowel dysfunction (n = 22), dyspareunia (n = 4), erectile dysfunction (n = 2). • Tarlov cysts were surgically treated either by simple cyst fenestration (n = 12) or nerve root imbrication (nerve root repair) (n = 27).	• Cyst fenestration surgeries from 2007 to 2009 (n = 11, 1 redo). • Surgeries involved partial sacral laminectomy, cyst fenestration, and injection of fibrin glue into the cyst lumen. • Procedures for 2 or more cysts were performed for 6 fenestration procedures. • Overall, operative microscope was used in 8 surgeries, intraoperative electromyographic monitoring used in all 12 surgeries. • Lumbar drain placed postoperatively in 4 procedures, median hospital LOS 4 days (range 1–15 days).	• Symptomatic improvements at all follow-up points (post-operative, 3, 12, and 24 months) were rated more often in modified +MacNab poor/fair categories (n = 9) than good/excellent (n = 3) at 3 months. • Surgical related complication rate 42% (n = 5). • Adverse events included contained CSF leak or pseudomeningocele (n = 4), wound infection (n = 1). • Redo procedure for no improvement or worsening of symptoms (n = 1). • No symptomatic cyst recurrence.
		• Nerve root imbrication (nerve root repair) from 2010 to 2013 (n = 25, 2 redo). • Procedures for 2 or more cysts were performed for 12 imbrication procedures. • Imbrication surgeries involved sacral laminoplasty, nerve root imbrication using non-absorbable	• Symptomatic improvements at all follow-up points (post-operative, 3, 12, and 24 months) were rated more often in modified +MacNab poor/fair categories (n = 14) than good/excellent (n = 7) at 3 months. • Surgical related complication rate 22% (n = 6). • Adverse events included contained CSF leak or

		materials (usually Nylon 6–0) — fibrin glue was injected around reconstructed nerve root in 18 procedures. • Overall, operative microscope was used in 25 procedures, intraoperative electromyographic monitoring used in 25 procedures. • Lumbar drains placed in 15 procedures, median hospital LOS 4 days (range 1–10 days).	pseudomeningocele (n = 4), wound dehiscence (n = 1), chemical meningitis (n = 1). • Redo procedure for no improvement or worsening of symptoms (n = 2). • Symptomatic cyst recurrence requiring intervention (n = 4).

CM: centimeter; CSF: cerebrospinal fluid; CT: computed tomography; IJOA Improved Japanese Orthopaedic Association; LOS: length of stay; MRI: magnetic resonance imaging.
+MacNab criteria: excellent (no pain, no restriction of mobility, return to normal work and level of activity); good (occasional non-radicular pain, relief of presenting symptoms, able to return to modified work); fair (some improved functional capacity, still handicapped and/or unemployed); poor (continued objective of nerve root involvement, additional operative intervention needed at index level irrespective of length of postoperative follow-up).

Additional evidence on surgical procedures for symptomatic Tarlov cysts is available from several systematic reviews by authors covering different time periods. Summaries of Kameda-Smith et al. (17) and Sharma et al. (18) on open surgery are described in Table 3.

Table 3. Systematic Reviews of Open Surgical and Percutaneous Interventions for Symptomatic Tarlov Cysts (7)

Author, Number of Studies Reviewed	Presenting Demographics and Symptoms	Cyst Information	Treatment Outcomes (meta-analyzed events)	Adverse Events (meta-analyzed events)
Kameda-Smith et al. (17) 2021 Systematic Review 16 Studies, 283 Patients	• Mean age 46 ± 8.6 years; 71% women. • Mean 27.4 ± 11.5-month follow-up. • Symptoms with Tarlov cysts included lower	• Multiple or bilateral cysts occurred in 42% patients.	• Complete or partial symptom resolution 81% (95% CI, 74-88%). • Complete or substantial reduction in	• Overall surgical complication rate 16.9% (95% CI, 11.8-22.7%) ranging from 5.6 to 31.4%. • Adverse events: CSF leaks 4.8%; surgical site infections 4.3% (95% CI, 2.4-8.1%);

Open Surgical Mgmt.	back pain (45%), lower extremity pain (52%), perineal/perianal pain (24%), motor deficits (16%), sensory deficits (25%), urinary or bladder dysfunction (46%), and sexual dysfunction (6%). • Pre-operative symptom duration 40 ± 26 days.	• Mean cyst size 3.0 ± 1.0 cm.	cyst size 79% (95% CI, 42-99%). • Symptoms decreased post-operatively in motor deficits (17.8 to 5.4%); sensory deficits (47 to 14.5%); and bowel dysfunction and urinary incontinence (40 to 14.3%). • Symptom recurrence 8.3% (95% CI, 2.7-6.3%). • Cyst recurrence 8.5% (95% CI, 3.5-15.4%).	and new or worsened bladder dysfunction 2.1% (95% CI, 0.07-4.0%). • Re-operation rate 6.7% (95% CI, 2.9-12%).
Sharma et al. (18) 2019 Systematic Review 32 Studies, 333 Patients Open Surgical Management	• Mean age 45 ± 13 years (range 21-83 years); 71.4% women. • Mean 38 ± 29-month follow-up. • Symptoms with Tarlov cysts included: back pain 82.8%; sacral radiculopathy 51.4%; bowel incontinence 20.3%; and bladder incontinence 37.8%.	• Cysts occurred as solitary cysts (n=122) and multiple cysts (n=82). • Cysts were commonly located on the S1-S3 sacral levels. • Cyst size ranged from 0.8 to 10 cm.	• Symptomatic improvement 83.5%. • Symptom recurrence 21% (95% CI, 12-54%). • Cyst recurrence 8% (95% CI, 5-10%).	• Overall surgical complication rate 21%. • Adverse events: CSF-related complications (CSF leaks, fistula, pseudomeningocele) (9%); transient sciatica 17% (95% CI, 4-30%); sexual dysfunction 11% (95% CI, 0-21%); bladder and bowel complications (sphincter weakness, urinary incontinence and overflow incontinence) 12%

	• Other symptoms occurring less frequently than in percutaneous group studies: coccygodynia (25.5% vs. 65.8%); perineal pain (26.5% vs. 77.6%); lower limb weakness (11.7% vs. 36.3%); sensory disturbances (35.7% vs. 62.7%); and sexual dysfunction (4.6% vs. 31.2%).			(95% CI, 8-15%); and wound infection requiring debridement and extended hospital stay with external CSF drainage 5% (95% CI, 4-7%). • Other complications 18% (95% CI, 9-26%) included marked venous bleeding, transient intracranial hypotension, superficial seroma, incisional erythema, cerebellar intracerebral hemorrhage, prostatitis.
Sharma et al. (18) 2019 Systematic Review 6 Studies, 417 Patients Percutaneous Cyst Aspiration and Fibrin Sealant Injection	• Mean age 38 ± 10 years (range 20 – 73 years); 74% women with mean follow-up 15 ± 12 months. • Symptoms with Tarlov cysts included: back pain, 82.8%; sacral radiculopathy, 51.4%; bowel incontinence 20.3%; and bladder incontinence 37.8%. • Other symptoms occurring more frequently that in surgical group studies: coccygodynia (65.8% vs.	• Cysts occurred as solitary cysts (n=82) and multiple cysts (n=122). • Cysts were commonly located at the S2-S3 sacral levels (n=264). • Cyst size ranged from 1.6 to 3.2 cm.	• Symptomatic improvement 83.5%. • Symptom recurrence 20% (95% CI, 10-50%). • Cyst recurrence 20% (95% CI, 10-50%).	• Overall complication rate 12.5%. • Adverse events: CSF leak 3% (95% CI, 1-5%); transient sciatica 8% (95% CI, 24-39%); bowel/bladder 1% (95% CI, 1-3%). • Other complications 3% (95% CI, 5-12%) included allergic reactions to sealants.

	25.5%); perineal pain (77.6% vs. 26.5%); lower limb weakness (36.3% vs. 11.7%); sensory disturbances (62.7% vs. 35.7%); and sexual dysfunction (31.2% vs. 4.6%).			

CI: confidence interval; CM: centimeter; CSF: cerebrospinal fluid.

The authors concluded that sacral Tarlov cysts are an uncommon spinal disease with a wide range of debilitating pain, neurological disturbances, and dysfunctions. Based on the risk-benefit perspectives and extensive reported complications of open surgery, percutaneous aspiration-fibrin sealant interventions should be considered for first-line treatment for patients with symptomatic Tarlov cysts. (7)

Summary of Evidence

The majority of evidence surrounding the treatment of Tarlov cysts (perineural cysts, sacral meningeal cysts) consists of small retrospective reviews and meta-analyses of literature. Most individuals presenting with these cysts are female, and most cysts occur at the sacral level of the spine. Treatment includes cyst fenestration with injection of fibrin glue or autologous fat. Laminectomies may also be performed. While no randomized controlled trials were identified, the literature is sufficient to consider treatment of Tarlov cysts using either cyst fenestration with injection of fibrin glue or autologous fat, or the performance of a laminectomy as medically necessary for individuals presenting with pain and neurological conditions that have failed to improve with non-surgical treatment for 6 to 12 weeks, and radiological evidence that is directly attributable to a Tarlov cyst.

Coding

Procedure codes on Medical Policy documents are included **only** as a general reference tool for each policy. **They may not be all-inclusive.**

The presence or absence of procedure, service, supply, or device codes in a Medical Policy document has no relevance for determination of benefit coverage for members or reimbursement for providers. **Only the written coverage position in a Medical Policy should be used for such determinations.**

Benefit coverage determinations based on written Medical Policy coverage positions must include review of the member's benefit contract or Summary Plan Description (SPD) for defined coverage vs. non-coverage, benefit exclusions, and benefit limitations such as dollar or duration caps.

CPT Codes	62268, 63265, 63266, 63267, 63268, 63270, 63271, 63272, 63273, 63275, 63276, 63277, 63278, 63295
HCPCS Codes	None

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Centers for Medicare and Medicaid Services (CMS)

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Policy History/Revision

Date	Description of Change
11/15/2024	New medical document. Treatment of Tarlov cysts (perineural cyst, sacral perineural cyst, sacral meningeal cyst), cyst fenestration with fibrin glue injection OR a cervical, thoracic, lumbar, or sacral laminectomy may be considered medically necessary when the individual meets ALL the following criteria: Radiological evidence (computed tomography [CT], magnetic resonance imaging [MRI], computed tomography myelogram [CT-myelography]) confirms the presence of a Tarlov cyst that, by its anatomic location and size (>1.5 cm), correlates to the neurological signs and symptoms; Neurological conditions are attributable to the Tarlov cyst identified by radiologic imaging (e.g., urinary or fecal incontinence, cauda equina syndrome); Conservative, non-surgical treatment (physical therapy, non-steroidal anti-inflammatory agents [NSAIDs]) for at least 6 to 12 weeks has failed to alleviate symptoms. Other procedures/treatments of Tarlov cysts are considered experimental, investigational and/or unproven. Reconstructive procedure of the bony architecture of the spine for the treatment of Tarlov cysts are considered experimental, investigational and/or unproven.