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Ultrasound - Guided C7 Nerve Root Injection for Radicular Pain Secondary to a Tarlov Cyst in a National Carrom Player

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Abstract: ***Background*: Tarlov cysts are nerve root cysts that contain cerebrospinal fluid (CSF) and are most commonly located at S2 - S3 level. They develop between the perineurium's protective layer and the endoneurium adjacent to the dorsal root ganglion. The majority of these cysts are asymptomatic, while few are symptomatic and are typically discovered incidentally through MRI scans. Case Presentation: A 42 - year - old male, national - level professional carrom player, presented with a 3months history of progressively worsening pain radiating down his right upper limb. Upon physical examination tenderness was noted over the posterior aspect of the cervical spine, particularly at C6 - C7 level. A magnetic resonance imaging (MRI) scan of the cervical spine, revealed a Tarlov cyst located at the C7 nerve root. The patient was treated conservatively with gabapentin, which provided slight relief from pain. Subsequently, an ultrasound - guided injection was planned by administering 4 mg of dexamethasone, 2 ml of 0.5% bupivacaine perineurally around the right C7 nerve root. Finally, patient reported sustained pain relief without significant exacerbation of pain. Conclusion: Targeted nerve root injection under ultrasound guidance serves as an effective method for managing symptomatic Tarlov cysts, while MRI serves as non - invasive technique for identifying Tarlov cysts.***

Keywords: Tarlov cyst, MRI, Local anesthetics, Ultrasound - guided C7 nerve root injection

1. Introduction

Tarlov cysts, also known as perineural cysts are cerebrospinal fluid (CSF) - filled sacs located in the spinal canal, most commonly in the sacral region [1]. While often asymptomatic, they can become symptomatic depending on the size, location and effect on surrounding nerve roots [2]. Symptomatic Tarlov cysts can present with a variety of neurological symptoms, including radicular pain, sensory disturbances and motor weakness [3]. Tarlov cysts are nerve root cysts occur most frequently at the S2 - S3 level (70% of cases) [4]. However, they can occur anywhere along the spine. They are characterized by a dilation of the perineural space at the junction of the dorsal root ganglion and the posterior nerve root [5].

This case report describes a 42 - year - old national carrom player who presented with debilitating right upper limb radiating pain secondary to a Tarlov cyst at the C7 nerve root, and the successful management of the pain with an ultrasound - guided nerve root injection.

2. Case Presentation

A 42 - year - old male, a professional carrom player at the national level, presented with a 3 - month history of progressively worsening pain radiating down his right upper limb. The pain was described as sharp, shooting sensation originated in his neck and extended down to his hand, often associated with paraesthesia in the C7 dermatome (middle finger). The pain was significantly exacerbated by prolonged sitting and the repetitive arm movements involved in playing carrom. He reported that the pain had become so severe that he was unable to practice for more than 15 minutes at a time, significantly impacting his ability to train and compete. His baseline pain score on a visual analogue scale (VAS) was 6/10. His past medical history was unremarkable.

Physical examination revealed tenderness to palpation over the posterior aspect of the cervical spine, particularly at the C6 - C7 level. Spurling's test on the right - side elicited reproduction of the radiating pain. Neurological examination revealed no significant motor weakness or reflex changes in the upper extremities whereas sensory examination revealed mild hypesthesia in the C7 dermatome on the right.

MRI of the cervical spine revealed a Tarlov cyst arising from the posterior aspect of the C7 nerve root (Fig 1). The cyst appeared to be compressing the nerve root, contributing to the patient's radicular symptoms.

Initially, our patient was treated conservatively with gabapentin 300mg once daily for two months. He reported slight relief in his pain, with his VAS score decreasing to 5/10. However, his ability to play carrom remained significantly limited. Given the persistent and activity - limiting pain, an ultrasound - guided C7 nerve root injection was planned. Under sterile conditions, using ultrasound guidance to visualize the C7 nerve root and surrounding structures, 4mg of dexamethasone and 2ml of 0.5% bupivacaine were injected perineurally around the C7 nerve root on the right side. The patient reported immediate and significant relief of his right upper limb pain post - procedure. His VAS score decreased to 1/10. He was able to

perform his daily activities without significant discomfort and was able to resume his carrom practice gradually.

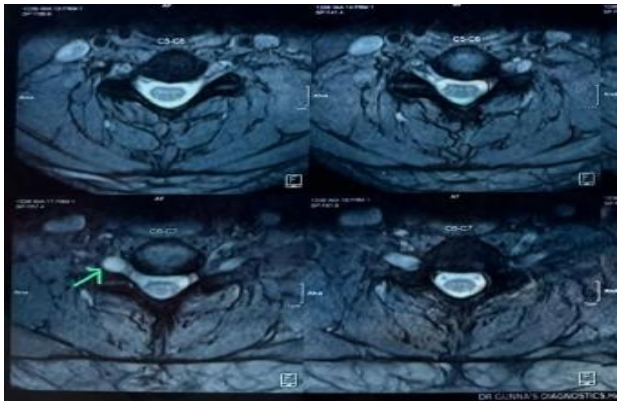

Figure 1: MRI showing Tarlov cyst arising from the posterior aspect of the C7 nerve root

During follow - up one - month post - injection, he reported sustained pain relief and was able to practice carrom for 5 - 6 hours daily without significant pain exacerbation. He successfully participated in a national - level carrom tournament without limitations.

3. Discussion

This case highlights a less common presentation of a symptomatic Tarlov cyst in the cervical region, causing significant radicular pain in a professional athlete. Tarlov postulated that these cysts occur due to the breakage of perineural venous drainage after any trauma Few types of pains like localized back pain, radicular pain radiating to the buttocks, legs or feet (in sacral cysts) or upper limbs (in cervical or thoracic cysts) can be seen in these types of cases. Pain can be exacerbated by sitting, standing, coughing or sneezing and sensory disturbances like numbness, tingling or paraesthesia in the affected dermatome [6]. Our patient had been experiencing steadily increasing discomfort that started in his neck and traveled down his right upper limb to his hand for three months and was frequently accompanied with paraesthesia in the C7 dermatome. While sacral Tarlov cysts are more prevalent, this case demonstrates that cysts in other spinal regions can also become symptomatic and impact a patient's quality of life and functional abilities. In our case the cyst appeared to be compressing the nerve root, contributing to the patient's radicular symptoms. In severe cases, compression of nerve roots can lead to muscle weakness or atrophy [7].

Magnetic resonance imaging (MRI) is the benchmark investigation and the most favored imaging technique for detecting Tarlov cysts and examining their association with adjacent structures. Its benefits encompass enhanced soft tissue resolution and improved clarity of multiplanar reconstructed images [8]. In our instance, a Tarlov cyst that originated from the posterior side of the C7 nerve root was observed during magnetic resonance imaging (MRI) of the cervical spine.

Conservative management with neuropathic pain medication provide only partial relief to patients. Pharmacological treatments recommended as the first - line treatment include antidepressants (tricyclic agents, serotonin - norepinephrine reuptake inhibitors) and anticonvulsants (gabapentin and pregabalin) [9]. In our case patient was treated conservatively with gabapentin and showed a slight relief in his pain. Langdown et al. outline an epidural steroid injection for a lumbosacral symptomatic Tarlov cyst and a conservative method of treating a cervical symptomatic Tarlov cyst with oral steroids following an initial unsuccessful course of NSAIDs [10].

Ultrasound - guided nerve root injection proved to be an effective interventional strategy, providing significant and sustained pain relief, allowing the patient to return to his demanding athletic pursuits [11]. In our case, the nerve root injection is administered under ultrasound guidance, which allows visualization of the nerve root and the surrounding structures. Ultrasound guidance offers several advantages for nerve root injections, including real - time visualization of the needle trajectory, the nerve root, and surrounding structures, potentially increasing the accuracy and safety of the procedure while reducing radiation exposure [12].

This case underscores the importance of considering Tarlov cysts in the differential diagnosis of radicular pain, even in less common locations. Ultrasound - guided C7 nerve root injection with corticosteroids and local anesthetic provided significant and sustained pain relief in a national carrom player with radicular pain secondary to a Tarlov cyst at the C7 nerve root, enabling him to return to his professional activities.

4. Conclusion

The potential utility of targeted nerve root injections as a valuable tool in the management of symptomatic Tarlov cysts. Corticosteroid and local anesthetic injection at the C7 nerve root, guided by ultrasound, offers substantial and long - lasting pain relief. MRI can be a noninvasive method to identify the Tarlov cyst. Further research is needed to evaluate the long - term efficacy of nerve root injections and other interventional techniques for the management of symptomatic Tarlov cysts in different spinal regions.

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