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Medullary Arachnoiditis Ossificans: Three Cases and Review

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ABSTRACT

Arachnoiditis ossificans is an inflammation in the leptomeninges, accompanied by calcifications in the dural sac. This condition causes pain and progressive neurological deterioration. This study presents three cases of cervico-thoracic ossifying arachnoiditis that underwent surgery at our center. Additionally, we provide a review of the scientific literature on the subject.

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Introduction

Arachnoiditis ossificans is an infrequent medical condition typified by inflammation in the leptomeninges, the innermost layers of the meninges enveloping the brain and spinal cord. This inflammation is frequently accompanied by abnormal bone or bone-like material formation within the dural sac encasing the spinal cord [1-3]. These calcifications can result in spinal cord and nerve root compression, leading to severe pain and progressive neurological decline. Our recent study involved an analysis and reporting of three cases of cervico-thoracic ossifying arachnoiditis that underwent surgical treatment at our medical facility. The surgical procedures were aimed at relieving compression and associated symptoms in these patients. Furthermore, our study encompasses a comprehensive review of the current scientific literature on this subject, offering insights into the intricate nature of this condition and its management.

Discussion

The paper discusses the cases of three patients who presented with spinal arachnoid cysts. The first patient, a 52-year-old woman, had a medical history that included a subarachnoid hemorrhage resulting from a ruptured PICA aneurysm and non-Hodgkin's lymphoma. Nine years following these incidents, she developed spastic tetraparesis. Upon undergoing an MRI, cervical arachnoid cysts were detected. Initially, the patient received treatment in the form of C5-C6 laminoplasty and arachnoidolysis, which led to temporary improvement in her condition. Afterwards, she underwent a surgical procedure known as C5-C6 laminectomy,

which involves the removal of the lamina to relieve pressure on the spinal cord. Additionally, neurolysis, a surgical procedure to remove scar tissue around a nerve, and duraplasty, a surgery to expand the space around the spinal cord, were performed. At present, she has seen some improvement in her lower limb paralysis [4-7].

The second medical case pertains to a 68-year-old male patient diagnosed with a D3 arachnoid cyst of unknown etiology. This condition manifested as weakness in the left lower limb and abnormal sensations in the right lower limb. The medical team conducted a surgical procedure involving a laminectomy of T3, T2, and partial T4, along with the excision of calcified arachnoid tissue. Subsequently, the patient experienced notable improvement following the intervention [8,9].

After experiencing worsening pain and weakness, a 61-year-old woman underwent surgical intervention for a transdural spinal hernia located between the D7 and D8 vertebrae. This condition resulted in paraparesis (partial paralysis of the lower limbs) and progressive weakness in all four limbs (flaccid tetraparesis). A Flow MRI revealed the presence of myelopathy (spinal cord disorder) and syringomyelia in the cervical region. As part of her treatment, she underwent a surgical procedure involving a T5-T9 laminectomy (removal of the vertebral bone), duro-arachnoid-medullary adhesiolysis (release of adhesions affecting the spinal cord and its coverings), and duraplasty (surgical repair of the dura mater) [10-13]. Subsequently, she has been under the ongoing care of the Pain Unit and has exhibited improvement in muscle strength, accompanied by a reversal of the cervical syringomyelia.



Figure 1: Cervico-Thoracic Medullary Arachnoiditis Ossificans in Patient 1

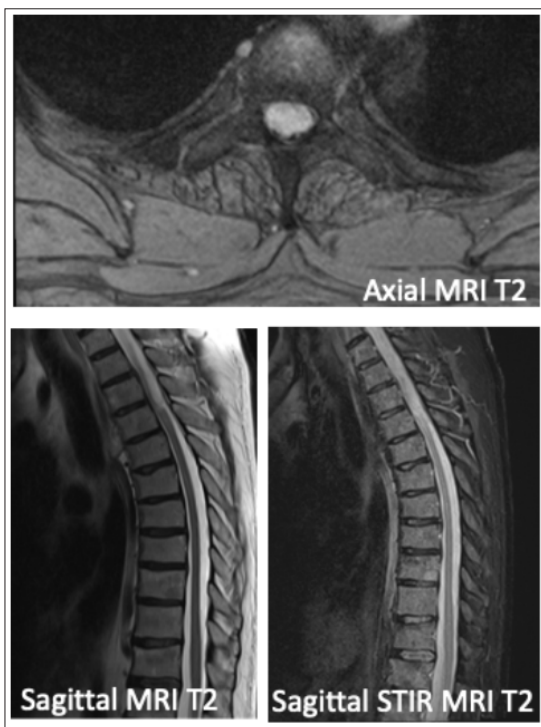


Figure 2: Thoracic Medullary Arachnoiditis Ossificans in Patient 2



Figure 3: Thoracic Medullary Arachnoiditis Ossificans in Patient 3

Results

Arachnoiditis ossificans is a rare medical condition that affects the spinal cord and can cause a range of symptoms like chronic pain, numbness, tingling, and weakness in the legs and lower back. It occurs when the arachnoid membrane, which is a thin and delicate layer that covers and protects the spinal cord, becomes inflamed and scarred. Over time, calcium deposits start to form on the scar tissue, leading to the formation of bone-like structures that can impede normal spinal cord function. The condition can be caused by various factors, including the use of intrathecal medication or anesthesia, subarachnoid hemorrhage (SAH), infection, tumors, spinal surgery, and contrast-enhanced myelography. In some cases, arachnoiditis ossificans can develop without a clear cause, which is known as idiopathic arachnoiditis ossificans. Since arachnoiditis ossificans is a rare condition, it can be challenging to diagnose. However, imaging tests like MRI, CT, and myelography can help identify the characteristic bone-like growths and rule out other potential causes of the symptoms. Treatment options are limited, and most focus on relieving the symptoms, which may include physical therapy, pain management, and surgery in severe cases. Adhesive arachnoiditis is a chronic, progressive condition that affects the spinal cord's arachnoid membrane. It is usually caused by invasive spinal procedures, infections, or trauma. In the final stages of the disease, patients experience chronic pain, severe neurological dysfunction, and loss of bladder and bowel control.

Clinical and radiological evaluation is necessary to diagnose adhesive arachnoiditis. The clinical evaluation may involve physical examination, medical history, and symptom analysis. The radiological evaluation may include magnetic resonance imaging (MRI) and computed tomography (CT) scans. Early diagnosis and treatment of adhesive arachnoiditis are crucial to prevent further damage and improve the patient's quality of life. Treatment options may include medications, physical therapy, and surgery. The goal of treatment is to manage symptoms, prevent complications, and

improve the patient's mobility and functionality.

Conclusions

Arachnoiditis ossificans is an uncommon condition characterized by the abnormal formation of bone within the arachnoid membrane of the spinal cord and brain. This rare condition can develop due to a variety of factors, including the introduction of substances into the spinal canal (such as intrathecal medication or anesthesia), subarachnoid hemorrhage (SAH), infection, tumors, spinal surgery, and contrast-enhanced myelography. However, it can also occur without a clear identifiable cause, in which case it is referred to as idiopathic arachnoiditis ossificans. [14,15] The final stage of adhesive arachnoiditis is a critical phase that requires careful clinical and radiological evaluation for diagnosis. Timely identification and treatment of this stage are crucial, as they can significantly enhance the patient's overall quality of life.

Recognizing the symptoms of arachnoiditis ossificans is crucial due to its severity, low frequency, and tendency to recur. It is essential to be vigilant for signs of progressive neurological deterioration, including pain, numbness, tingling, and weakness, as these may indicate the presence of arachnoiditis ossificans. Additionally, early diagnosis and prompt treatment are imperative to prevent further complications and minimize long-term effects. Therefore, any delays in seeking medical attention should be avoided to ensure the best possible outcomes for those affected by this condition.

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