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CASE REPORT

Resolution of isolated syringomyelia after treatment of cervical disc herniation: Association or coincidence?

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Abstract: *Background:* Syringomyelia is a fluid-filled tubular cavity within the spinal cord. The exact pathophysiology of syringomyelia remains complex and uncertain.
Material: We present a case of resolution of cervical syringomyelia after cervical disc operation in a follow-up time of 6 months.
Conclusion: Restoration of cerebrospinal fluid flow dynamics between the syrinx and the subarachnoid space via removing the main pathology such as in our reported case, may contribute in resolution of the syrinx cavity *(Fig. 3, Ref. 22)*. Full Text in PDF *www.elis.sk.*
Key words: cervical disc herniation, cerebrospinal fluid flow dynamics, syringomyelia, syrinx resolution, mechanism.

Syringomyelia is a fluid-filled tubular cavity within the spinal cord. Although it is generally associated with Chiari type I malformation, spinal tumors or spinal trauma, the pathophysiology is not completely understood (1–11). In order to prevent an irreversible neurologic disease in patients with syringomyelia, early detection, frequent monitoring and proper timing in treatment of the underlying etiology are necessary.

We report a case of a cervicothoracic syringomyelia which reduced after surgical treatment of cervical disc herniation. The origin and implications of this unusual combination are discussed in light of the recent literature to provide an evidence for a possible cause–effect relationship between syringomyelia and cervical disc herniation.

Case Report

A 46 year-old female was admitted to our hospital with the complaint of neck pain as well as a painful numbness and weakness on the left arm. The medical and family history was unremarkable. Spurling's sign on the left side, motor weakness on the left forearm (muscle power 4/5), paresthesia on the left C7 sensory distribution and hyporeflexia on the triceps were detected with neurological examination. Magnetic resonance imaging (MRI) revealed a cervical disc herniation at the C6/C7 level and syringomyelia from C6 to T2. Interestingly, Chiari I malformation which is commonly seen with syringomiyelia was not detected (Fig. 1). Anterior cervical microdiscectomy and fusion with a Polyether-etherketone (PEEK) cage were performed at the C6/C7 level. Postoperative examination performed at 3rd month after surgery revealed an improvement in neurological status. The patient had no complaints of pain, weakness and numbness. Postoperative imaging confirmed adequate position of the instrumentation (Fig. 2). Six months after the operation the patient remained asymptomatic, and MRI demonstrated that the syrinx resolved (Fig. 3).

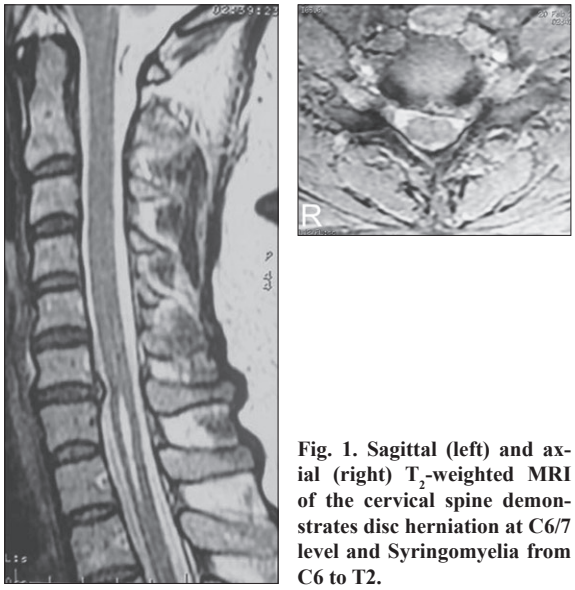

Fig. 1. Sagittal (left) and axial (right) T_2-weighted MRI of the cervical spine demonstrates disc herniation at C6/7 level and Syringomyelia from C6 to T2.

Discussion

Syringomyelia is a rare disease with an annual incidence of 8.4 cases per 100.000 people (11,12). The mean presentation age of this disease is reported to be between the third and fourth decades of life (8, 13). Two types of syringomyelia have been described:

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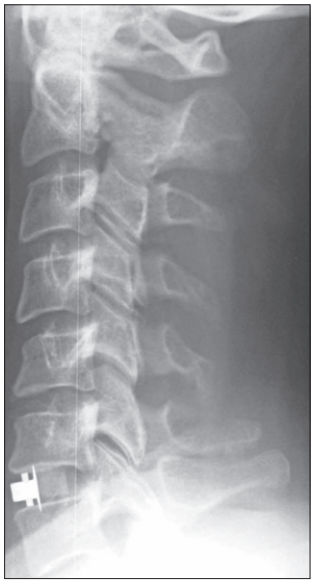

Fig. 2. Postoperative direct X-ray of the patient shows adequate position of the instrumentation.

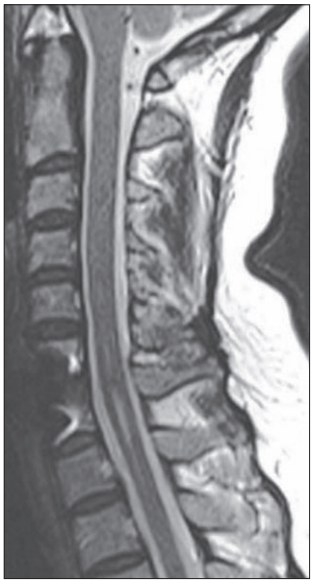

Fig. 3. Sagittal T_2-weighted MRI of the cervical spine 6 months after surgery showing cervical canal decompression and resolution of the syrinx.

Cerebrospinal fluid (CSF) filled cystic cavitation within the central canal in communication with the fourth ventricle, and syrinx formation within the cord parenchyma that may or may not extend secondarily to the central canal (7, 11, 14). Noncommunicating syrinxes, like our reported case, depends upon an obstruction of the CSF pathways that exaggerates the spinal pulse wave and forces fluid under increased pressure into the interstitial spaces of the spinal cord (15).

Syringomyelia is often in association with several pathologies including Chiari I malformation, basilar invagination, intramedullary tumour, spinal cord trauma, tethered cord, cervical spondylosis, disc prolapse, spinal arachnoid cyst, occipital encephalocele, tuberculous meningitis, arachnoiditis and cardiovascular anomalies (2–11). Furthermore there was no radiological evidence of Chiari I or any other craniocervical malformation and no history of trauma and infection in our case.

Although many mechanisms have been described to clarify the syrinx formation, the exact pathogenesis is still unknown (2, 16). A widely held theory focuses on local CSF flow which is disturbed within the subarachnoid compartment, creating a pressure gradient that drives fluid accross the perivascular space, thus increasing fluid volume within the extracellular compartment (11, 17). This phenomenon can occur in a number of different diseases involving partial restriction of cord mobility and might have developed due to craniospinal pressure dissociation caused by intermittent spinal cord compression (6).

Spontaneous resolutions of syringomyelia have been reported in the literature. However, most of the reported cases of spontaneous resolution of syringomyelia are in association with Chiari malformation and are seen in the pediatric population (18, 19). Enlargement of the posterior fossa with differential growth between the bone structures and the central nervous system leads to Chiari I malformation improvement and resolution of syringomyelia in childhood. In adults, rupture of the syringomyelic cavitiy, rupture of the arachnoid membranes obstructing the CSF flow or cerebellar atrophy can be the cause of resolution of syringomyelia (19). On the other hand, some reports of resolution of syringomyelia with idiopathic origin have also been reported (20, 21, 22). But the exact mechanism remain controversial. We hyphotezise that craniospinal pressure dissociation as a result of cervical disc herniation, is the cause of syringomyelia in this case. The herniated disc acts as "hammer" on the spinal cord and as a result of extramedullary compression causes change of the CSF pressure leading to transcordal CSF infiltration followed by cavitation. The resolution of the cavity after surgical treatment of cervical disc is the proof of this mechanism.

Conclusion

The pathophysiology of syringomyelia remains complex and uncertain. It should be kept in mind that careful neurological examination and radiographic imaging is still the most appropriate way of avoiding more diffucult treatment methods. This case is a good evidence for restoration of CSF flow dynamics between the syrinx and the subarachnoid space. Removing the main pathology is the exact and simple treatment of "complex nature diseases" such as in syringomyelia.

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