

Case Report

Syringomyelia Associated with a Spinal Arachnoid Cyst

Min-Su Kim, M.D., Seong-Ho Kim, M.D., Ph.D.

Department of Neurosurgery, College of Medicine, Yeungnam University, Daegu, Korea

While syringomyelia is not a rare spinal disorder, syringomyelia associated with a spinal arachnoid cyst is very unusual. Here, we report a 62-year-old man who suffered from gait disturbance and numbness of bilateral lower extremities. Spinal magnetic resonance imaging (MRI) showed the presence of a spinal arachnoid cyst between the 7th cervical and 3rd thoracic vertebral segment and syringomyelia extending between the 6th cervical and 1st thoracic vertebral segment. The cyst had compressed the spinal cord anteriorly. Syringomyelia usually results from lesions that partially obstruct cerebrospinal fluid flow. Therefore, we concluded that the spinal arachnoid cyst was causing the syringomyelia. After simple excision of the arachnoid cyst, the symptoms were relieved. A follow-up MRI demonstrated that the syringomyelia had significantly decreased in size after removal of the arachnoid cyst. This report presents an unusual case of gait disturbance caused by syringomyelia associated with a spinal arachnoid cyst.

KEY WORDS : Syringomyelia · Arachnoid cyst · Spinal cord neoplasm.

INTRODUCTION

Syringomyelia is not a very rare spinal disorder and it is characterized by the presence of abnormal fluid-filled cavities within the spinal cord. Spinal arachnoid cysts are relatively uncommon lesions that can be found in the intra- or extradural compartments of the spinal canal. Spinal arachnoid cysts may cause alterations in cerebrospinal fluid (CSF) flow within the spinal subarachnoid space, leading to the formation of syrinx cavities. The actual incidence of syringomyelia in patients with an arachnoid cyst is unknown, but is known to be very rare, being only eight reports of surgical treatment of an arachnoid cyst associated with syringomyelia^{2,4,7,8,10,11,18,19}. Most spinal arachnoid cysts are asymptomatic, but they can be symptomatic causing back pain, chest discomfort, numbness of the lower extremities, gait disturbance, and urinary incontinence by compressing the spinal cord or nerve root. This report describes the clinical presentation, diagnostic study, and surgical treatment of syringomyelia coexisting with a spinal arachnoid cyst.

CASE REPORT

The patient was a 62-year-old man who presented with the chief complaint of gait disturbance. He had noticed a numbness of the bilateral lower extremities, and had developed a weakness of the bilateral lower extremities over several years. On clinical examination, he had increased knee and ankle reflexes with ankle clonus, and a positive Babinski sign bilaterally. Sensory examination revealed hypoesthesia to pain, temperature, and light touch below the 7th thoracic dermatome. Proprioception was intact and no sphincter disturbance was reported.

Spinal magnetic resonance imaging (MRI) in the sagittal section revealed an intradural-extramedullary cyst between

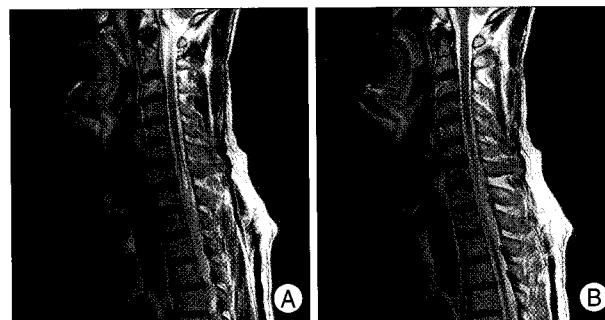


Fig. 1. Preoperative sagittal T2-weighted magnetic resonance image revealing a C6-T1 syrinx cavity (A) and adjacent C7-T3 posterior arachnoid cyst (B).

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- Address for reprints : Seong-Ho Kim, M.D., Ph.D.
Department of Neurosurgery, College of Medicine, Yeungnam University, 317-1 Daemyeong-dong, Nam-gu, Daegu 705-717, Korea
Tel : +82-53-620-3790, Fax : +82-53-620-3770
E-mail : shkim@med.yu.ac.kr



Fig. 2. Intraoperative finding after midline dural incision showing white-yellowish thickened arachnoid cystic membrane.



Fig. 3. Postoperative sagittal T2-weighted magnetic resonance image revealing successful resection of the cyst and a marked decrease of the syrinx cavity in size.

the 7th cervical and 3rd thoracic vertebral segment on the posterior aspect of the cord (Fig. 1). We suspected that the mass was a spinal arachnoid cyst and a syringomyelic cavity was identified rostral to the cyst, extending between the 6th cervical and 1st thoracic vertebral segment. There was no evidence of hydrocephalus, Chiari malformation, tethered cord, or syrinx cavity enhancement.

We performed a C7-T3 laminectomy and incised the dura mater at the midline. We identified the white-yellowish thickened arachnoid cystic membrane (Fig. 2). We performed a careful dissection and nearly total removal of the cystic membrane, and then primarily closed the dura mater. We did not apply a shunt tube for the syringomyelia, as we thought that the decompression procedure was sufficient to reestablish normal CSF flow. Pathological inspection of the cyst wall showed normal arachnoid tissue.

After the operation, the patient noted improvement in his ability to ambulate and in his neurological deficit. Three months after the operation, MRI demonstrated that the spinal cord had returned to its original position, the center,

the arachnoid cyst had disappeared, and the syringomyelia was significantly decreased in size (Fig. 3). Twelve months after the operation, the patient still has no clinical evidence of disease progression.

DISCUSSION

Syringomyelia is a cystic cavitation of the spinal cord that contains fluid that is identical or similar to cerebrospinal and extracellular fluid. The cavity may be formed by a dilatation of the central canal or can lie within the parenchymal substance. A syrinx may expand slowly with the passage of time. Syringomyelia is a complex disorder associated with a heterogeneous group of etiological entities including Chiari malformation, spinal trauma, and infection. Based on pathological and MRI findings, Milhorat et al.^{12,13} classified syrinxes as communicating central canal syrinxes, noncommunicating central canal syrinxes, noncommunicating extracanalicular syrinxes, atrophic cavitations, and neoplastic cavities. The syrinx of the case reported here is thought to be a noncommunicating central canal syrinx, which is generally associated with Chiari I malformations, cervical spinal stenosis, spinal arachnoiditis, and basilar impression¹³.

A number of different theories have been proposed to explain the origin of spinal arachnoid cysts, and the exact pathological mechanism of these lesions remains unclear. The true pathogenesis is likely to be multifactorial, although some of the better-established theories suggest a congenital cause. Perret et al.¹⁶ have postulated that the cysts are caused by a dilatation of the septum posticum, a thin membranous arachnoid partition that longitudinally divides the posterior subarachnoid space in the midline. This theory satisfactorily explains the frequent occurrence of posterior arachnoid cysts, but cannot account for arachnoid cysts that are found anterior to the spinal cord. Other authors have theorized that congenital dural defects allow the arachnoid to herniate through the dura via hydrostatic forces leading to extradural cyst formation¹. Spinal arachnoid cysts are most frequently found in the thoracic region, and intradural cysts are more common than extradural cysts. In this case, the spinal arachnoid cyst was located at the C7-T3 level and developed with syringomyelia at the C6-T1 level. In an analysis of 1,243 cases of syringomyelia in the Japanese population, the presenting symptoms were numbness (42% of cases), motor disturbances (40%), and pain (23%)¹⁴. Our patient experienced numbness below the C7 dermatome, gait disturbance, and both lower extremity sciatica for several years. There was no history of cervical trauma. Reported treatments for arachnoid cyst have incl-

uded complete or partial removal of the cyst^{5,6,15,17}, fenestration into the normal subarachnoid space^{5,20} and shunting of the cyst to the peritoneum³ or the atrium⁹). However, in an uncommon pathologic condition in which the arachnoid cyst and syringomyelia coexist, there seems to be no general agreement among neurosurgeons or spinal surgeons regarding the method of surgical treatment. The goal of surgery should be directed toward removal of the cyst wall and restoration of normal CSF flow. Takeuchi et al.¹⁸ reported that spinal arachnoid cyst associated with syringomyelia can be treated by simple excision of the cyst without shunting the syrinx if the decompression effect resulting from removal of the cyst is sufficient. Holly et al.⁸ reported that the placement of a syrinx cavity or arachnoid cyst shunt does not appear to have a role in the primary treatment of this entity. We thought that excising the cyst would provide sufficient decompression of the spinal cord, and we expected that the syrinx would disappear because of reestablishment of spinal subarachnoid CSF flow. We therefore excised the arachnoid cyst to treat the syringomyelia. After the operation, an improvement in the patient's neurological deficits was clearly evident. Three-month postoperative imaging showed successful resection of the cyst and a marked decrease in the size of the syrinx cavity.

CONCLUSION

We report a rare case of symptomatic syringomyelia associated with a spinal arachnoid cyst. The pathology of an arachnoid cyst coexisting with syringomyelia is unknown, but we assume that the arachnoid cyst was causing the syringomyelia in this case. In cases of syringomyelia associated with a spinal arachnoid cyst, a simple excision of the cyst is a good primary treatment option for improving the neurological symptoms and reducing the size of the syrinx cavity.

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