Asymptomatic Syringomyelia Associated with Cerebellopontine Angle Meningioma

—Case Report—

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Abstract

A 66-year-old female with a 3-year history of left trigeminal neuralgia presented with an unusual left cerebellopontine angle meningioma associated with asymptomatic syringomyelia at the C2 to C4 levels diagnosed by magnetic resonance (MR) imaging. Two months after total tumor removal, the syringomyelia had diminished without shunting. MR images are useful as a basis for early diagnosis of syringomyelia.

Key words: syringomyelia, brain tumor, meningioma

Introduction

Syringomyelia occasionally develops secondary to posterior fossa tumor,^{4,6-10,12)} including meningioma. We report an unusual case of asymptomatic syringomyelia associated with cerebellopontine angle meningioma.

Case Report

A 66-year-old female developed left mandibular pain in 1989. She went to a local dentist but from July, 1992, left hearing disturbance and aggravation of left mandibular pain occurred. She was referred to our hospital.

Neurological examination showed left trigeminal neuralgia in the third division area, sluggish left corneal reflex, left hearing disorder, and slight lower cranial nerve weakness. The sensory and motor functions of the extremities were normal with no cerebellar signs. Computed tomographic (CT) scans demonstrated a large mass at the left cerebellopontine angle with slight hydrocephalus. Magnetic resonance (MR) images showed hydrocephalus and a tumor in the same area, which compressed the brainstem. The tumor was isointense with a low-

intensity rim on the T₁-weighted image and hyperintense on the T₂-weighted image. The tumor was enhanced after intravenous administration of gadolinium-diethylenetriaminepenta-acetic acid (Gd-DTPA) on the T₁-weighted images (Fig. 1). A sagittal T₁-weighted image showed tonsillar herniation and syringomyelia from C2 to C4 of the cervical spine (Fig. 2). Cerebral angiograms indicated inferior displacement of the left posterior inferior cerebellar artery but no tumor staining.

The tumor was completely removed *via* the left lateral suboccipital approach. The tumor had compressed the facial and the acoustic nerves medially but these nerves were anatomically preserved by the arachnoid membrane between the tumor and nerves. Histological examination of the tumor specimen showed meningotheiomatous meningioma.

After the operation, transient left facial paresis developed but the trigeminal neuralgia had improved. She was discharged with no neurological abnormality but the MR images showed persisting syringomyelia. Two months later, MR images showed that the syrinx size had reduced with resolving tonsillar herniation (Fig. 3). The hydrocephalus had also disappeared on axial MR images.

Received February 16, 1993; Accepted April 7, 1993

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Fig. 1 MR images, showing a tumor at the left cerebellopontine angle. The tumor is isointense with a low-intensity rim on the T₁-weighted image (*upper left*) and hyperintense on the T₂-weighted image (*upper right*). The tumor was enhanced after intravenous administration of Gd-DTPA (*lower*). Coronal scan (*lower right*), showing upper part of syringomyelia and hydrocephalus (*arrow*).

Discussion

Posterior fossa tumors associated with syringomyelia include brainstem glioma,¹²⁾ meningioma,^{6,8,10)} cerebellar astrocytoma,⁹⁾ cerebellar hemangioblastoma,⁴⁾ and fourth ventricular epidermoid tumor.⁷⁾ Only one case of asymptomatic syringomyelia associated with meningioma, as diagnosed by MR imaging, has been reported.¹⁰⁾

There are several theories to explain the pathophysiology of syringomyelia. Gardner⁵⁾ suggested that a congenital imperforate of Magendie's foramen disturbs the cerebrospinal fluid flow out of the cisterna magna and an intracranial arterial pulse produces a water-hammer effect on the central canal, leading to enlargement of the syrinx. Williams and Timperley¹²⁾ stressed the importance of craniospinal pressure dissociation, with the venous pressure change occurring soon after coughing evacuating the central canal with syrinx extension. The check valve effect associated with foramen magnum obstructive

Fig. 2 Preoperative sagittal T₁-weighted MR image, showing syringomyelia of the cervical spine from C2 to C4 and tonsillar herniation.

Fig. 3 Postoperative sagittal T₁-weighted MR image, showing resolving syringomyelia and tonsillar herniation.

lesions may enhance syringomyelia,¹¹⁾ a theory accepted by many clinicians. Ball and Dayan²⁾ found that cerebrospinal fluid leaking into the spinal cord along Virchow-Robin spaces may cause syringomyelia. Aubin *et al.*¹⁾ observed the transneural passage of cerebrospinal fluid into the spinal cord by comparison of the CT density of the subarachnoid space, spinal cord, and syringomyelic cavity. Barnett *et al.*³⁾ classed syringomyelia into communicating and non-communicating types. Communicating syringomyelia is consistent with Gardner's hydrodynamic theory, with communication between the syrinx and fourth ventricle. Non-communicating syringomyelia is secondary to intramedullary tumors or spinal injury, with no communication between the syrinx and fourth ventricle.

Various pathogeneses for syringomyelia with posterior fossa tumor have been identified. De Reuck *et al.*⁴⁾ reported syringomyelia with cerebellar hemangioblastoma and concluded that faulty closure of the dorsal raphe with glial inclusion caused the

syrinx. Williams and Timperley¹²⁾ reported three cases of syringomyelia with brainstem glioma and emphasized the importance of craniospinal pressure dissociation and evacuation of the central canal. All reported cases demonstrated obstruction of the foramen magnum associated with tonsillar herniation or tumor extension.^{4,6-10,12)} In most patients, the clinical or radiological manifestations of syringomyelia improved following tumor removal.^{6-10,12)} Blockage of the foramen magnum decreased cerebrospinal fluid out flow from the ventricle into the subarachnoid space resulting in syrinx extension. Our patient demonstrated improved syringomyelia after treatment of the lesion obstructing the foramen magnum (tonsillar herniation) after total tumor removal. Our case was thus concluded to be communicating syringomyelia.³⁾

We routinely perform midline sagittal scanning in all brain MR imaging, which identified the syrinx incidentally in this case. The syringomyelia was asymptomatic, since no symptoms were identified 1 month after the operation. The syringomyelia resolved 2 months after the operation.

Asymptomatic syringomyelia associated with various intracranial disease can be diagnosed by neurological imaging. An early diagnosis is essential for a good prognosis.

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