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Clinical Study

# Clinical course of incidental syringomyelia without predisposing pathologies

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ABSTRACT

Although the widespread use of MRI has facilitated the diagnosis of subclinical syringomyelia, little information has been established regarding its natural course. To elucidate the clinical course and treatment strategy of incidental syringomyelia without predisposing pathologies, we retrospectively reviewed the clinical course of 12 adult patients with incidental syringomyelia. No patients had any predisposing pathology, including Chiari malformation or spinal cord tumor. Using the medical records and MRI, we analyzed the neurological and radiological features of each patient. After a mean of 39.9 months follow-up, no patient developed neurological deterioration. Although one patient had radiological progression without neurological deterioration, 11 patients (91.7%) had no change on MRI. Additionally, all patients experienced a favorable clinical course without surgery. These results indicate that, for patients with incidental syringomyelia without predisposing pathology, close observation rather than surgery can be recommended.

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## 1. Introduction

The diagnosis and follow-up of syringomyelia has been revolutionized by the advent of MRI.[1–4] There has been an apparent increase in the incidence of syringomyelia because previously undiagnosed, small subclinical lesions are now being detected with MRI.[2] The management of these incidental lesions requires a consideration of the natural course of the lesion.[5]

In general, the treatment for syringomyelia associated with Chiari malformation consists of either drainage of the syringomyelia or the correction of the bony abnormality.[1,3,6,7] Similar treatments are also used for syringomyelias associated with other predisposing pathologies.[8,9]

However, in incidental syringomyelia, little consensus has been reached regarding the use of surgery or observation as a treatment strategy. The exact pathogenesis and development of syringomyelia are uncertain, and the natural course of syringomyelia is variable.[2,6,10,11] Moreover, as a result of the small number of studies on incidental syringomyelia, little is known about syringomyelia with no predisposing pathology, such as Chiari malformation or spinal cord tumor.

We present 12 patients with incidental syringomyelia with no predisposing pathology. The purpose of this study was to elucidate the clinical course and treatment strategy of this condition.

## 2. Materials and methods

We retrospectively reviewed the medical records and MRI of 12 patients with incidental syringomyelia. No patient had an associated predisposing pathology, including Chiari malformation or spinal cord tumor. The male-to-female ratio was 5:7, and the mean age at diagnosis was 38.4 years (range: 20–64 years). We excluded pediatric patients (aged ⩽15 years at diagnosis) and patients who had never attended the Department of Neurosurgery. We also excluded patients with definite symptoms or neurological abnormalities related to syringomyelia or whose follow-up duration was shorter than 12 months.

These 12 patients were selected from all patients who underwent MRI between January 2000 and September 2010 at the Seoul National University Hospital. We accessed the imaging using a computerized MRI database. We identified a total of 406 adult patients whose MRI reports contained one of the following words: syringomyelia, syrinx, syringohydromyelia, hydromyelia, hydrosyringomyelia, or hydrosyrinx. Using the MRI studies and medical records, we classified patients according to their predisposing pathologies. The results were: 110 patients with spinal cord tumor, 66 patients with spinal stenosis (including degenerative disc disease), 65 patients with Chiari malformation, 31 patients with central nervous system (CNS) infection, 55 patients with trauma, 31 patients with tethered cord syndrome or spina bifida, 22 patients with spinal deformity (including scoliosis), seven patients with demyelinating disease (such as multiple sclerosis), and 19 patients with idiopathic syringomyelia. From the idiopathic syringomyelia

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**Table 1**
Incidentally identified syringomyelia associated with no predisposing pathologies in 12 patients

| Patient No. | Sex/age (years)[a] | Neurological follow-up | | | MRI follow-up | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Initial symptom[b] | Outcomes | Follow-up (months) | Initial location | Initial extent (vertebral length) | Initial width[c] (%) | Size changes | Follow-up (months) | MRI check (No. times) |
| 1 | M/53 | Ankle pain | Stable | 34 | T1–3 | 2.6 | 47 | New lesion developed | 32 | 2 |
| 2 | M/36 | Shoulder pain | Improved | 94 | T3–4 | 1.4 | 60 | No change | 94 | 3 |
| 3 | M/20 | Shoulder pain | Stable | 40 | T2–3/ T5–6 | 1.8/1.3 | 48/58 | No change | 38 | 4 |
| 4 | M/27 | Neck pain after trauma | Stable | 36 | C6–7 | 1.4 | 47 | No change | 12 | 2 |
| 5 | F/37 | Back pain after TA | Stable | 44 | T4–6 | 1.9 | 50 | No change | 32 | 5 |
| 6 | F/27 | Headache | Stable | 38 | C2–6 | 4.7 | 23 | No change | 22 | 3 |
| 7 | F/45 | Left calf atrophy | Improved | 32 | C6 | 0.8 | 31 | No change | 16 | 3 |
| 8 | F/51 | Arm pain after TA | Improved | 46 | C7 | 1.1 | 33 | No change | 46 | 3 |
| 9 | F/31 | Neck pain after TA | Stable | 14 | T2–3 | 1.4 | 65 | No change | 14 | 3 |
| 10 | F/38 | Neck pain after TA | Improved | 13 | C6–7 | 1.7 | 41 | No change | 12 | 2 |
| 11 | F/64 | Neck pain after TA | Improved | 74 | C5–6 | 1.4 | 66 | No change | 73 | 4 |
| 12 | M/32 | Neck pain after TA | Stable | 14 | C6–7 | 1.1 | 47 | No change | 13 | 3 |

C = cervical, F = female, M = male, T = thoracic, TA = traffic accident.
[a] Age at the time of diagnosis;
[b] Symptom at the time of diagnosis.
[c] maximum transverse diameter relative to the size of the cord.

group, we excluded patients with a history of: intracranial disease, including hydrocephalus (two patients); intracranial hemorrhage (two patients); cerebellar arachnoid cyst (one patient); and meningioma (one patient). One additional patient was excluded because of neck pain that was related to syringomyelia. Thus, we identified 12 patients with incidental syringomyelia who had no predisposing pathology.

The clinical course of the 12 patients was analyzed by an assessment of both neurological and MRI findings. The neurological information, including symptoms, neurological status, and clinical outcomes, was obtained from the medical record. The neurological follow-up period from the time of diagnosis was 39.9 months (range: 13–94 months).

In addition, we obtained MRI information regarding the location, extent, and width of the syringomyelia. The extent and width of syringomyelia was measured using the sagittal and axial views of the MRI. The extent of syringomyelia was measured by longitudinal length, according to the number of adjacent vertebra. In some patients, in whom the entire length of syringomyelia could not be visualized in a single image, we viewed several consecutive sagittal and axial images. Changes in both the extent and width of syringomyelia were assessed. MRI evaluation was performed a mean number of 1.1 times per patient annually. The average radiological follow-up period was 33.6 months (range: 12–94 months).

We reviewed a total 37 MRIs from 12 patients. We de-identified the personal information of all patients and reviewed their MRI anonymously in random order.

## 3. Results

### 3.1. Neurological changes

Seven patients were asymptomatic, and five patients were diagnosed on investigation of unrelated symptoms. The seven asymptomatic patients were detected incidentally on MRI after a recent minor traffic accident or trauma. The most common initial presentation was neck pain, which was experienced by five of the seven patients. The other two patients experienced back or arm pain. Pain began almost immediately after the trauma or accident and improved over time.

In the remaining five patients, two patients presented initially with shoulder pain, and two patients experienced unrelated symptoms, such as headache or ankle pain. One patient had subjective left calf weakness, which improved over time (Table 1). During follow-up, no patient had aggravation of their symptoms or new neurological abnormalities as a result of syringomyelia. The symptoms improved in five of the 12 patients (41.7%) and persisted in seven patients (58.3%). No patient underwent surgery during the follow-up period.

### 3.2. MRI changes

On the initial MRI study, syringomyelia was located in the cervical region in seven patients, and thoracic in five patients. In one patient (Patient 3), the syringomyelia was located in two segments (T2–3 and T5–6). The mean extent of syringomyelia in 12 patients was 1.9 vertebral segments and ranged from 0.8 to 4.7 vertebrae (Table 1).

After a mean radiological follow-up period of 33.6 months, 11 patients (91.7%) had no significant change in the extent or width of the syringomyelia. In one patient who originally had syringomyelia in the thoracic region (Patient 1), a new lesion developed in the cervical region (C3–4) without aggravation of symptoms or neurological deterioration (Fig. 1). It was unclear whether there was a connection between the two syrinxes.

## 4. Discussion

### 4.1. Patient characteristics

All patients in this study can be classified as having "idiopathic" as well as "incidental" syringomyelia. The term "idiopathic syringomyelia" is commonly defined as a syringomyelia that is not associated with any underlying pathologies, such as Chiari

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