

## Key Points

1. Syringomyelia develops in up to 25% of people after spinal cord injury
2. SM can form months to years after injury
3. Study reviewed 58 symptomatic post-traumatic syringomyelia patients to identify predictors of PTS
4. PTS was more likely to develop in people with complete spinal cord injuries than incomplete
5. Older age, cervical or thoracic injury, displaced fracture, and surgical treatment all predicted an earlier onset of PTS

## Definitions

**cerebrospinal fluid (CSF)** - clear liquid in the brain and spinal cord, acts as a shock absorber

**cervical** - relating to the upper portion of the spinal cord, the neck area

**complete spinal cord injury** - type of spinal injury where there is no feeling or motor control below the level of injury

**displaced fracture** - type of fracture where the two parts of broken bone are separated, or displaced, from each other

**fracture** - break in a bone

**incomplete spinal cord injury** - type of spinal injury where there is some feeling or motor control below the level of the injury

**laminectomy** - surgical removal of part (the bony arch) of one or more vertebrae

**lumbar** - relating to the lower part of the spinal cord, or the lower back

**MRI** - Magnetic Resonance Imaging; diagnostic device which uses a strong magnetic field to create images of the body's internal parts

**ORIF** - open reduction and internal

## Predicting Post-Traumatic Syringomyelia

Adding insult to injury, literally, post-traumatic syringomyelia (PTS) will develop in upwards of 25% of people with spinal cord injuries (SCI). The development of a syrinx, months to years after the initial injury, often brings with it even more pain and disability and can be very difficult to treat. While surgery for Chiari related syringomyelia is successful about 80% of the time, treatment for PTS is the opposite, with 80% of patients showing no improvement or only stabilization over the long term.

Because of the situation, doctors have been eager to try to identify which spinal cord patients are likely to develop PTS. Patients identified as high risk can then be monitored and treated early to try to head off a downward spiral. But because the exact mechanisms of syrinx formation after trauma are not well understood, this has been a difficult task.

Instead of looking at the mechanisms of development, surgeons at the University of Toronto have taken a top-down approach in trying to identify predictors of PTS. Dr. Vannemreddy and his colleagues reviewed the medical, surgical, and radiological records of 58 symptomatic PTS patients they treated between 1967-1997 in order to determine if age, gender, cause of injury, type of injury (complete/incomplete), level of injury, type of fracture (displaced/not displaced), and treatment method influenced either the development of PTS or the time between injury and the onset of PTS. They reported their results in the March, 2003 issue of the British Journal of Neurosurgery.

The patients included 46 males and 12 females and represented about 2.5% of the total spinal cord injury patients treated during the 30 year span. The causes of injury were varied (see Fig. 1) with motor vehicle accident being the most common. The type and location of spinal cord injuries were also varied (see Fig. 2), with cervical and thoracic injuries being more common than lumbar injuries. Thirty-five of the patients were younger than 30 at the time of injury and ten were older than 51. The average time between SCI and the development of PTS for the entire group was 11 years.

The researchers found that a strong predictor for developing post-traumatic syringomyelia was a complete spinal cord injury (no feeling or control below the injury) versus an incomplete injury. In looking at a 10 year subset, they found that 8.3% of complete spinal cord injury patients developed PTS versus only 2.7% of incomplete injury patients. In addition, those PTS patients with complete injuries developed syrinxes an average of 9.5 years after injury, while those with incomplete injuries took an average of 14 years to develop a syrinx.

The researchers also found a number of variables which were statistically related to an earlier onset of PTS after injury. Older age at time of injury, higher level of injury (cervical/thoracic), displaced fracture, and surgical intervention with instrumentation - rods, plates, etc. - all predicted an earlier onset of PTS.

While explaining these results can be difficult, the surgeons speculate that PTS may develop earlier in older people due to a natural narrowing of the spinal cord or a change in the body's response to spinal trauma with age. They also speculate that displaced fractures - where the bones are separated from each other - may interfere with normal CSF flow, a known contributor to syrinx formation.

Perhaps the most surprising result was that the type of treatment the patients received for their injuries appeared to influence how quickly PTS would develop. Of the 58 patients, 24 patients underwent ORIF surgery, 6 underwent a simple laminectomy, and 28 were treated non-surgically. The average time to onset of PTS in the ORIF group was 5.9 years, compared with 13.5 years for the laminectomy group and 14.8 years for the non-surgery group. The surgeons speculate that the ORIF procedure - which involves instruments such as screws and rods - may produce inflammation in the area of injury and lead to PTS.

Unfortunately, effective treatment options and a true understanding of PTS remain elusive. However, by identifying those most likely to develop PTS, not only can those patients be monitored and treated more effectively, but perhaps, a little bit of light can be shed on this otherwise cloudy subject.

**Figure 1**  
**Cause of Spinal Cord Injury**

Cause of Injury	# of Patients
Motor Vehicle Accident	29
Falls	12
Diving	6
Gun Shots	3
Sports	2

fixation; surgical technique to correct spinal injuries where instruments, such as rods, screws, and plates, are used

**post-traumatic syringomyelia -**

syringomyelia which develops after a spinal cord injury

**syringomyelia** - neurological condition where a fluid filled cyst forms in the spinal cord

**thoracic** - relating to the middle part of the spinal cord, the chest area

**Source**

Vanemreddy et.al; [Posttraumatic syringomyelia predisposing factors](#). British Journal of Neurosurgery; March, 2002; 16(3) 276-283.

Industrial Accident	2
Other	4

**Figure 2**  
Type and Location of Spinal Cord Injuries

Type	Location	Number
Complete (40)	Cervical	22
	Thoracic	15
	Lumbar	3
Incomplete (18)	Cervical	6
	Thoracic	8
	Lumbar	4