



Craig Hospital

Redefining Possible for People with Spinal Cord and Brain Injuries

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Tethered Spinal Cord & Syringomyelia

What is Tethered Spinal Cord & Syringomyelia?

After a spinal cord injury, scarring can occur along the cord. The scar tissue abnormally attaches to or “tethers” the cord to the surrounding tissue. This restricts the normal movement of the spinal cord and the free flow of cerebrospinal fluid (CSF) around it. As a result, abnormal stretching of the spinal cord and breakdown of nerve cells can occur over time.

Due to changes in CSF fluid circulation, different pressures can cause leaks of fluid, softening of the cord, and possibly the formation of a cyst or syrinx (syringomyelia).

All people with spinal cord injury have some degree of tethered cord. According to neurosurgeon Scott Falci, MD, approximately 10% to 15% of people with SCI develop symptoms related to tethering that are significant enough to require surgery.

What are the symptoms?

A patient with spinal cord injury may experience symptoms anywhere from one month to 45-years post SCI. Because injury is occurring to the spinal cord, symptoms will depend on the level of the tethering or syrinx. Symptoms may come on over a long period of time and may seem to come and go at whim.

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Symptoms may include:

- Pain (burning or aching) that is exacerbated by activities that increase pressure in the body (coughing, sneezing, lifting, transferring, forward leaning weight shifts)
- Decreased function or weakness, usually progressive
- Sensory loss (changes in ability to feel pain, temperature)
- Disruptions to sweating
- Disruptions to bowel or bladder management
- Sexual dysfunction
- Scoliosis
- Horner's syndrome (variable sweating on one side of body, pupil sizes do not match)
- Change in muscle spasms (increase or decrease)
- Impaired respiratory function or sleep apnea
- Impaired cardiovascular function or orthostatic hypotension (ASAP, 2008; Board of Trustees, 1994; C & S, 2007; Little, 2003; NINDS, 2010)

How is it diagnosed?

MRI of the spinal cord is the preferred method of diagnosis. The MRI differentiates between CSF and normal spinal cord tissue and areas of spinal cord swelling, softening, and scar tissue.

In patients who have spinal hardware that prevents MRI imaging, a CT scan can be helpful in delineating the extent of syrinx, scarring, tethering, and obstruction of CSF flow.

How is it treated?

Non-surgical interventions include close monitoring of neurological changes and functioning. The progression of tethered cord and syringomyelia may take several years or it may plateau without further injury. Careful monitoring is key to catching the progression early to prevent permanent loss of function. Once sensory or motor loss is detected, surgical intervention is recommended to prevent permanent damage.

Activity limitations may be placed to reduce the internal pressure around the spinal cord. Precautions may be taken to decrease CSF production including medications to lower pressure in the veins and to decrease fluid accumulation. Other precautions include sleeping with the head of bed at 20 degrees to decrease fluid in the syrinx, if present.

Surgery is the most common treatment for syringomyelia and tethered cord and is usually done only when losses are seen in motor function or in sensation or when pain increases.

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Is surgery helpful?

- After surgery, over 90% of patients stop the progression of functional loss caused by the tethered cord.
- Over 50% of patients show improvement in function post surgery.
- Some patients show more motor (17%) and sensory function (18%) than they had even after their initial SCI.
- 60% of patients show improvement in spasticity.
- 77% of patients show improvement in uncontrollable sweating.
- 50% of patients show improvement in a relief of neurogenic pain.
- 2% of patients experience re-scarring within two years; 10% within 10 years
- 14% of patients require an additional surgery because of re-tethering, shunt malfunction, or pseudomeningocele formation. (Falci, Indeck, & Lammertse, 2009)

What are the risks with surgery?

With all surgery there are risks to be considered. Your doctor will let you know about all risks; here are a few:

- Meningitis – Infection of the tissue surrounding the spinal cord and brain
- Wound infection
- Cerebral Spinal Fluid (CSF) leak
- Congestion in lungs – Atelectasis / Pneumonia
 - Can increase pulmonary hypertension which leads to increased risk for CSF leak
- Blood Clots - Pulmonary embolism or deep venous thrombosis
- Over-sedation caused by medications

The Take Home Message:

People with SCI need to be aware of changes in sensation, function, pain, and strength. With any change, speak with your doctor and report changes early. Be proactive in your health – losing function or sensation can lead to other problems.

For information about Craig Hospital's Neurosurgical Program for Syringomyelia and Tethered Spinal Cords visit: <http://craighospital.org/programs/rehabilitative-neurosurgery>

References:

Falci, S. P., Indeck, C., & Lammertse, D. P. (2009). Posttraumatic spinal cord tethering and syringomyelia: surgical treatment and long-term outcome. *Journal of Neurosurgery: Spine*, 11(4), 445-460.

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