Key Points

1. TCS is a complicated condition, which can be due to a number of different causes, and can be difficult to diagnose
2. It has been noted that a significant number of Chiari patients may also have TCS and some speculate that TCS can cause Chiari
3. Treatment for TCS involves surgically freeing the cord or releasing the tension the cord is under
4. This study looked at the outcomes of 22 children with TCS to see if duration of symptoms influenced outcome
5. Found that those treated in the first 6 months had the best outcomes
6. Nearly everyone treated within one year improved; but only 25% of those treated after one year improved

Definitions

conus - cone shaped area at the lower end of the spinal cord

filum terminale - fibrous thread that connects the lower end of the spinal cord to the bony spinal column

incontinence - inability to control urination

lipoma - a benign tumor of fatty tissue

occult - a disease or problem that is not readily apparent; in other words can not be seen on images

spina bifida - birth defect where the neural tube does not close properly, also known as myelomeningocele

tethered cord syndrome (TCS) - condition where the spinal cord is improperly attached, or tethered, to the spine

spinal cord - bundle of nerve fibers that runs from the base of the brain all the way down the

Timing Important For Tethered Cord Surgery

July 31, 2007 -- Tethered Cord Syndrome (TCS) is a complicated (or some would say not well defined) condition where the spinal cord is placed under abnormal tension. Since the tethering usually occurs near the base of the cord, common symptoms include bowel and bladder problems and leg weakness. Over time the traction, or stress, on the cord can cause nerve damage.

TCS can be due to a number of causes, the most notable of which may be spina bifida, where the protrusion of the spinal cord can attach, or tether to bone. Similarly, some people have lipomas, or deposits of fatty tissue, which can adhere to the spinal cord tissue and essentially anchor it. Another type of adhesion can develop from scar tissue due to previous surgery or infection.

The spinal cord can also be put under tension by an abnormal filum terminale. The filum is a fibrous thread which connects the lower end of the cord to the bony spinal column. A healthy filum has a certain amount of elasticity, however some people are born with filums that are fatty, which reduces their elasticity, and essentially pulls the entire cord down.

Treatment for TCS is usually surgical and involves freeing whatever is tethering the cord; removing a lipoma or sectioning the filum terminale for example. Although treatment for TCS is straightforward, diagnosing it can be difficult and people can go years before being properly diagnosed.

While clinicians have always thought early diagnosis and treatment was better, recently, two surgeons from Slovakia wanted to see if this all too common delay in diagnosis had an impact on surgical outcomes. To do this, they studied the outcomes of 22 children they treated over a 15 year period. They published their results in the June issue of European Journal of Pediatric Surgery.

Of the group, nine children improved after surgery, eleven were unchanged and two got worse (see Table 1). Interestingly, the average duration of symptoms for the improved group was about 16 months, compared to 52 and 54 months for the unchanged and worse groups. Further, the doctors noted that those treated within the first six months of symptoms experienced the best outcomes.

Table 1
Surgical Outcomes and Average Time to Treatment

Outcome	# of Patients	Avg Time (months)
Improved	9	16.7
Unchanged	11	52.4
Worse	2	54

Statistically, those treated in the first year were 24 times more likely to have a better outcome and nearly every patient treated in the first year improved. However, only 25% of those treated after the first year improved.

Does this mean there's a 12 month window for diagnosing and treating TCS after symptoms become apparent? This study is too small to say conclusively, but it is strongly suggestive that early intervention may be key.

Research into adult TCS may also support this notion. One study (Rajpal et al.) found that less than half of adults treated for TCS experienced long term improvement. This low success rate could be because their TCS went undiagnosed for a long period of time.

This finding is especially important for the Chiari community because it can sometimes be difficult to sort out the root cause of symptoms. If a person has Chiari, a syrinx and a tight filum, the tight filum may go unnoticed because the symptoms may be assumed to be due to the Chiari and syrinx. Or, if someone's symptoms recur some time after Chiari surgery it can be difficult to determine whether the decompression was insufficient or if scarring has led to the cord becoming tethered.

Adding to the diagnostic confusion is the recent, and controversial, idea that not all tethered cords can be seen on MRI. Some doctors and researchers believe that the filum terminale can put the spinal cord under enough pressure to cause symptoms, but that it can not be seen on MRI. This is referred to as Occult TCS.

The good news is that clinicians and researchers are becoming more aware of the possible overlap between Chiari and TCS and are working to improve diagnosis.

back, through the bony spine

cerebellar tonsils - portion of the cerebellum located at the bottom, so named because of their shape

cerebellum - part of the brain located at the bottom of the skull, near the opening to the spinal area; important for muscle control, movement, and balance

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

Chiari malformation I - condition where the cerebellar tonsils are displaced out of the skull area into the spinal area, causing compression of brain tissue and disruption of CSF flow

decompression surgery - general term used for any of several surgical techniques employed to create more space around a Chiari malformation and to relieve compression

Source

Hajnovic L, Trnka J. *Tethered spinal cord syndrome - the importance of time for outcomes.* Eur J Pediatr Surg. 2007 Jun;17(3):190-3.

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