Tethered cord syndrome surgery

Tethered cord can cause neurological, orthopaedic and sphincteric problems in children and detethering surgery may prevent or reverse these problems.

In adults, if the only abnormality is a thickened, shortened filum, then a limited lumbosacral laminectomy may suffice, with division of the filum once identified. If a lipoma is found, it may be removed with the filum if it separates easily from neural tissues.

The filum is differentiated from nerve roots by the presence of characteristic squiggly vessel on the surface of filum. Also, under the microscope, the filum has a distinctively whiter appearance than the nerve roots, and ligamentous-like strands can be seen running through it. NB: intra-op Electrostimulation and recording of anal sphincter EMG are more definitive.

<html><iframe width="560" height="315" src="https://www.youtube.com/embed/6JoomEagpEc" frameborder="0" allow="accelerometer; autoplay; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe></html>

Untethering (tethered cord release) is the gold standard treatment for TCS. However, untethering carries risks of spinal cord injury and postoperative retethering [1)]

Intraoperative MEP improvement occurs in about 50 % of the patients following successful untethering. This finding probably provides support to the ischemic theory of tethered cord syndrome.

Surgical detethering led to a reduction in the CSF levels of the markers of anaerobic metabolism and neuronal injury. There was also a reduction in the latencies of the SSEP waves, indicating better electrophysiologic functioning of the cord [2)]

Shifting the tethered cord and lipoma to the dorsal side by harnessing the lumbar lordosis instead of detethering, is a viable treatment option for tethered cord syndrome [3)].

Although some associated syrinxes improved after surgery for tethered cord, radiological improvement was not consistent and did not appear to be associated with change in clinical symptoms. The decision to surgically untether a cord should be focused on the clinical symptoms and not the presence of a syrinx alone [4)].

Early untethering of the cord may result in improvement of scoliosis; however, untethering must be done when the scoliosis is mild. When cases of≤10° scoliosis were untethered, 68% had neurologic improvement and the remaining 32% were stabilized, whereas when scoliosis is severe (≥ 50°) ≈ 16% deteriorated.

Recurrence

Recurrent Tethered Cord Syndrome

References

1)
Kokubun S, Ozawa H, Aizawa T, Ly NM, Tanaka Y. Spine-shortening osteotomy for patients with tethered cord syndrome caused by lipomyelomeningocele. J Neurosurg Spine. 2011 Jul;15(1):21-7. doi: 10.3171/2011.2.SPINE10114. Epub 2011 Apr 15. PubMed PMID: 21495816.
2)
Maurya VP, Rajappa M, Wadwekar V, Narayan SK, Barathi D, Madhugiri VS. Tethered cord syndrome - a study of the short term effects of surgical detethering on markers of neuronal injury and electrophysiologic parameters. World Neurosurg. 2016 Jul 12. pii: S1878-8750(16)30524-1. doi: 10.1016/j.wneu.2016.07.005. [Epub ahead of print] PubMed PMID: 27422680.
3)
Murata Y, Kanaya K, Wada H, Wada K, Shiba M, Kato Y. Reduction of caudal traction force using dural sac opening rather than spinal cord detethering for tethered cord syndrome caused by lipomyelomeningocele: a case report. Spine J. 2014 Oct 1;14(10):e1-3. doi: 10.1016/j.spinee.2014.02.031. Epub 2014 Mar 5. PubMed PMID: 24613376.
4)
Bruzek AK, Starr J, Garton HJL, Muraszko KM, Maher CO, Strahle JM. Syringomyelia in children with closed spinal dysraphism: long-term outcomes after surgical intervention. J Neurosurg Pediatr. 2019 Dec 13:1-7. doi: 10.3171/2019.9.PEDS1944. [Epub ahead of print] PubMed PMID: 31835253.