Chronic Spinal Cord Injury

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Chronic Spinal Cord Injury (SCI): a permanent and/or progressive interruption in the conduction of impulses across the neurons and tracts of the spinal cord. It may be due to mechanical distortion or vascular ischaemia of the spinal cord arising from trauma, tumour, infection or other space-occupying lesions.

Pathophysiology:

- Hypoperfusion of grey matter → Increases in intracellular calcium and reperfusion injury
- Compression of white matter → increased parenchymal pressure → white matter undergoes gliosis, demyelination + axonal loss
- Rapid or a critical degree of compression leads to collapse of the venous microvasculature → vasogenic oedema → Vasogenic edema exacerbates parenchymal pressure → may lead to rapid progression of neurological dysfunction secondary to direct damage of ascending and descending pathways in the spinal cord

Presentation

- Motor weakness in upper/lower limb
- Loss of fine motor coordination - difficulty writing/dropping objects
- Spasticity - can be graded using Modified Ashworth Scale
- Dysesthaesia (burning pain), hyperaesthesia, hyperalgesia, or numbness
- Hyperreflexia and ankle clonus - leads to frequent falls
- Pathological reflexes - babinksi sign, Lhermitte's sign, hoffman's sign

Diagnosis

- MRI spine - reveals the site and extent of cord compression
- EMG - can monitor changes in cord function and determine the prognosis
- Neurological examination - ASIA Impairment Scale is used to determine the level and severity of injury
- Urodynamic study

Management

Sub-acute/chronic rehabilitation:

- Respiratory muscle training for cervical spinal cord injury - induces diaphragm hypertrophy + improved neural control of the respiratory muscles
- Functional electrical stimulation if grade 3 or less on Oxford muscle grading scale
- Urinary incontinence in partial SCI can be managed through pelvic floor muscle training completed 4-5x daily
- Daily progressive resistance training for innervated muscles - focus on low load and high repetitions
- Gait training possible in patients ranging from paraplegia (inability to voluntarily move the lower part of the body) to lower limb paresis - use of orthoses and walking aids
- Teach wheelchair mobility - for individuals with tetraplegia (inability to voluntarily move the upper and lower limbs)
- Rehabilitation for bed mobility and transfers
- Prevention of pressure ulcers - teach patient self-lift techniques
- Passive stretching and elongated positioning of limbs to prevent contracture

Medical: Maintenance of blood pressure via IV fluid + vasopressors, corticosteroids, DVT prophylaxis, urinary catheterisation, gabapentin, continuous positive airway pressure (CPAP)

Want to learn more?

With AcePhysio the learning journey doesn't stop here! Take a look at our further reading recommendations below to become an expert in Chronic Spinal Cord Injury:

1. Mehrholz J, Kugler J, Pohl M. Locomotor training for walking after spinal cord injury. Cochrane Database Syst Rev. 2012 Nov 14;11
2. Kostovski E, Iversen PO, Hjeltnes N. Complications of chronic spinal cord injury [in Norwegian]. Tidsskr Nor Legeforen. 2010 Jun 17;130(12):1242-5
3. Cadotte DW, Fehlings MG. Spinal cord injury: a systematic review of current treatment options. Clin Orthop Relat Res. 2011 Mar;469(3):732-41.