

Cauda equina syndrome

[Cauda equina syndrome](#) (CES) is a serious neurologic condition in which damage to the [cauda equina](#) causes acute loss of function of the [lumbar plexus](#), ([nerve roots](#)) of the [spinal canal](#) below the termination ([conus medullaris](#)) of the [spinal cord](#). CES is a lower motor neuron lesion.

Epidemiology

[Cauda equina syndrome epidemiology](#).

Etiology

[Cauda Equina Syndrome Etiology](#).

Clinical features

[Cauda Equina Syndrome Clinical Features](#).

Diagnosis

Examination for pain sensation, by pinprick, shows leg (lumbar nerves) analgesia with perineal (sacral nerves) escape. The maintenance of perineal sensation with absence of pain sensation over the lumbar nerve roots is typical for an extra-medullary and intra-theatal (outside the cord and within the dural sheath) process. Inability to walk, with this unusual sensory examination completes a triad of signs and usually represents spinal tuberculosis. The triad is paraplegia with lumbar loss of pain sensation and presence of perineal altered sensation.

Diagnosis is usually confirmed by an MRI scan or CT scan, depending on availability. If cauda equina syndrome exists, emergency surgery is usually performed depending on the etiology discovered and the patient's candidacy for major spine surgery.

Treatment

[Cauda equina syndrome treatment](#).

Outcome

[Cauda equina syndrome outcome](#).

Cost

CES affects mainly middle-aged individuals. There is a significant cost associated with hospital admissions, as CES is considered an emergent condition. CES is often concurrent with congenital or degenerative diseases and represents a high cost of care to those admitted to the hospital for surgery.

Hospital stays generally last 4 to 5 days, and cost an average of \$15,000 to \$17,000.

Metaanalysis

Literature search identified 27 studies of CESR patients with clear definition of surgical timing. Relative risk (RR) could not be calculated in 11 studies, leaving 16 for meta-analysis. Urinary retention related to surgical timing at 5 breakpoints: 12, 24, 36, 48, or 72 hours. Urinary outcome was classified as Normal, Fair, or Poor. Meta-analysis was performed for "Event = Fair/Poor" or "Event = Poor." Eight studies allowed separation into CESR and incomplete CES (CESI), and 5 of these had enough data for meta-analysis to compare CESR and CESI. A random effects meta-analysis model was used because of heterogeneity across the studies. A best-evidence synthesis was performed for the 4 largest studies that had 24- and 48-hour breakpoints.

For "Event = Fair/Poor," meta-analyses using the 5 breakpoints predicted a more likely Fair/Poor outcome for later surgery (RR range 1.77-2.19). The RR for later timing of surgery was statistically significant for 24- and 72-hour breakpoints and was elevated but not statistically significant for the other 3. For "Event = Poor," the RR range was 1.09-5.82, statistically significant for the 36 hour breakpoint only. Meta-analysis comparing CESR patients with CESI patients predicted a Fair/Poor result for CESR (RR 2.58, 95% confidence interval 0.59-11.31). The best-evidence synthesis did not disclose reasons for differences in the results of the 4 studies.

This study supports early surgery for CES and indicates that CESR and CESI cases should not be analyzed together ¹⁾.

Case reports

2016

A report describes the circumstances of a patient with a cauda equina syndrome due to the development of a lumbar subdural CSF collection with ventral displacement of the cauda equina shortly following posterior fossa decompression for [Chiari malformation Type I](#) (CM-I). This unusual, but clinically significant, complication was successfully treated with percutaneous drainage of the extraarachnoid CSF collection. Although there are a few cases of intracranial [subdural hygroma](#) developing after surgery for CM-I, often attributed to a pinhole opening in the arachnoid, as far as the authors can determine, a [spinal subdural hygroma](#) associated with surgery for CM-I has not been recognized ²⁾.

2015

A 32-year-old woman with remotely repaired spinal defect who experienced subarachnoid hemorrhage and underwent anterior communicating artery aneurysm clipping. Post-operatively, she developed urinary and **fecal incontinence** as the sole presenting symptom of communicating post-hemorrhagic hydrocephalus. New neurological deficits in this population can also be attributed to recurrent cord tethering or syrinx, both of which were demonstrated on her lumbar spine MRI, but her incontinence resolved with external ventricular drain placement and Cerebrospinal fluid shunt. There are few case reports of patients with closed neural tube defects and hydrocephalus and none in the adult population to our knowledge. Neurological change in patients with any history of spinal **dysraphism** may reflect altered cerebrospinal fluid dynamics affecting either end of the neuraxis ³⁾.

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DeLong WB, Polissar N, Neradilek B. Timing of surgery in cauda equina syndrome with urinary retention: meta-analysis of observational studies. J Neurosurg Spine. 2008 Apr;8(4):305-20. doi: 10.3171/SPI/2008/8/4/305. PubMed PMID: 18377315.

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Darwish HA, Oldfield EH. Lumbar subdural cerebrospinal fluid collection with acute cauda equina syndrome after posterior fossa decompression for Chiari malformation Type I: case report. J Neurosurg Spine. 2016 Sep;25(3):328-31. doi: 10.3171/2016.2.SPINE151480. Epub 2016 Apr 15. PubMed PMID: 27081710.

³⁾

Bender MT, Colby GP, Huang J. Post-hemorrhagic hydrocephalus presenting as cauda equina syndrome in a patient with spinal dysraphism. J Clin Neurosci. 2016 Apr;26:159-61. doi: 10.1016/j.jocn.2015.10.023. Epub 2015 Dec 7. PubMed PMID: 26675625.

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