Cerebellar Mutism Pathophysiology

The pathophysiology of this condition remains unclear, but there is evidence implicating surgical injury of the proximal efferent cerebellar pathway (pECP) and the cerebellar vermis to PFS.

Theories include postoperative vasospasm, cerebellar ischemia, and edema, as well as transient dysregulation of neurotransmitter release. However, the most widely accepted explanation is cerebellar diaschisis46 (from the Greek: διάσχισις meaning “shocked throughout”): metabolic hypofunction in a brain region distant but connected to an area of brian injury. Specifically: CM has been linked to the disruption of cerebello-cerebral circuits, such as the dentatethalamocortical tract, which originates in the dentate nucleus, extends through the superior cerebellar peduncle, and decussates to the contralateral cerebral hemisphere, where it connects the ventrolateral nucleus of the thalamus to diverse cortical areas.

SPECT scans demonstrated transient reduction of cerebral perfusion in frontal, parietal & temporal cortices of patients with post-op CM.

In this manner, a supratentorial condition is provoked by the disruption of connections to the cerebellum as a result of a cerebellar injury.

Pitsika et al., The PubMed database was searched using the term cerebellar mutism and relevant definitions to identify publications in the English-language literature. Pertinent publications were selected from the reference lists of the previously identified articles. Over the last few years an increasing number of prospective studies and reviews have provided valuable information regarding the cerebellar mutism syndrome. Importantly, the clarification of principal terminology that surrounds the wide clinical spectrum of the syndrome results in more focused research and more effective identification of this entity. In children who undergo surgery for medulloblastoma the incidence of cerebellar mutism syndrome was reported to be 24%, and significant risk factors so far are brainstem involvement and midline location of the tumor. The dentate-thalamo-cortical tracts and lesions that affect their integrity are considered significant pathophysiological issues, especially the tract that originates in the right cerebellar hemisphere. Moderate and severe forms of the cerebellar mutism syndrome are the most frequent types during the initial presentation, and the overall neurocognitive outcome is not as favorable as thought in the earlier publications. Advanced neuroimaging techniques could contribute to identification of high-risk patients preoperatively and allow for more effective surgical planning that should focus on maximal tumor resection with minimal risk to important neural structures [1)].

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Pitsika M, Tsitouras V. Cerebellar mutism. J Neurosurg Pediatr. 2013 Dec;12(6):604-14. doi: 10.3171/2013.8.PEDS13168. Epub 2013 Sep 27. Review. PubMed PMID: 24073751.