

Fourth ventricle tumor surgery complications

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[Fourth ventricle tumor surgery](#) is delicate and carries specific risks due to the complex anatomy of the region. The fourth ventricle lies in the posterior fossa of the brain, nestled between the brainstem and cerebellum. Because of this, complications can involve vital neurological structures.

□ Neurological Complications

[Cranial Nerve](#) Deficits

Especially CN VI (abducens), CN VII (facial), and CN VIII (vestibulocochlear).

May cause [diplopia](#), facial weakness, or [hearing loss](#).

Cerebellar Dysfunction

[Ataxia](#), [dysmetria](#), [intention tremor](#).

Can be transient or permanent.

Brainstem Injury

Risk of respiratory or cardiovascular instability.

It can lead to [coma](#) or [death](#) in extreme cases.

[Mutism](#) / Cerebellar Cognitive Affective Syndrome

Especially in pediatric patients after resection of [medulloblastomas](#) or [ependymomas](#).

Characterized by mutism, emotional lability, and executive dysfunction.

□ CSF-related Complications

[Hydrocephalus](#) (pre- or post-operative)

Due to obstruction of CSF pathways (aqueduct or outlets of the fourth ventricle).

May require an [external ventricular drain](#) (EVD) or VP shunt.

CSF Leak / [Pseudomeningocele](#)

From poor dural closure or pressure buildup.

Risk of infection or wound healing issues.

[Meningitis](#) / [Ventriculitis](#)

Especially if there's a CSF leak or prolonged drain use.

□ Vascular Complications

[Hemorrhage](#)

Intraoperative bleeding from a tumor or surrounding vessels.

Postoperative hematoma causing [brainstem compression](#).

[Ischemia](#)

Injury to perforating arteries (e.g., branches of the [posterior inferior cerebellar artery](#) - PICA).

It can cause [infarcts](#) in the brainstem or cerebellum.

□ Systemic and General Complications

[Infection](#)

[Seizures](#) (rare for the posterior fossa)

Respiratory compromise (especially in children or after brainstem manipulation)

Wound complications

□ Tumor-specific factors

Ependymomas: Adherence to the floor of the 4th ventricle increases brainstem injury risk.

Medulloblastomas: prone to CSF spread, so thorough surgical and oncologic planning is key.

Choroid plexus tumors: highly vascular, bleeding risk.

Cohort studies

In a large multicenter [cohort study](#) Persson et al. investigate postoperative word-finding abilities in children undergoing [posterior fossa tumor surgery](#) (PFTs), with data from 184 children across Europe. The authors address a critical yet understudied postoperative complication—[word-finding difficulty](#), which goes beyond classic [cerebellar mutism syndrome](#) (CMS) and focuses on more subtle higher-order [language impairments](#) ¹⁾

The study's key strength lies in its pre- and postoperative comparisons using a speeded picture-naming test, providing quantitative insights into word retrieval speeds. Interestingly, the results reveal no significant change between pre- and postoperative performance on average. This means that while some children improved, others declined, underscoring the heterogeneous outcomes in PFT surgeries.

A striking finding is that 95% of children performed more than two standard deviations slower than age norms after surgery, despite no aggregate decline. This discrepancy suggests that even without a gross drop in individual scores, the cohort as a whole demonstrates clinically significant delays, potentially overlooked in standard assessments.

The study identifies [fourth ventricle tumor](#) as a specific risk factor ($B = -4.09$, $p < 0.05$), linking it to possible damage of the [dentato-thalamo-cortical pathway](#). This aligns with previous neuroanatomical models implicating cerebellar-thalamo-cortical circuits in language function, not just motor planning.

From a clinical perspective, these findings call for routine postoperative language screening—even in patients who do not develop [mutism](#)—to detect subtle deficits that may affect communication and academic performance. Furthermore, early intervention strategies may be needed, particularly for children with tumours in higher-risk locations.

This study contributes valuable evidence supporting the existence of subtle yet functionally important postoperative language impairments in children with PFTs. It urges the [neurooncology](#) and [neuropsychology](#) communities to broaden the scope of postoperative assessments to include not only [mutism](#) but also word-finding and higher cognitive-linguistic functions.

¹⁾

Persson K, Grønbaek J, Tiberg I, Fyrberg Å, Castor C, Andreozzi B, Frič R, Hauser P, Kiudeliene R, Mallucci C, Mathiasen R, Nyman P, Pizer B, Sehested A, Boeg Thomsen D; CMS study group. Postoperative word-finding difficulties in children with posterior fossa tumours: a crosslinguistic European cohort study. *Childs Nerv Syst*. 2025 Mar 12;41(1):128. doi: 10.1007/s00381-025-06787-4. PMID: 40075014; PMCID: PMC11903548.

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