Isolated Abulia as the Sole Presentation of Secondary Hydrocephalus Following Foramen Magnum Meningioma Resection: First Reported Case and Literature Review

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Introduction and Objectives

Profound abulia or mutism is typically attributed to frontal lobe or basal ganglia pathology and is exceedingly rare following posterior fossa surgery. Normal pressure hydrocephalus (NPH), a known complication after large skull base tumor resections typically presents with gait disturbance, cognitive decline, and urinary incontinence. However, atypical neurobehavioral manifestations, such as isolated motivational deficits, remain under-recognized. To our knowledge, this is the first documented case of isolated abulia without classical NPH features following infratentorial tumor resection, which was fully reversible with cerebrospinal fluid (CSF) diversion.

Our objectives included (1) To describe the first known case of isolated, reversible abulia secondary to communicating hydrocephalus following resection of a skull base lesion. (2) To provide a focused literature review on secondary hydrocephalus after skull base surgery and its neuropsychiatric sequelae. (3) To highlight the implications for postoperative monitoring and early intervention in skull base surgery patients presenting with atypical neurobehavioral symptoms.

Methods and Materials

A 64-year-old woman underwent an uncomplicated far lateral craniotomy for resection of a ventral foramen magnum meningioma. Initial postoperative recovery was unremarkable; however, within two weeks, she developed progressive mutism and profound abulia despite preserved motor strength, alertness, and ability to follow commands. Serial imaging revealed progressive ventriculomegaly without evidence of infarction or hemorrhage. Comprehensive workup—including lumbar punctures, infectious and metabolic panels, and psychiatric evaluation—was nondiagnostic. Due to worsening clinical status, a ventriculopleural shunt (VPLS) was placed on postoperative day 44. Clinical, radiographic, and neurobehavioral status were assessed pre- and post-shunt. A systematic literature review (PubMed, Embase, Scopus) identified publications on secondary hydrocephalus after skull base surgery, post-craniotomy neuropsychiatric syndromes, and neuroanatomical correlates of motivational deficits.

Results

Post-VPLS, the patient exhibited rapid and dramatic improvement. Within days, spontaneous speech resumed, oral intake normalized, and independent ambulation was restored. By two weeks post-shunting, she returned to her neurological baseline with intact cognition and full behavioral engagement. Neuropsychiatric testing confirmed resolution of abulic syndrome. Literature review revealed that secondary NPH occurs in approximately 6–8% of skull base tumor resections, but isolated abulia or mutism as a primary presentation has not been previously reported. Existing reports commonly describe multifocal deficits or classical triad symptoms. Neuroanatomical evidence supports vulnerability of brainstem and diencephalic arousal circuits—particularly monoaminergic nuclei—to CSF pressure alterations, providing a plausible mechanism for this unique clinical presentation.

Conclusions

This case represents the first documented instance of abulia due to secondary communicating hydrocephalus following infratentorial tumor resection. It challenges the traditional frontal lobe-centric localization of motivational deficits and highlights the susceptibility of brainstem and diencephalic arousal systems to CSF-flow disruption. Our literature review underscores a critical gap in recognition of neuropsychiatric complications after skull base surgery. Clinicians should maintain a high index of suspicion for atypical NPH syndromes in postoperative patients presenting with behavioral inertia but preserved cognition and motor function. Early neuroimaging and CSF-diversion may facilitate rapid recovery, reduce misdiagnosis, and improve outcomes. This case also emphasizes the importance of close postoperative neurobehavioral monitoring after skull base lesion resections.

Figure 1

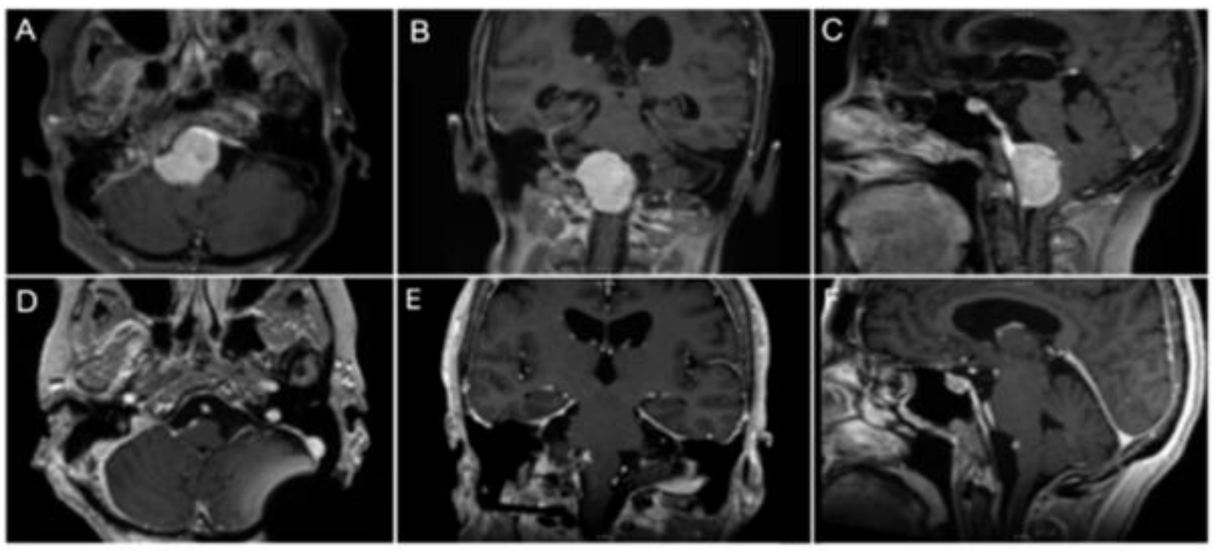

Figure 1. Preoperative magnetic resonance imaging (MRI) in T1 post-contrast sequences in the axial (A), coronal (B), and sagittal planes (C) demonstrates a 3.5cm homogeneously enhancing ventral brainstem mass with a dural tail, suggestive of a meningioma. This meningioma was gross totally resected (D-F).

Figure 2

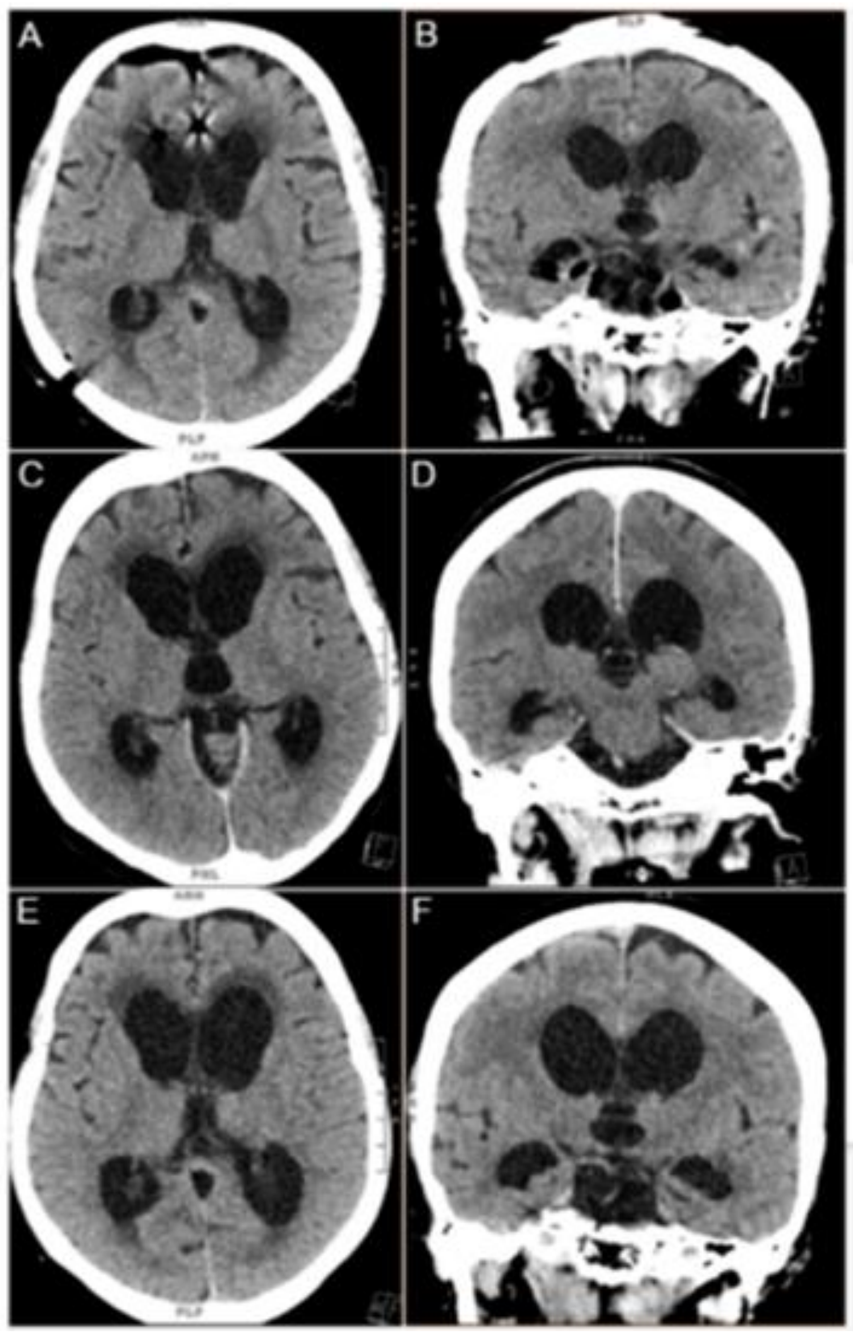

Figure 2. Postoperative computed tomography (CT) scans in the axial (A,C,E) and coronal (B,D,F) planes demonstrate marked progressing ventriculomegaly. Images A and B are from the immediate postoperative period (POD 0), images C and D are from POD 14, and images E and F are from POD 39. A parietal entry catheter can be seen in image A, with linear encephalomalacia noted along the course of the catheter. Periventricular hypodensity, potentially representing chronic small vessel disease or transependymal CSF flow was noted across all time periods. At maximum size, the third ventricle measured approximately 20 mm in transverse dimension.