Extraventricular Neurocytoma in the Left Frontal Lobe: A Case Report and Literature Review

Fan Chen, Rihua Jin, Xinmin Wu, Zengping Dong, Dawei Chen

Key words
- Case report
- Cerebral parenchymal
- Extraventricular
- Neurocytoma
- Surgical resection

Abbreviations and Acronyms
CT: Computed tomography
MRI: Magnetic resonance imaging
WHO: World Health Organization

Department of Neurosurgery, First Hospital of Jilin University, Changchun, China

To whom correspondence should be addressed: Dawei Chen, PhD [E-mail: professorchen@foxmail.com]

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BACKGROUND: **Neurocytoma is a rare brain neoplasm of neuroepithelial origin that occurs predominantly in the ventricular system adjacent to the interventricular foramen and septum pellucidum. However, extraventricular neurocytoma is an extremely rare entity, with poor clinical, radiologic, and histopathological characterization. Here we report a case of an extraventricular parafalcine neurocytoma in the left frontal lobe. We also examine previously reported cases of extraventricular neurocytoma in an attempt to provide an up-to-date summary of the condition.**

METHODS: **A literature search was performed using PubMed with specific key terms, inclusion criteria, and exclusion criteria. Selected case studies and case series were then compared, and statistical analyses were performed where appropriate. We report a 59-year-old woman presenting with weakness in her right leg and urinary incontinence. Physical examination revealed muscle strength of grade 3/5 in the right lower extremity. Brain magnetic resonance imaging showed a parafalcine mass in the left frontal lobe, with perilesional edema; the cerebral falx and lateral ventricle were shifted due to the compression. Gross total resection was performed.**

RESULTS: **Histopathological examination revealed a neurocytoma. Immunohistochemical staining showed diffuse positivity for synaptophysin. MIB-1 staining for Ki-67 antibody showed a labeling index of 20%. No adjuvant radiation or chemotherapy was administered. Brain computed tomography performed at a 3-month follow-up showed no signs of recurrence.**

CONCLUSION: **Extraventricular neurocytoma occurring in the brain parenchyma is a very rare central nervous system tumor. Its clinical and radiologic manifestations are nonspecific. The diagnosis depends on histopathological and immunohistochemical examination. Surgical resection should be the first-choice treatment.**

INTRODUCTION

Central neurocytoma is a rare central nervous system neoplasm of neuroepithelial origin that grows mostly in the ventricular system adjacent to the interventricular foramen and septum pellucidum. This tumor accounts for approximately 0.25%–0.50% of all primary intracranial tumors.[1] Extraventricular neurocytoma occurring in the brain parenchyma is an extremely rare entity, however,[2-4] with only approximately 100 cases reported to date. Their clinical, radiologic, and histopathological features are not well characterized. Here we report a case of an extraventricular parafalcine neurocytoma in the left frontal lobe that mimicked meningioma on radiologic imaging.

CASE PRESENTATION

A 59-year-old woman presented to us with a 2-year-long history of weakness in the right leg and a 1-year-long history of urinary incontinence. Physical examination showed muscle strength of grade 3/5 in the right lower extremity and delayed relative deep tendon reflexes. Muscle tone was normal. There was no sensory disturbance or pathological reflexes.

Brain magnetic resonance imaging (MRI) showed a 5.8 cm × 5.1 cm × 6.2 cm parafalcine mass in the left frontal lobe, with perilesional edema. The cerebral falx and lateral ventricle showed a shift due to the compression. The lesion appeared hypointense on T1-weighted MRI and hyperintense on T2-weighted MRI, diffusion-weighted imaging, and fluid-attenuated inversion-recovery MRI sequences. After administration of gadolinium-diethylenetriaminepentaacetic acid, the lesion showed slight heterogeneous enhancement with visible vessels (Figure 1A–E). A diagnosis of meningioma was suspected.

Surgical resection was performed via a transcortical approach. Intraoperatively, the tumor was gray-red, fish-flesh-like in appearance, hard in consistency and showed abundant blood supply with calcification and cystic components. The tumor was adherent to the adjacent structures and had wrapped several veins and a part of the left pericallosal artery. Gross total resection was achieved.

Histopathological examination with hematoxylin and eosin staining

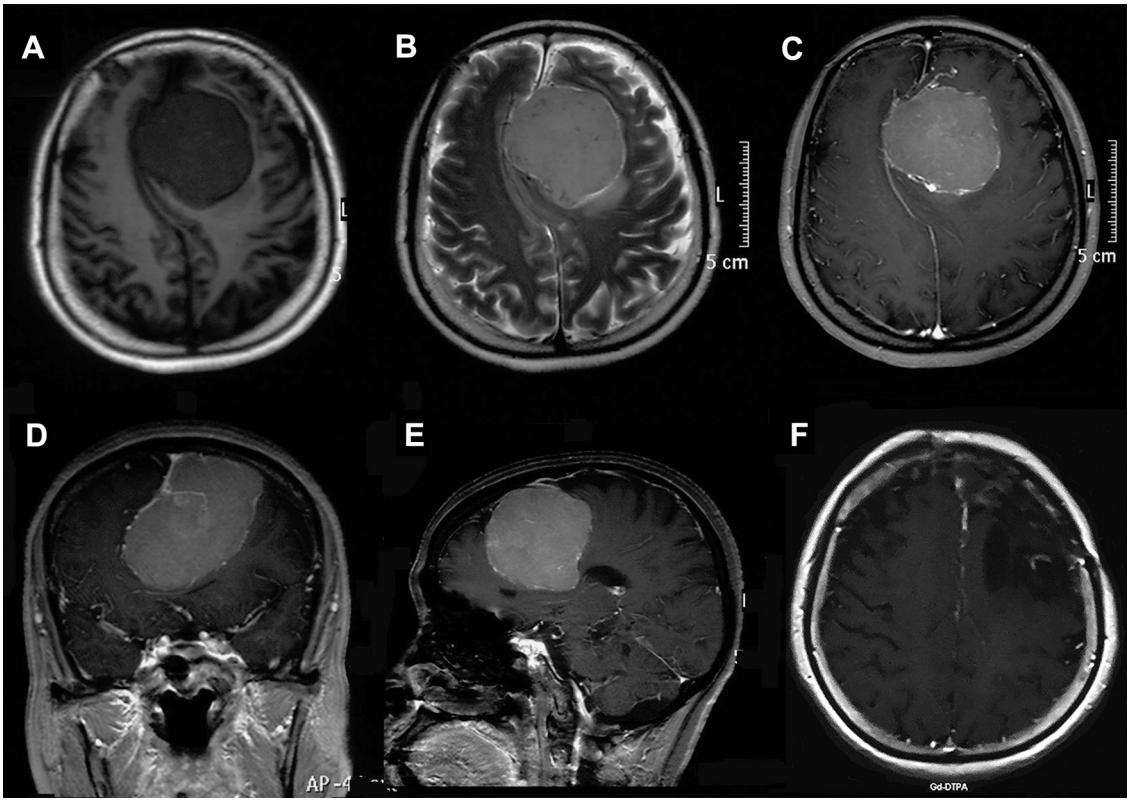

Figure 1. (**A** and **B**) Brain magnetic resonance imaging (MRI) showing a parafalcine mass in the left frontal lobe with perilesional edema, with the cerebral falx and lateral ventricle shifted due to compression. The lesion appears hypointense on T1-weighted MRI (**A**) and hyperintense on T2-weighted MRI (**B**). (**C**) After administration of contrast medium, the lesion shows a slight heterogeneous enhancement with visible internal vasculature. (**D**) Coronal imaging. (**E**) Sagittal imaging. (**F**) Brain MRI at 10 months postsurgery showing no signs of recurrence.

(Figure 2A) showed clusters of uniform oval and well-differentiated cells with regular nuclear morphology, round-to-oval nuclei with fine chromatin, and sparse cytoplasm with mild acidophilia. Immunohistochemical staining showed diffuse positivity for synaptophysin (Figure 2C). Staining for glial fibrillary acidic protein was negative. MIB-1 staining with Ki-67 antibody showed a labeling index of 20% (Figure 2B). These findings were consistent with a diagnosis of extraventricular neurocytoma.

No adjuvant radiotherapy or chemotherapy was administered. Postoperative

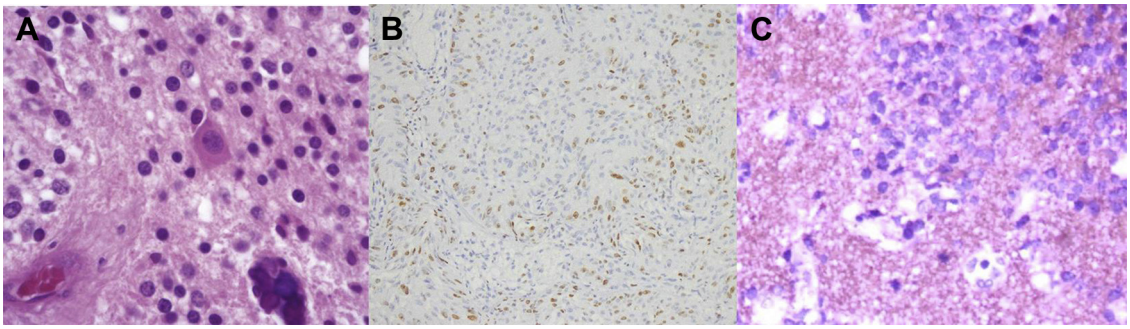

Figure 2. Histopathological examination of the resected specimen. (**A**) Hematoxylin and eosin staining showing clusters of oval and well-differentiated cells with regular nuclear morphology, round-to-oval nuclei with fine chromatin, and sparse cytoplasm with mild acidophilia (400× magnification). (**B**) MIB-1 staining for Ki67 antibody showing a labeling index of 20%. (**C**) Immunohistochemical staining showing diffuse positivity for synaptophysin.