

Case Reports & Case Series

Ventriculoperitoneal shunt catheter tract glioblastoma multiforme concomitant to infection

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ABSTRACT

Given the high rate of hardware infection seen due to ventriculoperitoneal shunts, radiographic changes near the shunt system are most often concerning for infectious etiology. We present a patient who developed an intracranial neoplasm along the proximal shunt catheter that was initially radiographically diagnosed as an infarct. Further imaging helped characterize the hypodensity seen on CT as a neoplasm and she underwent resection. This case demonstrates the need to maintain a wide-open differential diagnosis until all diagnostic tests are completed.

A 61-year-old female initially presented with a ruptured subarachnoid hemorrhage requiring coil embolization and subsequent ventriculoperitoneal shunt (VPS) for post-hemorrhagic hydrocephalus. Five years later, she returned with seizure and CT initially read as stroke adjacent to the VPS catheter (Fig. 1). Further MR imaging revealed edema around the shunt catheter concerning intracranial in-

fection (Fig. 2), supported by elevated infectious markers. She underwent removal of the shunt system with temporary drainage.

Cultures ultimately grew polymicrobial flora including *Propionibacterium acnes*, *Enterococcus faecium*, and *Staphylococcus hominis*, and antibiotics were tailored appropriately. Though she clinically improved, repeat MRI revealed progression of the lesion de-

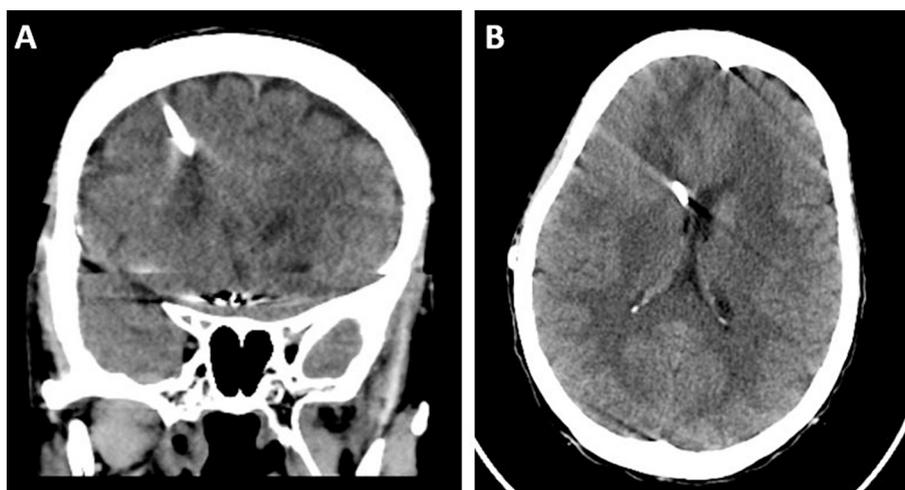


Fig. 1. Computed tomography (CT) A) coronal and B) axial images with hypodensity adjacent the proximal VPS catheter tract initially read as ischemic infarct.

Abbreviations: CT, computed tomography; GBM, glioblastoma multiforme; MR, magnetic resonance; VPS, ventriculoperitoneal shunt

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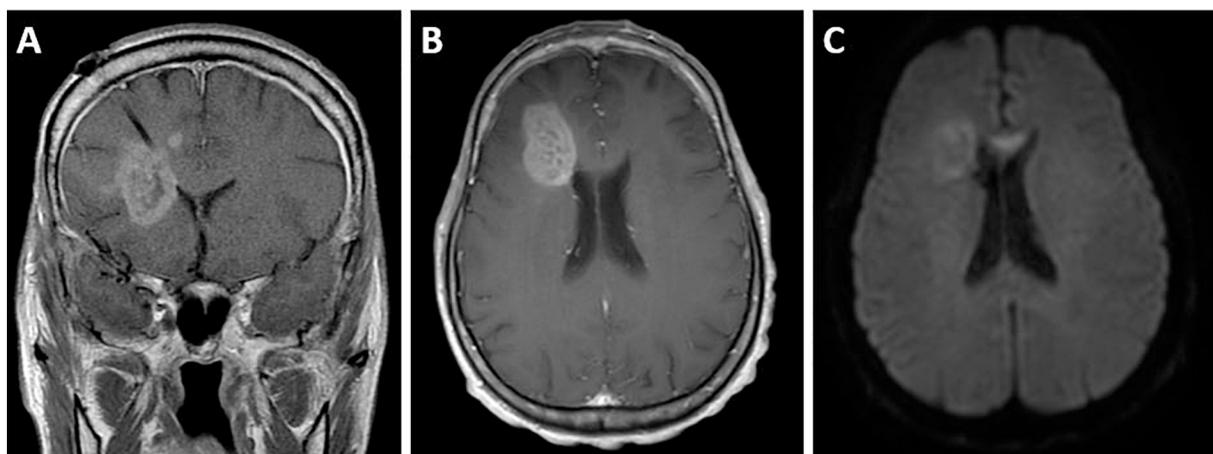


Fig. 2. A) Coronal and B) axial T1-weighted Magnetic Resonance Imaging (MRI) with contrast showing diffuse heterogeneous enhancement in the right frontal lobe along the catheter tract with 2 smaller adjacent foci of enhancement and surrounding vasogenic edema concerning for underlying lesion vs cerebritis. Diffusion weighted imaging (C) shows heterogenous restriction within the lesion, as well as the corpus callosum.

spite two weeks of antibiotics, to a size of $3.5 \times 3.1 \times 2.4$ cm. Due to concern for possible underlying neoplasm, MR spectroscopy was performed, with decreased choline to NAA ratios and increased choline to

creatine ratios, as well as elevated lipid peaks on the short time to echo spectrum (Fig. 3). Surgical resection confirmed diagnosis of glioblastoma multiforme (GBM) (Fig. 4).

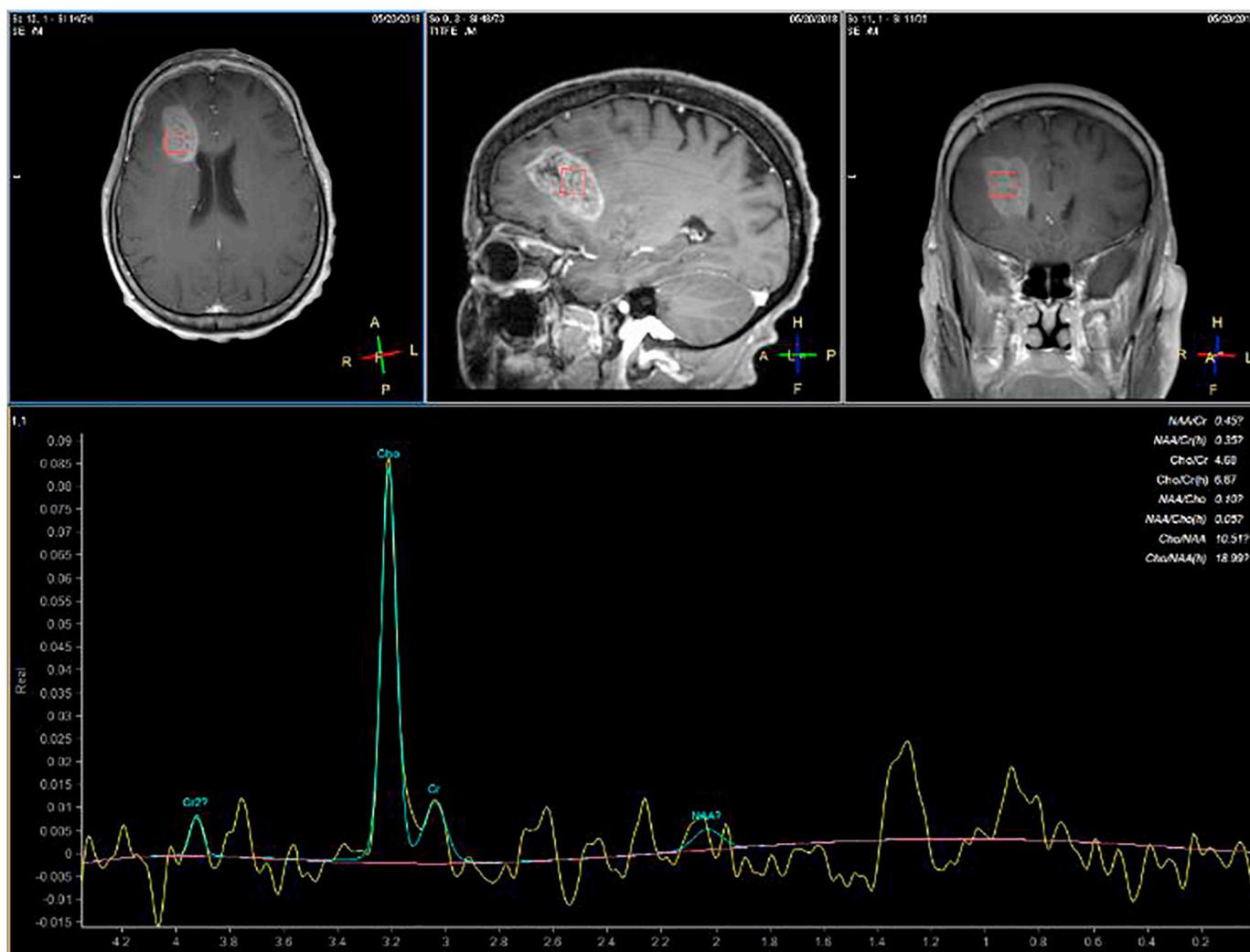


Fig. 3. Post-shunt-removal with redemonstrations of enhancing mass in the frontal lobe despite hardware removal and antibiotic therapy for two weeks. MR spectroscopy graphs revealing decreased choline to NAA ratios, increased choline to creatine ratios, and markedly elevated lipid peaks on the short TE spectrum concerning for highly-cellular neoplasm.

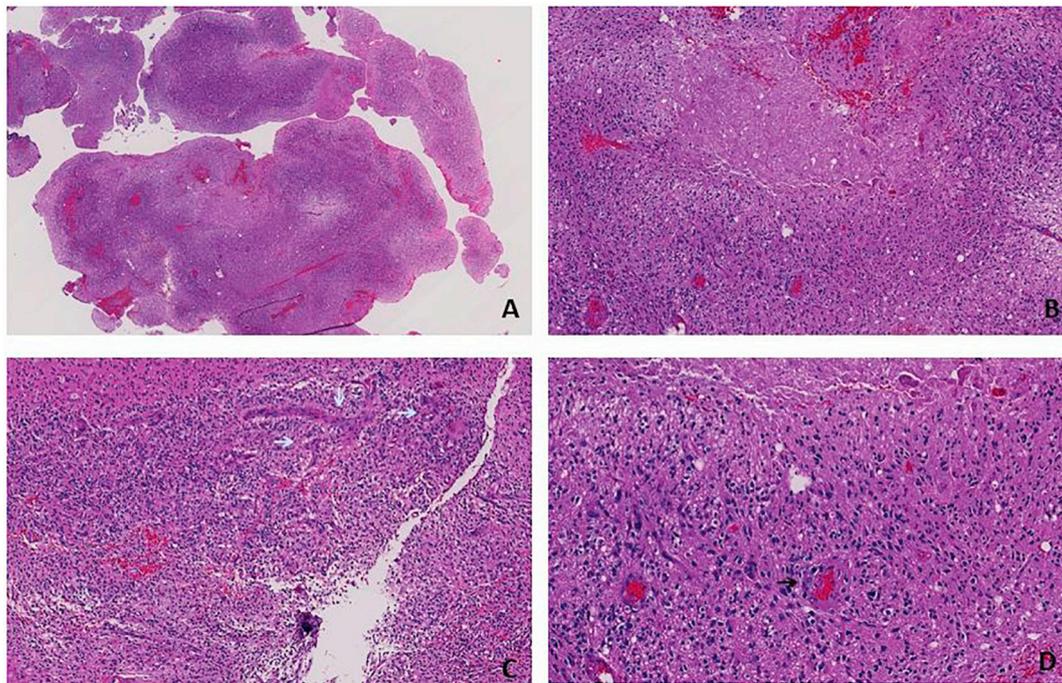


Fig. 4. A) 2.5× magnification shows a central zonal area of coagulative necrosis (X) without pseudopalisading and increased cellularity at the periphery; B) 10× magnification of the same field shows a central zonal area of coagulative necrosis (X) without pseudopalisading and increased cellularity at the periphery; C) different field (10×) demonstrating vascular proliferation of multiple small vessels (white arrow); D) 20× view shows a polymorphic population of pleomorphic, infiltrative astrocytes, as well as multilayered endothelial proliferation of vessels (black arrow).

Infection rates for VPS range from 10 to 22%, most commonly within 30 days of implantation and rarely this far from implantation [5]. Treatment generally involves removal of implanted hardware with concurrent targeted antibiotic therapy [1]. Pathologically confirmed GBM mimicking infection in the setting of previous intracranial surgery is uncommon [3,4].

As the diagnostic and therapeutic options for intracranial lesions evolve, judicious approach to characterizing uncommon clinical presentations should be undertaken. MR spectroscopy is a useful tool in aiding with challenging diagnoses, especially in GBM [2]. Our patient's clinical picture evolved over time, and continued vigilance via serial imaging led to an appropriate diagnosis despite atypical presentation of tumor along the proximal VPS catheter.

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Disclosure

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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