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Brain angiometastasis from a non-seminomatous germ cell tumor: A case report

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ABSTRACT

INTRODUCTION: Brain metastasis from non-seminomatous germ cell tumors (NSGCT) is rare. Herein, we describe the second reported case of brain metastasis from a NSGCT with high-flow arteriovenous (AV) shunts, and propose a novel surgical treatment plan.
CLINICAL CASE: The patient was a 34-year-old male who presented with hemiparesis and hemianesthesia. Magnetic resonance angiography revealed three vascular lesions with afferent vessels and efferent vessels. Angiography displayed two high-flow AV shunts. During angiography, the patient experienced sudden neurological deterioration and consequently underwent surgery. During surgery, a lesion with large AV shunts was observed, with arterialized drainage veins, pedicled arterial vessels affluent to the nidus, and an absent pial plane. The surgical technique was adapted to lesion morphology using special bipolar forceps. Histological and immunohistochemical tests confirmed that the lesion was a NSGCT.
DISCUSSION: NSGCTs are clinically more aggressive than seminomas. Lesions with an AV shunt and glioma combination are designated as angiogliomas. Therefore, we termed the lesion in the present case as an "angiometastasis," which was formed from numerous AV shunts. The use of presurgical embolization has been reported to improve long-term survival in patients with intra-axial hypervascular tumors with AV shunts.
CONCLUSION: We here propose a novel strategy for the management of hypervascular brain metastasis from NSGC, consisting of angiography, tumor embolization, and the use of an angiometastatic surgical technique with special bipolar forceps. This case report may help neurosurgeons make better surgical decisions in the management of highly vascularized brain metastasis.

1. Introduction

Brain metastases from non-seminomatous germ cell tumors (NSGCTs) are rare, occurring in only 0.5%–1% of NSGCT cases [1–3]. Patients presenting with cerebral metastases are classified as having a "poor prognosis" according to the International Germ Cell Consensus Classification [4]. Currently, the treatment recommendation for this type of tumor is based on results of case series and clinical studies and expert opinions [1–3]. To the best of our knowledge, only one published case has reported on the unusual presentation of highly vascular brain metastasis of a germ cell tumor [5]. Currently, all case reports involving an association between arteriovenous (AV) shunts and tumors have involved tumors of glial origin. Herein, we report the second case of brain metastasis from an NSGCT with high-flow AV shunting, revealed by angiography. We describe the morphology of the brain NSGCT metastasis as well as a novel surgical treatment strategy. This work has been reported in accordance with the SCARE criteria [6].

2. Presentation of case

The patient was a 34-year-old male with the following surgical history: radical left orchiectomy at the age of 33 with a histopathologic report of germ cell mixed tumor and pulmonary metastasectomy. His alpha-fetoprotein level was 1.54 ng/mL, and B-human chorionic gonadotropin (B-HCG) level was <1.00 mUI/L.

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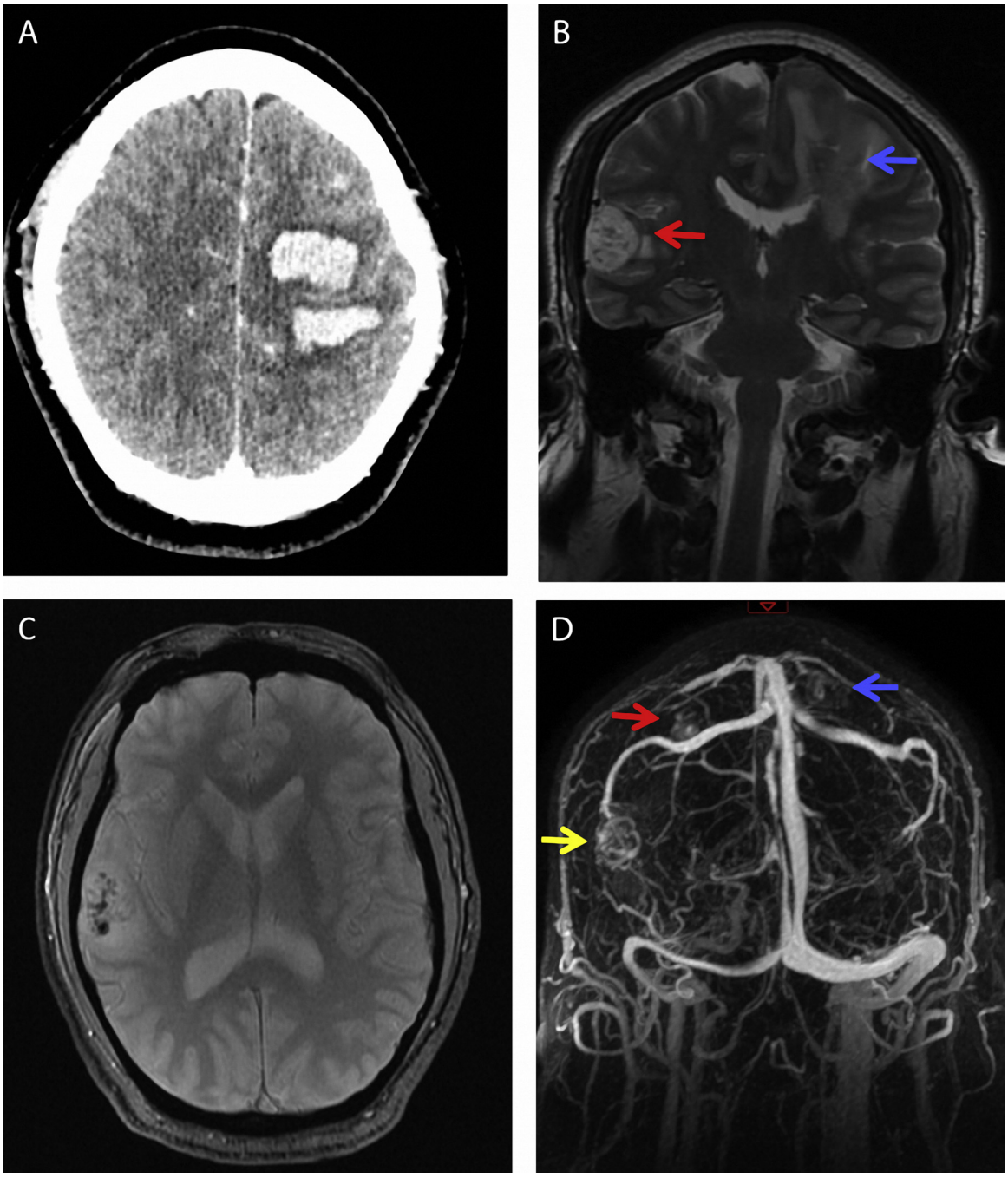

Fig. 1. A) Simple axial computed tomography showing a hemorrhage located in the left hemisphere from the semioval center to the middle frontal, pre-, and post-central gyri. B) Magnetic resonance imaging (MRI) T2 showing two lesions: 1) a heterogeneous lesion in the right superior and middle temporal gyri (red arrow); and 2) a hemorrhagic lesion with edema in the pre- and post-central gyri on the left side (blue arrow). C) MRI T2 gradient-echo showing a lesion located in the temporal lobe, with tubular forms lacking signal. D) MRI showing three vascular lesions (yellow, red, and blue arrows) with afferent vessels (arteries) and efferent vessels (veins).

The patient received additional maintenance polychemotherapy. Laboratory findings showed no further abnormalities.

During examination, the patient was awake and alert with right hemiparesis and hemianesthesia. Computed tomography (CT) performed on admission displayed a hemorrhage in the left frontal lobe. T2-weighted coronal magnetic resonance imaging (MRI) revealed three lesions in the right temporal lobe and left frontal lobe. MRI with T2-weighted gradient-echo sequence revealed a tubular formation with no signal in the temporal lobe. Magnetic resonance angiography (MRA) revealed three vascular lesions with afferent and efferent vessels (Fig. 1). Cerebral angiography displayed two AV shunts (Fig. 2). During angiography, the patient experienced sudden-onset neurological deterioration. CT scan showed a new hemorrhagic lesion in the temporal lobe, with severe cerebral edema (Fig. 2). The hemorrhagic lesion was removed via decompressive craniectomy. During surgery, the lesion was observed to have large AV shunts, arterialized drainage vein, and pedicle arterial vessels affluent to the nidus. The lesion was managed as follows: 1) its borders were exposed (this was challenging because the pial plane was absent); 2) progressive circumferential dissection of the lesion was performed and affluent arterial vessels coagulated and cut, achieving hemostasis was challenging as the feeding vessels reflected their neoplastic infiltration; and 3) the final stage involved drainage of the veins that were coagulated