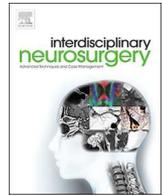




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Case Reports & Case Series

A case of recurrent gliosarcoma mimicking subdural hematoma

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ABSTRACT

The authors present the case of a patient who after undergoing craniotomy for glioblastoma resection was found to have gliosarcoma recurrence in the subdural space without intraparenchymal recurrence. A 74-year old man originally presented with the first seizure of his life and was found to have a right temporal glioblastoma multiforme. He underwent craniotomy and adjuvant chemotherapy and radiation therapy. Five months later, he presented with what was to be presumed to be a right subdural hematoma found on surveillance imaging. After expanding on repeat imaging, the patient was electively taken for burr hole evacuation, however intraoperatively thickened membranes were encountered leading to craniotomy and resection of lesion with pathology consistent with gliosarcoma. What we describe is novel because not only was there rare subdural spread of previously resected glioblastoma observed, but also transformation to the more aggressive tumor of gliosarcoma. Thus, we add to the body of literature and evidence to the clinical consideration of glioma as a rare cause of non-traumatic subdural collection. Specifically in a population of patients who have already undergone glioma resections, work up of subdural collections should include contrasted MRI beyond CT. The treatment paradigm does not change in this presentation of glioma recurrence. Surgical decompression and resection to alleviate brain compression, followed by adjuvant chemotherapy and radiation.

1. Introduction

Glioblastoma is among the most aggressive yet common primary tumors of the central nervous system (CNS) [1,2]. Patients typically present in middle age with headache, seizures, and progressive neurological deficits [3]. The vast majority of glioblastomas originate from the subcortical regions and spread through the subarachnoid space or, rarely the subdural space [4]. Here, we report a case of a patient with previous resection of a right temporal glioblastoma, who presented with what on imaging was consistent with subdural hematoma, but intra-operatively demonstrated subdural spread of tumor. Upon re-operation, the pathology showed gliosarcoma. Diagnostic and management strategies are discussed with a review of pertinent literature.

2. Case report

The patient is a 74-year old right-handed male who initially presented to an outside institution after the first seizure of his life. On work

up, he was found to have a right temporal non-enhancing lesion. (Fig. 1A) The patient underwent initial biopsy which was consistent with an infiltrating glioma (IDH wild-type, ATRX retained), subsequently followed by a right craniotomy and gross total resection (Fig. 1B). The final pathology was consistent with glioblastoma WHO Grade IV (IDH wild-type). The patient was started on temozolamide and radiation therapy (46 Gy at 2 Gy per fraction to the tumor bed plus a 2 cm margin and a 14 Gy boost in 7 fractions to the postoperative cavity and residual tumor with a 2 cm margin). On repeat surveillance imaging, it was shown that the patient had developed a right subdural fluid collection with 5 mm of midline shift (Fig. 1C), and upon follow-up imaging the collection had grown in size (Fig. 1D). The patient was electively taken to the operating room for evacuation of the collection. The operative plan was to perform two burr holes for fluid evacuation, however, thick membranes were encountered and ultimately resected via craniotomy (Fig. 2A,B). The patient did well post operatively and was discharged home. The final pathology of the membranes resected were consistent with gliosarcoma. The tumor recurred 2 months later

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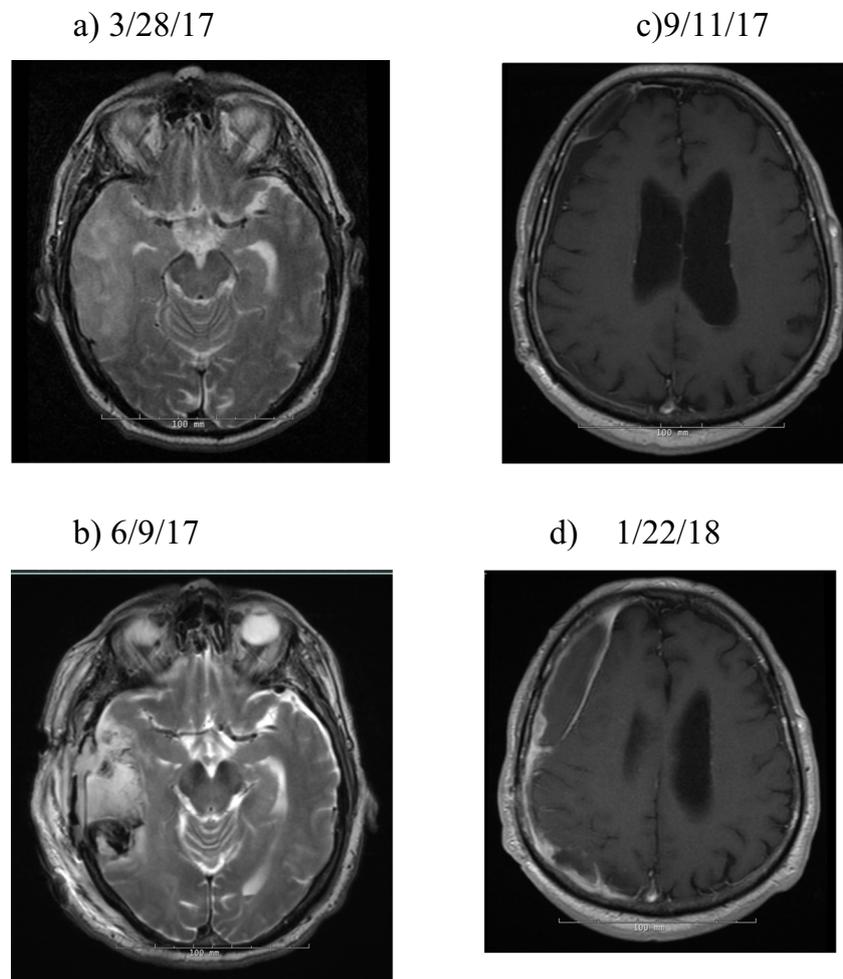


Fig. 1. a: Preoperative axial T2 weighted MRI showing right temporal lesion
 b: Postoperative axial T2 weighted MRI showing resection cavity with blood in cavity
 c: Axial post-contrast T1 MRI showing right subdural fluid with enhancing membrane
 d: Axial T2 weighted MRI showing progression of subdural fluid and enhancing membrane.

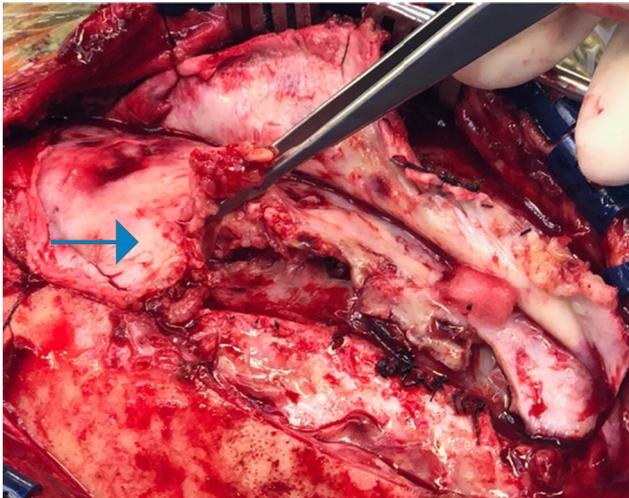
(Fig. 3A) and patient underwent a second resection. Interestingly, during surgical resection there was no intraoperative evidence of intraparenchymal recurrence (Fig. 3B,C).

3. Discussion

In this case report, we describe the report of a 74 year old male with previously resected glioblastoma and completion of adjuvant radiation and chemotherapy, taken for elective resection of what was thought to be a growing asymptomatic chronic subdural hematoma. However, on final pathology was found to be a subdural gliosarcoma. While the suspicion of recurrence is high, especially in the setting of a previously

resected glioblastoma, this particular case did not present with the typical clinical and radiographic evidence of a straight forward recurrence. The collection was first imaged five months from the original resection and upon subsequent imaging, it was found to be growing in size. Looking at the T1 sequences, membranes and septations associated with chronic subdural hematomas could be seen (Fig. 1D), as well as a hemosiderin lining upon the membranes. All of these characteristics are associated with subdural hematomas. Although the patient did not report any symptoms, given its increasing size and midline shift, the decision was made to evacuate the suspected subdural hematoma. The encounter of the thick membranes and viscous fluid intraoperatively was not characteristic of a typical subdural hematoma, and raised

a)



b)

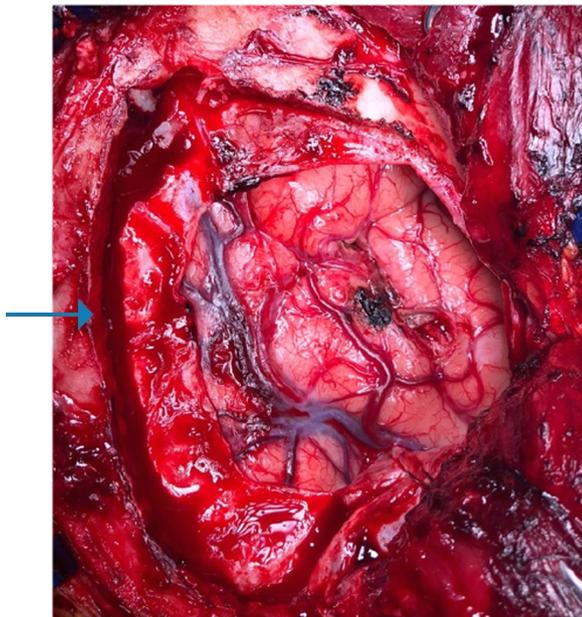


Fig. 2. Intraoperative views of thickened subdural membrane.

suspicion to send pathology and microbiology to further investigate the collection.

In the literature, the majority of glioma cases are discovered after headaches, nausea/vomiting, seizures, cranial nerve deficits, with appropriate imaging and confirmation via surgical pathology. Less common presentations of gliomas may include spontaneous intraparenchymal hemorrhage [5]. Typically, tumor recurrence and

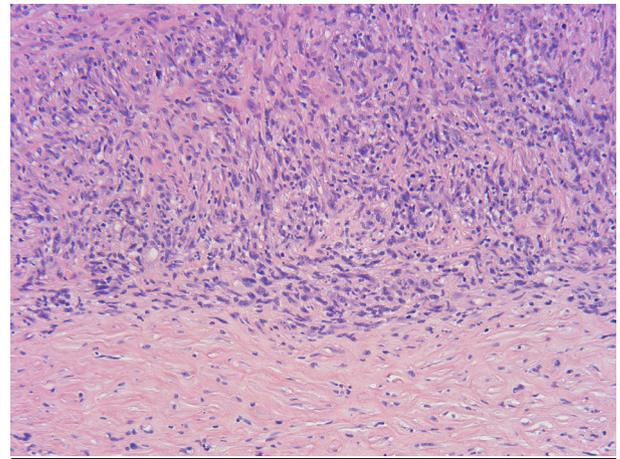


Fig. 3. Hematoxylin & Eosin stain show a subdural malignant invasive spindle cell neoplasm showing enlarged hyperchromatic nuclei with associated cytologic atypia (Gliosarcoma). X-400.

spread occurs within adjacent parenchyma and in much more rare instances, as we have described here to the subdural space. There have only been few published case studies demonstrating glioma recurrence and dissemination in the subdural space. In one notable case, a 57-year old patient with history of resected glioblastoma was admitted for both a right-sided SDH and after open evacuation [6], a tumor mass was found to be gliosarcoma in the subdural space. The patient had multiple recurrences and eventually pursued comfort care. The conclusion from that study was that to add primary brain glioma to the differential of extra-axial enhancement where treatment effect versus progression is being considered (Fig. 4).

What we describe is novel because not only was there rare subdural spread of previously resected glioblastoma observed, but also transformation to the more aggressive tumor of gliosarcoma. Thus, we add to the body of literature and evidence to the clinical consideration of glioma as a rare cause of non-traumatic subdural collection. Specifically in a population of patients who have already undergone glioma resections, work up of subdural collections should include contrasted MRI beyond CT. While these steps were undertaken in our case as well, imaging indicated chronic, septated subdural hematoma as per the discussion of imaging above. The treatment paradigm does not change in this presentation of glioma recurrence. Surgical decompression and resection to alleviate brain compression, followed by adjuvant chemotherapy and radiation.

4. Conclusion

We present a case of recurrent gliosarcoma thought to be a chronic subdural hematoma on imaging. However, after visualizing membranes intraoperatively, final pathology revealed gliosarcoma. Although rare, it is important to add recurrent glioma to the differential of non-traumatic chronic SDH.

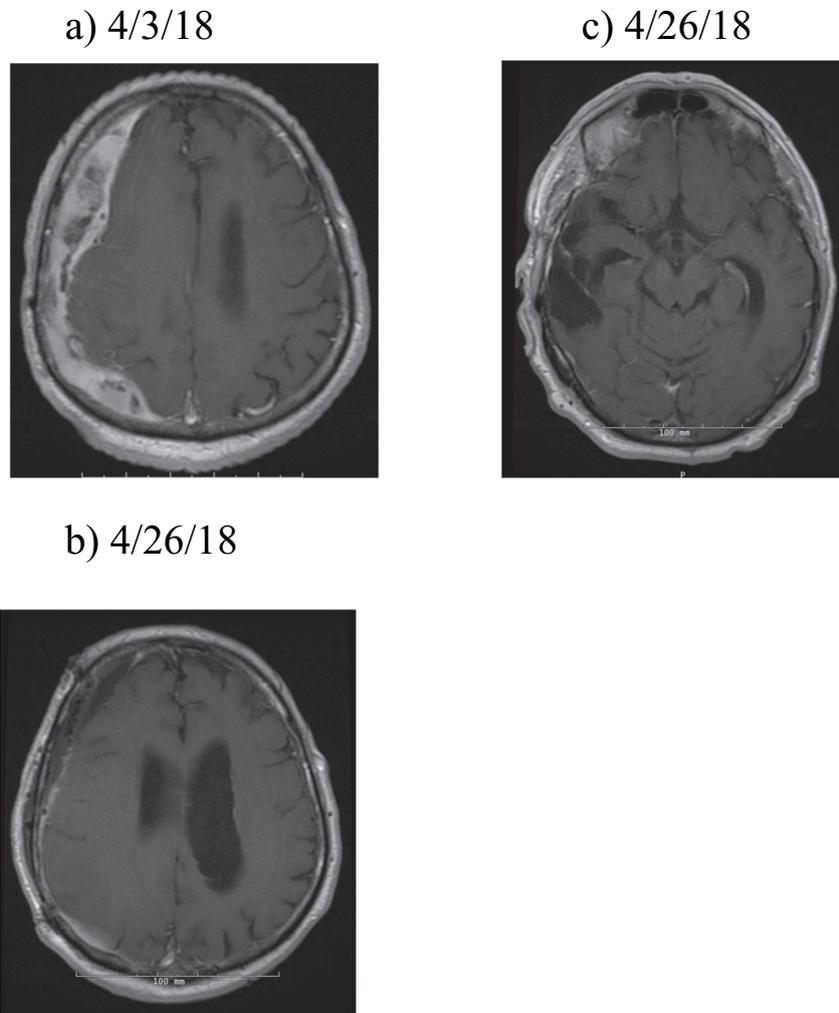


Fig. 4. a: Axial T1 weighted MRI showing significant progression in enhancing subdural mass
 b: Postoperative axial T1 weighted MRI showing resection of subdural gliosarcoma
 c: Postoperative axial T1 weighted MRI showing no evidence of temporal lobe tumor recurrence.

Conflicts of interest

We declare that we have no conflicts of interest in the authorship or publication of this manuscript.

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