Astroblastoma: A Case Report and Review of the Literature

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Disclosures:

- None
Introduction:

- Astroblastoma is an exceedingly rare tumor, comprising approximately 0.5% of all glial tumors.
- Astroblastoma typically involves the pediatric population with a supratentorial location with well-circumscribed solid and cystic components.
- Astroblastoma was first described in 1926 by Bailey and Cushing.
- The pathology of astroblastoma is distinct from ependymomas, embryonal tumors, or astrocytic masses.
- The grading, disease progression, and prognosis of astroblastomas is quite variable and unpredictable regardless of low or high-grade pathology.
- Complete surgical resection and low grade/well-differentiated tumors are associated with increased survival.
Methods:

- Here, we present a pediatric patient with a supratentorial case of astroblastoma.
Results:

- Case Presentation: A 5-year-old, otherwise healthy female presented to our emergency department with headache, several episodes of vomiting and gradually worsening periorbital ecchymoses of her left eye for several hours.

- The neurological exam revealed a left eye esotropia, but the rest of the physical exam was unremarkable.

- A head computed tomography (CT) without contrast was done and showed a heterogeneous mass lesion of hyperdensity within the left temporal lobe with adjacent subdural hemorrhage along the left cerebral hemisphere, causing effacement of the surrounding sulci, mass effect on the left lateral ventricle, and a rightward midline shift.

- Magnetic resonance imaging (MRI) revealed a large, lobulated intra-axial lesion in the middle cranial fossa, measuring 5.4 x 4.4 x 4.7 cm, causing a rightward midline shift of 4 mm with mild subfalcine and left uncal herniation. The lesion had heterogeneous signal on T1-weighted images with isointense signal corresponding to acute hemorrhage, and heterogeneously increased signal on T2-weighted and FLAIR images. The postcontrast T1-weighted images showed a nodular area of enhancement along the posterolateral margin of the lesion and evidence of mild dural enhancement over the left fronto-temporal region suggestive of dural invasion.

- The patient underwent left sided craniotomy resulting in gross total resection of the tumor in all areas except the parietal portion of tumor and involved dura adjacent to a large dilated vein. The patient had an uneventful postoperative period.
Results:

Figure 1: (a and b) Axial computed tomography scans without contrast showing hyperintense heterogeneous mass lesion in the left temporal lobe with subdural hemorrhage along the left hemisphere, effacement of the surrounding sulci and the left lateral ventricle and rightward midline shift. (c and d) Axial and coronal T1-weighted magnetic resonance images with gadopentetate dimeglumine contrast showing a heterogeneous, lobulated mass lesion with in the left temporal lobe, with a nodular area of enhancement (arrow) along the posterolateral margin of the lesion and evidence of mild dural enhancement over the left fronto-temporal region, causing mild herniation.
Results:

- The postoperative postcontrast T1-weighted MRI taken 1 day after the surgery revealed hyperintense signal likely representing blood products and surgical packing material in the resection cavity, with no evidence of residual enhancing tumor, and showed improvement in the lesion-associated mass effect including the rightward midline shift and herniation.

- MRI of spine was negative for neuroaxis dissemination.

- The pathological examination result of the resected tumor was consistent with anaplastic astroblastoma.

- The patient was treated with chemoradiation therapy with a total dose of 54 Gy radiation given in 30 fractions with daily temozolomide during the radiotherapy started 1.5 months after the surgery for the microscopic residual of the tumor that could not be resected.

- The patient had surveillance MRI scans performed every 3 months. The last MRI at 7 months post-operatively showed continued resolution of postoperative changes within the left temporal lobe with enhancement of the dura adjacent to the craniotomy but not within the postoperative bed, and no other foci of abnormal signal intensity within the brain, indicating no disease progression.
Results:

Figure 2: (a and b) Axial and coronal postoperative T1-weighted MRI scans with gadopentetate dimeglumine contrast showed no evidence of residual enhancing tumor, and revealed improvement in the lesion-associated mass effect including the rightward midline shift and herniation.
Discussion:

- Patients typically present as infants, children, or adolescents, but cases have been reported in patients as old as 73.

- This is a dearth of diagnostic and therapeutic information regarding astroblastoma in the literature making management difficult. Astroblastoma remains a distinct pathologic entity in the updated World Health Organization central nervous system tumor classification scheme.

- Radiographically, the initial MRI demonstrated findings that are common in other case reports including the lesion being intra-axial, located peripherally in the supratentorial space, heterogenous solid and cystic components (giving a characteristic “bubbly” radiographic appearance), occasional calcifications on CT scan, and a heterogenous center and contrast enhancement. Astroblastomas tend to have a relatively small amount of cytotoxic edema given their classically large size compared to glioblastoma multiforme, anaplastic astrocytoma, ependymoma, or metastatic lesions.

- Pathologic analysis of astroblastoma, even high-grade tumors, demonstrates a non-infiltrating nature of the tumor suggesting that a gross total resection may be curative. Patients who have undergone a gross total resection with low-grade pathology typically have low rates of recurrence but recurrence can occur, even as soon as 1 year after the resection.

- The role of adjuvant chemoradiation in astroblastoma is not well-established. Most cases reported in the literature report improved outcomes for high-grade astroblastoma with adjuvant chemoradiation after maximal resection. Even in cases of low-grade astroblastoma, recurrence, although more rare than in the high-grade variant, occurred sooner in the absence of adjuvant therapy.
Conclusions:

- The literature regarding management of anaplastic astroblastoma (a high-grade variant) suggests gross total resection followed by radiation and adjuvant chemotherapy leads to improved outcomes.
- In our case, a gross total resection was not possible given the adherence of adjacent vasculature. We proceeded with radiation targeted towards the remnant tumor and adjuvant chemotherapy with temozolamide given the high-grade pathology.
- Follow-up imaging demonstrated no tumor recurrence 9 months from diagnosis even with a subtotal resection.
- Previous case reports of astroblastoma demonstrate improved outcomes of adjuvant chemotherapy in terms of decreased recurrence and increased life expectancy but the majority of these patients had gross total resections.
- Our case demonstrates the role of adjuvant chemotherapy and radiation may also significantly improve survival in cases where a complete resection is not possible.
References:


