Introduction

The association between brain tumors and intracranial aneurysms has been previously described, with significant variability in the reported co-occurrence rate. Many aneurysms in published reports involved the paraclinoidal internal carotid artery, anterior communicating artery, and middle cerebral artery, and most associated tumors were meningiomas, pituitary adenomas, and gliomas. The exact relationship between intracranial neoplasms and aneurysms is unknown, but several mechanisms have been hypothesized, including increased regional blood flow, presence of dysgenetic factors, and tumor-induced injury of the arterial wall. The coexistence of these distinct clinical entities represents a management dilemma, as aneurysmal subarachnoid hemorrhage incurs a significant risk of neurological morbidity and mortality. Prior reports have documented perioperative aneurysm rupture following brain tumor resection. These findings underscore the importance of formulating a treatment strategy that addresses both lesions. We describe the management of a patient with a dural-based left temporal brain tumor associated with an unruptured anterior cerebral artery (ACA) proximal A1 segment aneurysm.

Case Presentation

A 56-year-old female presented with progressively worsening headaches and occasional convulsions with a normal neurological examination. Neuroimaging showed a large, 5x3 cm dural-based left temporal tumor causing regional mass effect. Position emission tomography showed a small, hypermetabolic lung lesion. The location of the lung lesion precluded both bronchoscopic and needle biopsies. Therefore, we counseled the patient regarding brain tumor resection to obtain a tissue diagnosis and relieve the mass effect. We performed a catheter cerebral angiogram for preoperative embolization of the tumor, and this incidentally showed a small, 2.0 x 1.6 mm unruptured left ACA proximal A1 segment aneurysm. Given the proximity of the two lesions, we counseled the patient regarding aneurysm clipping during tumor resection, and she elected to proceed with both procedures concurrently. We performed a left peritumoral craniotomy, including drilling of the lesser wing of the sphenoid bone tailored to provide access to both lesions. The tumor was resected first. Then we opened the Sylvian fissure to expose the left supracallosal internal carotid artery and its branches. The aneurysm was identified arising from the posterior wall of the left A1, immediately distal to its origin from the internal carotid artery (ICA) bifurcation. The adjacent ICA bifurcation perforators were dissected off the aneurysm neck, and the aneurysm was occluded using a single aneurysm clip. Postoperatively, the patient developed transient mild right-sided hemiparesis (4/5 muscle strength grade) that completely resolved by POD 3. Postoperative cerebral angiography showed complete aneurysm occlusion, and brain magnetic resonance imaging (MRI) showed gross total resection of the tumor with a punctate infarct in the left anterior thalamus.

The final histopathological analysis of the tumor revealed a diagnosis of small cell carcinoma of the lung. The patient was discharged to a rehabilitation facility, and she was subsequently treated with stereotactic radiosurgery of the tumor resection cavity. At 4 months follow-up, she remained neurologically intact and was undergoing chemotherapy for lung cancer.

Conclusion

The coexistence of intracranial aneurysms and brain tumors is uncommon, and the mechanisms for this association remains unclear. Patients with these dual diagnoses may be challenging to successfully manage. The surgical treatment of brain tumor alone, puts the patient at risk for perioperative aneurysm rupture. In cases for which treatment of each lesion is indicated and both can be safely accessed from a single operative approach or craniofacial, concurrent surgical intervention for the tumor and aneurysm is justifiable in appropriately selected cases. Since no consensus regarding the optimal treatment algorithm for coincident intracranial neoplasms and aneurysms exists, an individualized strategy accounting for tumor, aneurysm, and patient characteristics is necessary.

References