Single Agent Therapy with Bevacizumab for the Treatment of Atypical Choroid Plexus Tumor

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Introduction

Choroid plexus tumors are rare tumors of the brain. They account for 0.3-0.6% of all brain tumors.[1] Fifty percent of these tumors occur in the lateral ventricle, 40% in the fourth ventricle, 5% in the third ventricle, and 5% are multifocal.[1,2] Grading of choroid plexus tumors is based on World Health Organization (WHO) classification.[3] Choroid plexus papilloma is grade I, atypical choroid plexus papilloma is grade II, and choroid plexus carcinoma is grade III.

For both choroid plexus papilloma and choroid plexus carcinoma, age at presentation correlates with the location of the tumor.[4] Lateral ventricle tumors are more common in children less than 10 years old, while fourth ventricle tumors are distributed evenly up to 50 years of age. Choroid plexus papilloma is well-differentiated and usually has a benign course and carries a good prognosis after complete resection. Occasionally, there can be a malignant transformation to a choroid plexus carcinoma at recurrence. These are aggressive tumors characterized by brisk mitotic activity, increased cellularity, nuclear pleomorphism, focal necrosis, loss of papillary architecture, and invasion of neural tissue. Presenting symptoms often are related to cerebrospinal fluid obstruction, such as headache, diplopia, and ataxia.

We present a rare case of atypical choroid plexus papilloma in an adult who was treated with single agent chemotherapy.

Case Report

A 52-year-old woman was referred for chemotherapy of recurrent atypical choroid plexus papilloma. She initially was diagnosed with choroid plexus papilloma and underwent resection. The tumor recurred on multiple occasions and the patient was treated with surgery (three resections) and stereotactic radiosurgery. The last surgery was thirteen years post diagnosis. The pathology result was positive for atypical choroid plexus papilloma (Figure 1). Her last MRI (Figure 2) showed the recurrence of the tumor in the pons area. Due to the location of the tumor, she was not recommended for surgery and referred to medical oncology for systemic chemo-therapy. At relapse, the patient complained of headaches and neuropathic pain in the right neck when rotated. She also had right facial nerve palsy with numbness secondary to previous surgeries.

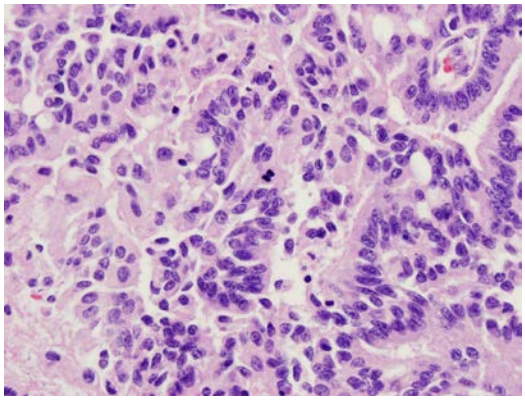

Figure 1. Atypical Choroid Plexus Papilloma shows nuclear pleomorphism (with increased mitotic activity).

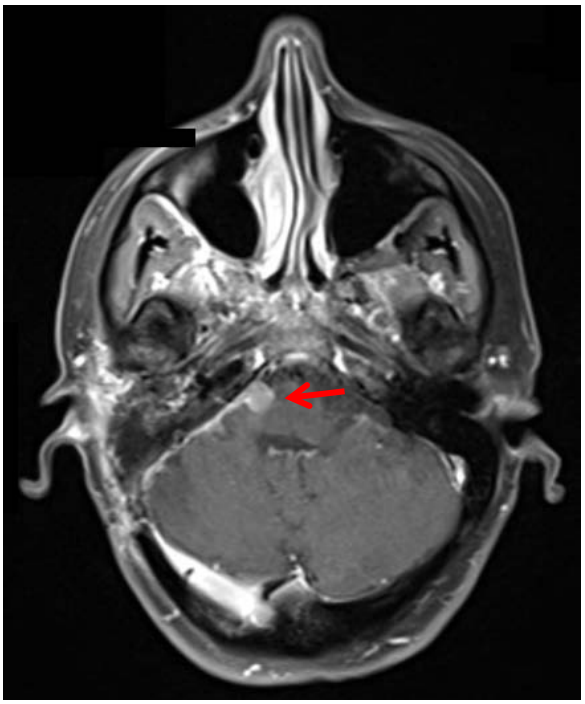

Figure 2. T1 contrast-enhanced image shows a right cerebellopontine angle papilloma (red arrow).

Bevacizumab was started as a single agent therapy, as per recommended dosing and schedule used to treat other brain tumors (e.g., glioblastoma multiforme). On a 28 day cycle, bevacizumab was administered on day one and day fifteen. The only appreciable adverse event the patient developed was grade 2 hypertension managed with oral anti-hypertensives. MRI was repeated after completion of two cycles of bevacizumab and showed stable disease.

During treatment, the patient had surgery for her right facial nerve palsy. Bevacizumab was held after four and one-half cycles (almost two months before surgery) and was restarted 45 days after surgery. MRI after surgery showed stable disease. After eight cycles of bevacizumab, a follow-up MRI showed a minimally decreased enhancing lesion involving the right cerebellopontine angle cistern near the inferior pons. The patient was maintained on single agent bevacizumab without evidence of progression.

Discussion

Choroid plexus is the neuroepithelial tissue that produces cerebrospinal fluid. Choroid plexus tumors are intraventricular, papillary neoplasms derived from choroid plexus epithelium and are supported by well vascularized connective tissue.[5,6] In 2007, an intermediate entity called atypical choroid plexus papilloma was introduced in the WHO classification of tumors of the central nervous system.[7]

Atypical choroid plexus papilloma is distinguished from choroid plexus papilloma by increased mitotic activity of two or more mitoses per ten randomly selected high power fields.[8] Up to two of the following features may be present: increased cellularity, nuclear pleomorphism, blurring papillary pattern (solid growth), and areas of necrosis.[8] Clinical features and treatment outcomes of atypical choroid plexus papilloma have not been well established in the literature. Bevacizumab acts by binding and inhibiting vascular endothelial growth factor and decreasing microvascular growth and metastatic progression.[9]

Bevacizumab's mechanism of action and the vascular nature of this tumor need further evaluation. Given the rarity of this cancer, this case report illustrated one possible therapeutic strategy if resection and/or radiation are no longer options.

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