



## Topics in Neurology

# Previously Undiagnosed Malignant Brain Tumor Discovered During Examination of a Patient Seeking Chiropractic Care



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### Abstract

**Objective:** This case report describes the diagnosis of a malignant brain tumor in a patient requesting chiropractic care for headaches after a motor vehicle accident.

**Clinical Features:** A 30-year-old man presented with numbness and tingling in all extremities, lower extremity muscle weakness, and a recent increase in headaches with the loss of ability to concentrate. He was involved in a high-speed motor vehicle collision approximately 4 months before the onset of symptoms. Examination showed slow gait with a lack of arm swing, bilateral hip flexors and knee extensors were all graded as 4/5 on muscle testing, and cranial nerve examination was unremarkable with the exception of 2 beats of nystagmus on left lateral eye movement. Because of these findings and a family history of multiple sclerosis, the patient was referred for a brain magnetic resonance imaging scan.

**Intervention and Outcome:** Imaging showed a craniocervical junction mass centered at the floor of the fourth ventricle with obstruction of foramina and marked impingement on the medulla. A posterior fossa craniotomy and tumor removal procedure was performed by a neurosurgeon, followed by 34 sessions of radiation therapy. The final diagnosis was a grade II glioma with features of ependymoma.

**Conclusions:** This report describes the clinical presentation, examination, and medical management of a 30-year-old man presenting to a chiropractic practice with an unsuspected malignant brain tumor.

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## Introduction

Primary malignant brain tumors are rare, resulting in 2% of all cancers in United States adults. They are more

common in men than in women: 7.6 vs 5.3 per 100,000 person-years.<sup>1</sup> Approximately 2000-3000 low-grade (grades I-II) gliomas are diagnosed in the United States every year. Low-grade gliomas are particularly common among white men aged 35-44 years.<sup>2</sup> The only proven environmental risk factor for the development of brain tumors is exposure to high-dose ionizing

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radiation. Other risk factors, including occupational exposures, electromagnetic radiation, pesticides, cellular telephones, and head trauma have not been causally linked.<sup>1</sup> A family history of glioma is unusual but, when observed, is associated with a 2-fold increased risk. A recent study looking at genomewide susceptibility loci found 5 new risk loci for glioma, bringing the total to 12. The authors estimated that these risk loci account for 27% of familial risk for glioblastoma and 43% of risk for nonglioblastoma tumors.<sup>3</sup> Unlike almost every other form of cancer, early diagnosis and treatment of glioma unfortunately do not improve outcomes.<sup>4</sup>

There are 5 groups of primary malignant brain tumors: neuroepithelial tumors, tumors of cranial nerves and paraspinal nerves, tumors of meninges, lymphomas and hematopoietic neoplasms, and other. Of the 5, the most common are the neuroglial tumors (subtype of neuroepithelial), which account for 80% of primary brain tumors. There are 4 grades which determine the severity of the glioma. Grades I and II are considered low grade, whereas grades III and IV are considered high grade.<sup>1</sup>

With the exception of a single case study describing a benign meningioma,<sup>5</sup> the literature is devoid of articles discussing primary brain tumors presenting to chiropractic practices. Given that the most common presenting symptom of brain tumor is headache,<sup>4</sup> this topic likely deserves more discussion in the literature.

The purpose of this article is to describe the clinical presentation, examination, and medical management of a 30-year-old man presenting to a chiropractic practice with an unsuspected malignant brain tumor.

## Case Report

A 30-year-old man presented to a chiropractic college teaching clinic with numbness and tingling into all extremities, lower extremity muscle weakness, and recent increase in headaches with the loss of ability to concentrate. He was involved in a serious motor vehicle accident approximately 4 months earlier, where his car ran into another vehicle at approximately 50 miles per hour and then struck a barrier at an angle causing a secondary impact. There was no ambulance transportation or follow-up care after the accident. There were stiffness and muscular pain following the accident, which cleared after 2 months. Shortly after recovering from the accident-related symptoms, he began feeling muscle hypertonicity in the areas of the

spine, weakness of the gluteal and quadriceps muscles, numbness and tingling into the hands and feet, and an increase in headaches. At the same time, he noticed an inability to concentrate for even short periods of time. At the time of his visit, he was taking 100 mg of CoQ-10 per day, 2 g of omega 3 fish oils per day, 5000 IU of vitamin D3 daily, a B vitamin complex, and a daily multivitamin. There was a positive family history of multiple sclerosis (MS) with his father. No family history of brain cancer was present. The patient was concerned that the most recent symptoms he was experiencing could be early signs of MS.

Vitals were within normal limits (WNL). His gait pattern was slow with a lack of arm swing. Range of motion testing of the cervical spine showed decreased motion globally. Neurological examination findings were as follows: sensory examination including sharp/dull discrimination and vibration were WNL; right wrist extensors and flexors, bilateral hip flexors, and knee extensors were all graded as 4/5 on muscle testing (others WNL); reflexes were WNL. During cerebellar testing, the patient was able to perform heel to shin; however, he had limited ability to perform Romberg test in a single leg stance for longer than 2-3 seconds. The cranial nerve examination was unremarkable with the exception of 2 beats of nystagmus on left lateral eye movement on H-pattern testing. Results of orthopedic testing including cervical compression, maximum cervical compression, cervical distraction, Valsalva maneuver, and Lhermitte test were all negative. The 2 differential diagnoses at that time included MS and a space-occupying lesion in the brain.

Because of a family history of MS, along with abnormal neurological findings on examination, the patient was immediately referred to a local imaging center for a brain magnetic resonance imaging (MRI) with contrast. The report indicated the following results (Figs 1-4): craniocervical junction mass  $4.8 \times 2.6 \times 3.8$  cm centered at the floor of the fourth ventricle with obstruction of foramina and marked impingement on medulla; well-defined margins and heterogeneous T1/T2 signal and heterogeneous enhancement; ventricles are mildly enlarged with a thin rind of hyperintense signal from transependymal edema; mild mass effect on cerebellum. The differential diagnosis provided by the interpreting radiologist was ependymoma, medulloblastoma, or other primary central nervous system neoplasm. The results were discussed with the patient, who was referred to a medical neurologist.

After meeting with his neurosurgical team, it was decided that a posterior fossa craniotomy and tumor removal procedure would be performed. This occurred

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