Case Report: Neurooncological Observations
Cavernous malformation after radiation therapy for astrocytoma in adult patients: report of 2 cases

M. Furuse, S.-I. Miyatake, and T. Kuroiwa

Department of Neurosurgery, Osaka Medical College, Osaka, Japan

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Summary

Radiation-induced cavernous malformations are rarely reported, and most cases have been children. We describe two adult patients with cavernous malformation after irradiation for astrocytoma. Magnetic resonance (MR) imaging, at their ages of 53 years, showed a cavernous malformation in the irradiated field 26 and 10 years after resection and irradiation, respectively. Cavernous malformations were confirmed by the histopathological examination in the both cases. Radiation-induced cavernous malformations are rare in adult patients with astrocytoma. One reason why we found two such cases was that these patients had been successfully treated for astrocytoma and had long follow-up periods.

Keywords: Adults; astrocytoma; cavernous malformation; radiation therapy.

Introduction

Treatment of cerebral gliomas usually necessitates irradiation after surgical resection. Injurious effects of irradiation can occur in any phase, and neoplasia is one of the delayed effects. Meningiomas, sarcomas, and gliomas have been well known as radiation-induced intracranial tumors. Some papers have also reported cavernous malformations in the irradiated field. Most cases have been children with a history of previous radiation therapy.

We describe here two adult patients who, after receiving radiation therapy for astrocytoma, presented intracerebral hemorrhage accompanied by radiation-induced cavernous malformations. This is the first report of cavernous malformation in patients who had radiation therapy at an age older than 20 years.

Case report

Case 1

A 53-year-old man had, at the age of 27, presented with headache and vertigo. Computed tomography (CT) scanning at that time showed a right cerebellar mass in the posterior fossa. The tumor was partially resected at the first operation, and the histopathological diagnosis was grade II astrocytoma. The patient received 6000 cGy local brain irradiation, including the right temporal lobe fractionated over 6 weeks. He subsequently underwent a second operation after radiation, in which a gross-total resection of the tumor was performed. Twenty-one years later, at the age of 48 years, follow-up magnetic resonance (MR) imaging showed no recurrence of the tumor in the right cerebellar hemisphere (Fig. 1a).

At the age of 53 years, 26 years after irradiation, he presented with a seizure like a drop attack. Then MR imaging showed T2 hyperintensity in the right temporal white matter (Fig. 1b). Follow-up MR imaging, performed 1 month later, revealed a T2 hypo-intense round mass lesion in the right temporal T2 hyperintense area (Fig. 1c). He underwent surgery to remove the right temporal mass: the lesion was well demarcated and was totally resected. The histopathological diagnosis was cavernous malformation (Fig. 1d). This lesion was thought to be radiation-induced because the right temporal lobe included the irradiated field.

Case 2

A 53-year-old man had, at the age of 42 years, presented with headache, and T1-weighted imaging at that time revealed a hypo-intense mass lesion in the right frontotemporal lobe (Fig. 2a). He underwent a subtotal resection of the tumor. The histopathological examination showed fibrillary astrocytoma. He then received 6000 cGy local brain radiation therapy as well as ACNU chemotherapy with β-interferon. The patient was followed up neurologically and radiologically. Follow-up MR imaging showed no other lesion (Fig. 2b).

Eight years later, at the age of 50, he showed signs of dementia, and CT scanning showed enlarged ventricles. At the age of 52, 10 years after radiation therapy, his symptoms worsened and he underwent a ventriculo-peritoneal shunt. Follow-up MRI performed 11 years after irradiation
Fig. 1. Patient 1, a 53-year-old man, treated by surgical resection and radiation therapy for a cerebellar astrocytoma. (a) MR imaging obtained 21 years after resection and radiation showed no recurrent tumor in the right cerebellum. (b) T2-weighted image 26 years after radiation revealed hyperintensity spreading in the right temporal white matter. (c) A T2 hypo-intense mass lesion had arisen in the right temporal hyperintense area one month after the previous MR imaging. (d) A microphotograph of histopathological examination in case 1 showing multiple dilated vessels forming in the sinusoid. Hematoxylin and eosin, original magnification ×80.