

LETTER TO THE EDITOR

Glioblastoma multiforme in childhood: a case report

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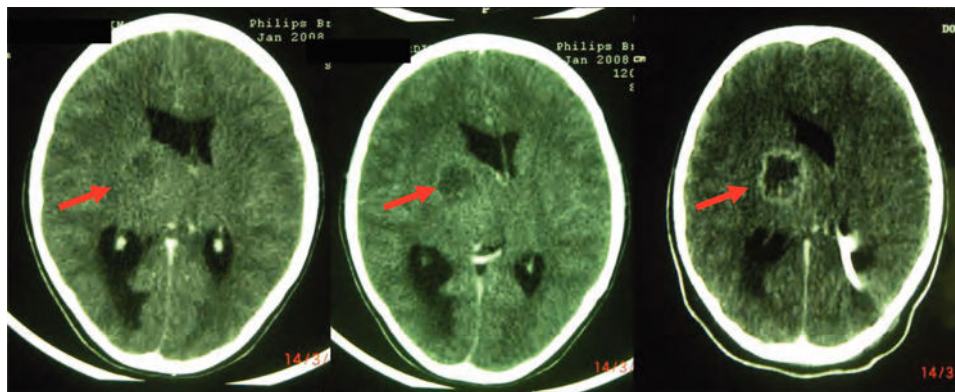


Figure 1 - Skull CT: Deep-seated cerebral lesion with an irregular outline, mass-effect, peripheral contrast uptake, and central necrosis.

INTRODUCTION

Among high-grade gliomas, childhood glioblastoma multiforme (GBM) is particularly challenging in terms of therapeutic treatment.¹⁻⁵ Cerebral tumors are the most frequent childhood solid neoplastic disorders and are the primary cancer-related cause of death among children.^{1,3} Gliomas constitute approximately 60% of all cerebral tumors, and approximately half of them are considered to be high-grade malignant tumors.¹ The prognosis for recovery is conservative, and 5-year survival rates range from 5% to 15%.^{2,6,7} This case report documents a GBM that was located deep in the right cerebral hemisphere of a 9-year-old child. Because this is a rare illness for a patient of this age, we also provide a brief literature review to supplement this case report.

CASE REPORT

A previously healthy 9-year-old girl with adequate neuropsychomotor development was admitted to the hospital with a 15-day-long hemiparesis and disorientation. A skull computerized tomography (CT) scan showed a deep-seated, irregularly shaped expansive lesion on the right of brain, with peripheral contrast uptake that was

impinging on and obstructing the cerebrospinal fluid (CSF) pathways (see Figure 1). We performed a ventriculoperitoneal shunting and stereotactic biopsy of the lesion. The histopathology showed a pleomorphic neoplasia, which was associated with vascular neoformation, and necrosis with elongated cells and hyperchromatic and pleomorphic nuclei that had atypia and mitotic figures. The immunohistochemistry (see Table 1) was positive for the glial fibrillary acidic protein (GFAP), Ki-67 proliferation antigen, and S-100 protein. These findings, along with the morphological features and the presence of necrosis, confirmed the diagnosis of GBM (see Figure 2). The patient, whose level of consciousness improved with steroids but whose motor functioning remained impaired, was referred to radiotherapy. After 40 days, there was a significant neurological worsening with hemiplegia and a fluctuating level of consciousness. Skull CT and MRI results showed an increase of the lesion size (see Figure 3). A craniotomy with a partial tumor removal was performed to reduce the

Table 1 - Antigens that were used for the immunohistochemistry.

Antigens	Clone	Result
Glial fibrillary acidic protein (GFAP)	Polyclonal	Positive
Ki-67 cellular proliferation antigen	M1B1	Positive
S-100 protein	Polyclonal	Positive
Neu-N	MAB377	Negative
CD45RB – leukocyte-common antigen (pan-hematopoietic)	PD7/26/16&2B11	Negative

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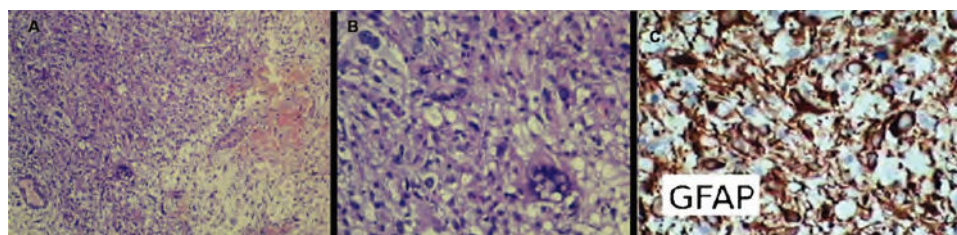


Figure 2 - A, B: Histological sections of cerebral tissue showing areas of elongated cells with pleomorphic and hyperchromatic nuclei that are associated with vascular neoformation and extensive hemorrhage and necrosis. C: Immunohistochemistry positive for GFAP.

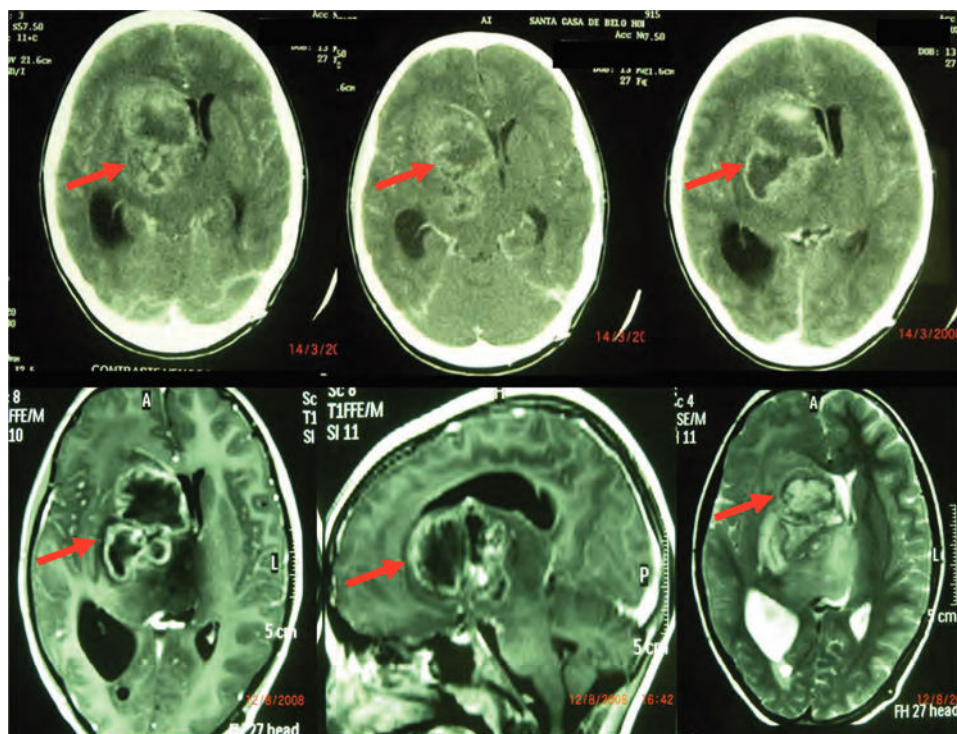


Figure 3 - CT (above) and MTI (below): A large lesion impinging on the thalamus and basal ganglia with peripheral contrast uptake and central necrosis.

intracranial hypertension. The patient died ten days after the procedure.

DISCUSSION

Malignant gliomas are rare in childhood, comprising approximately 6.5% of all intracranial neoplastic disorders in the pediatric population. Although these gliomas may occur in any anatomical site within the central nervous system, they are most frequently located in the supratentorial site.^{1,3,5} Males are slightly more affected than females (male:female ratio = 1.5:1). In terms of histology, anaplastic astrocytomas are characterized by hypercellularity, nuclear atypia, mitotic figures, nuclear pleomorphism and vascular proliferation; GBM also has associated necrosis.^{2,6}

Children with high-grade gliomas present with a variety of signs and symptoms that chiefly depend on their age and the tumor localization. The rate of neurological impairment is characteristically quick and may range from months to

days. Seizures may herald the onset, especially when tumors are close to the cerebral cortex. Other common clinical manifestations include hemiparesis, visual deficit, headache, and, in some cases, signs of intracranial hypertension due to an obstruction of the CSF pathways.²⁻⁸ In our case, the first clinical manifestation was hemiparesis and clouding of the consciousness, with rapidly evolving intracranial hypertension despite partial removal of the tumor.

A brain MRI is the investigational tool of choice for determining a GBM diagnosis.^{1-3,8} In this case, there was an irregularly outlined, deep-seated cerebral lesion with a mass effect, peripheral contrast uptake and central necrosis. Such findings are consistent with the literature.^{1,3}

The treatment of malignant gliomas is still a challenge, particularly in children. Chemotherapy and radiotherapy, far from being satisfactory treatment options, are associated with a significant rate of morbidity.⁹⁻¹² Present day treatment includes tumor resection, local radiotherapy,

and chemotherapy, which are approaches that promote an improvement in the length of survival but do not seem to change the inexorable course of the disease.^{1,3-5,13,14}

Our patient developed obstructive hydrocephalus that demanded ventriculoperitoneal shunting. A subsequent stereotactic biopsy led to the histopathological confirmation of GBM. We chose to perform radiotherapy and chemotherapy. The quick, unfavorable evolution of the disease precluded the use of chemotherapy and led us to try a partial tumor resection for decompression, which was ultimately unsuccessful.

The role of adjuvant chemotherapy for the treatment of pediatric high grade gliomas (HGGs) was established in the 1980s,¹⁵ which is based on the results of a randomized Children's Cancer Group study using lomustine and vincristine. Recently, studies have shown a small increase in survival rates using temozolomide and lomustine to treat pediatric HGGs.¹⁶ These studies have demonstrated that surgery, chemotherapy, and radiotherapy were ineffective in achieving long-term survival. There have only been anecdotal reports of good results in the treatment of glioblastoma in children. Further research on this disease is needed so that better treatments may be developed to improve the quality of life and prognosis of these patients.

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