Case report

Glioblastoma multiforme in a 12 years old boy

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Abstract:

This is a rare case of a fit twelve-year-old male child, who presented with headache and convulsions. MRI showed 5x5 cm right tempro-parietal mass. Surgery was performed, and histopathology and immune-histochemistry confirmed the diagnosis of gliobastoma multiforme. He received external beam radiotherapy in a dose of 54 Gy in 27 fractions, concomitant with daily oral Temozulamide, followed by adjuvant monthly Temozulamide for six months. He remained well and died two and half years after treatment due to disease progression.

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Introduction:

Malignant gliomas are rare in children, forming about 3 % of all primary intracranial neoplastic disorders. Glioblastoma multiforme is extremely rare in children [(1)]. Malignant gliomas can occur in any site in the central nervous system, but they are more frequently located in the supratentorial area [(1)]. The male: female ratio is 1.5: 1 [(2)]. The mean age in children was reported as ranging between 8.8 and 12.years [(3)]. The clinical presentation in children varies according to age and tumor site. Seizures and headaches are common, especially if the tumor is close to the cerebral cortex [(4)]. MRI is the investigation of choice [(5)]. Treatment is challenging in children, and usually includes surgery, radiotherapy and chemotherapy.

Case report:

A twelve-years-old boy, with a good performance status, presented with two months history of headaches, convulsions and left hemiparesis (Figure 1). MRI showed a well-defined 5x5 cm right fronto-parietal mass encroaching on the supra-sagital area (Figure 2). He underwent surgery. Pathology was positive for glioblastoma multiforme; positive for glial fibrillary acidic protein (GFAP) Ki 67 = 60%, S 100 positive.

Following surgery, he was given a course of external beam radiotherapy, using two lateral wedged fields, to the tumor bed and a 2 cm margin, by co 60, in a dose 54 Gy in 27 fractions over five and a half weeks, and concomitant Temozolamide (TMZ) 75 mg/m^2 for 42 days; vincristine 1.4 mg/m^2 weekly and prednisolone, followed by four weekly Temozolamide 200 mg/m^2 for five days every four weeks for six months. He tolerated his treatment very well and was seen after six month.

He regained his left body side power, with no symptoms of raised intracranial pressure. His MRI (Figure 3) showed evidence of partial response. He was seen again after one year, with no significant symptoms or signs. Then, after one year he presented with severe headaches and convulsions, went into coma, and died in hospital.

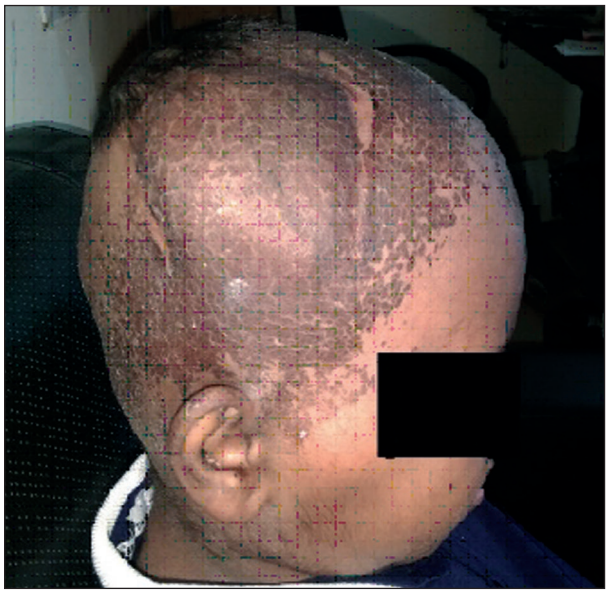

Figure 1. Photograph of the child

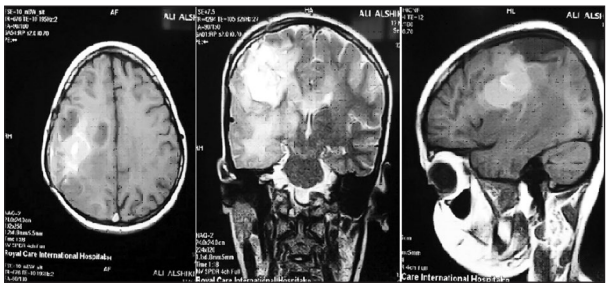

Figure 2. Pre-treatment MRI images:

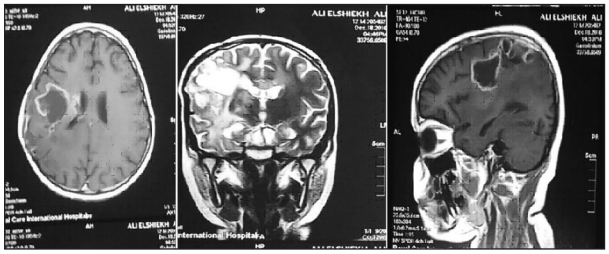

Figure 3. Post- treatment MRI images:

Discussion:

We report the first case of paediatric GBM from Sudan. Gliomas are the most aggressive primary brain tumors. They account for about 3% of primary pediatric brain tumors [1]. The youngest child diagnosed with GBM was 3.5 years old; the eldest was 13.5 years old [3]. Site distribution showed that 65% arise in the cerebral hemispheres; 20% in the thalamus and hypothalamus and the diencephalon; 15% in the cerebellum and brain stem [6]. In spite of modern multimodality treatment, including surgery, radiotherapy and chemotherapy, survival remains very poor in most series, with 2-year overall survival rate of 52 % and 5-year overall survival of 35- 40 % [7].

The initial standard treatment is surgery, with maximum possible safe margins. The extent of surgery is an important prognostic factor; even with this approach, there will be residual microscopic tumor tissue [8]. So, radiotherapy should be given specially in children older than three years of age. Radiotherapy is given to the tumor bed with a margin. The usual dose is 50–60 Gy, conventional fractionation: 180-200 Cgy per fraction [9].

Chemotherapy was first introduced in the treatment of high grade gliomas in children in the 1970s. The CCG 943 trial, randomized children with high grade gliomas following surgery into local radiotherapy alone 54 Gy vs. local radiotherapy 54 Gy and concomitant chemotherapy, vincristine, lomustine and prednisolone (PCV); results showed 5-year events-free survival of 46% in the chemotherapy group and 18% in the radiotherapy alone group, a statistically significant difference [9] .

Unfortunately, a number of subsequent chemo-radiotherapy trials over the last 40 years failed to show a similar outcome. The following study, the CCG 945, randomized children with high grade gliomas into local radiotherapy and PCV as in CCG 943 vs. an experimental arm of the so-called eight in one regimen, all given within short period (vincristine, prednisolone, hydroxyurea, lomustine, cytarabine, dacarbazine, procarbazine, cisplarinum), for two cycles given before radiotherapy. There was no statistically significant difference in the outcome between the two arms [10].

In adults, high grade gliomas, Bevacizumab, an anti-angiogenic agent which blocks the vascular endothelial growth factor (VEGF) has shown promising benefit in recurrent high grade gliomas [11]. So, a similar trial was done in children, (the PBTC 022) using Bevacizumab and CPT 11, in children with recurrent high grade gliomas and diffuses intrinsic pontine gliomas. Thirty one children

received a median of two cycles of Bevacizumab and CPT 111. It was well tolerated, but showed minimum efficacy [12].

Supriya et al reported a study of 23 pediatric GBM patients treated with concomitant radiotherapy 60 Gy in 30 fractions over 6 weeks, with daily Temozolamide (TMZ) 75mg/m^2 ,followed by 6 cycles of TMZ 150—200 mg/m^2 every four weeks for six cycles vs. concomitant treatment alone. The median overall survival was 8 months for the concomitant treatment only vs. 41.9 months for the adjuvant arm, p ==0.081[13].

Mansour et al reported 23 cases who were treated with surgery, radiotherapy and chemotherapy. The mean survival was 16 months. Two cases survived for more than 5 years. Thus, significant prognostic factors were: age, radiotherapy dose and performance status [14].

Perkins et al from the University of Washington reported 24 cases in the period 1970—2008, mean age =11 years; median survival was 13.5 months [15].

Declaration:

No conflict of interest

No grant received.

Consent: informed parents' consent was obtained.

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