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(CASE REPORT)

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Gliosarcoma as a rare variant of glioblastoma: 6-Case clinical trial and literature review

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Abstract

Gliosarcoma is a rare and highly malignant central nervous system tumor that accounts for 1% to 8% of glioblastomas; it usually occurs in middle-aged and older adults between 40 and 60 years of age and is rare in children. Here in, we present a retrospective study of 6 cases of gliosarcomas diagnosed at the Mohamed V Military Instruction Hospital (HMIMV). A review of clinical, radiological, therapeutic and evolutionary data was carried out. Treatment consisted of a complete macroscopic resection for 5 patients, completed with an adjuvant radiotherapy with temozolomide, the median survival time of our cases was 9,4 months. As a conclusion, there is a lack of a definitive treatment that significantly improves prognosis for gliosacroma's tumor, so more case reports of GS should be conducted, which would allow a clearer diagnosis and improved treatment methods and prognoses.

Keywords: Glioblastoma; Gliosarcoma; Isocitrate Dehydrogenase; Brain Tumor; Macroscopic resection; Temozolomide.

1 Introduction

Glioblastoma (GBM) is a predominant form of brain cancer, which arises mainly from glial cells [1]. Among its variants Gliosarcoma (GS) is a rare isocitrate dehydrogenase wildtype (IDH-WT) representing up to 2- 8% of all GBMs cases. Histologically, GS tumors are characterized by a biphasic growth pattern composed of both gliomatous and sarcomatous components [2,3]. According to the World Health Organization (WHO) 2021 guidelines of nervous system tumors' classification, GSs are classified as a subtype of GBM: WHO grade IV astrocytoma [2,3]. The age of onset is similar to that of glioblastoma with a preference between 40 and 60 years (mean age of 52.1 years) and a male predominance with a sex ratio of 1.4 to 1.8/1 [4]. The aim of our work is a to review clinical, therapeutic and evolutionary characteristic of 6 cases of gliosarcomas patients diagnosed at the Mohamed V Military Instruction Hospital (HMIMV).

2 Cases descriptions

This is a retrospective study of 6 cases of cerebral gliosarcomas collected in the neurosurgery service of Mohamed V Military Instruction Hospital (HMIMV). The diagnostic criteria were established according to the WHO classification of nervous system tumors. A review of the clinical, radiological, therapeutic and evolutionary features was carried out.

2.1 Epidemiological features

We retrospectively evaluated the 6 gliosarcoma cases we found. Of the 6 patients, 4 (66%) were male and 2 females (30%), with a median age of 52.5 years (range, 36–81). Regarding tumor location, they were 3 temporoparietal, 2 temporal and one parietal (Table1).

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Table 1 Demographical features of patients

Cases	Age	Sex	Tumor location
Case N° 1	Male	81	Right temporo-parietal
Case N° 2	Female	36	Right temporo-parietal
Case N° 3	Male	48	Right temporal
Case N° 4	Female	46	Left temporo-parietal
Case N° 5	Male	50	Left temporal
Case N° 6	Male	54	Right parietal

2.2 Clinical signs features

Clinical examination on admission for the 6 cases found conscious patients with a Glasgow Coma Score (GCS) of 15. The clinical symptomatology was dominated by Headaches. Table 2 lists the clinical signs manifested in the 6 cases of gliosarcoma studied.

Table 2 Clinical symptoms of patients

Cases	clinical signs
Case N° 1	Headaches, Speech disorders, Deviation of the mouth Weakness of the left hemibody, Left hemiparesis with facial paralysis
Case N° 2	Appearance of permanent and progressive diffuse headaches resistant to usual analgesics, Easy projectile vomiting and notions of visual blur; with recent history of generalized epileptic seizures
Case N° 3	Dizziness, headaches, Epileptic seizures
Case N° 4	Weakness on the right side of the body, Generalized seizures progressing.
Case N° 5	Helmet headache Generalized epileptic seizure
Case N° 6	HTIC syndrome Cognitive disorders.

2.3 Diagnosis assessment

Magnetic resonance imaging (MRI) was performed in the six cases. All tumors presented as lesions with irregular contours. The MRI of Patient N°2 revealed a right temporo-parietal mass measuring (41 × 41 × 46 mm) with perilesional edema determining a moderate mass effect on the midline structures and the left lateral ventricle (Figure 1&2). Then pathological exams including histochemical and immunohistochemical study were done and confirmed the diagnosis of gliosarcoma in all cases.

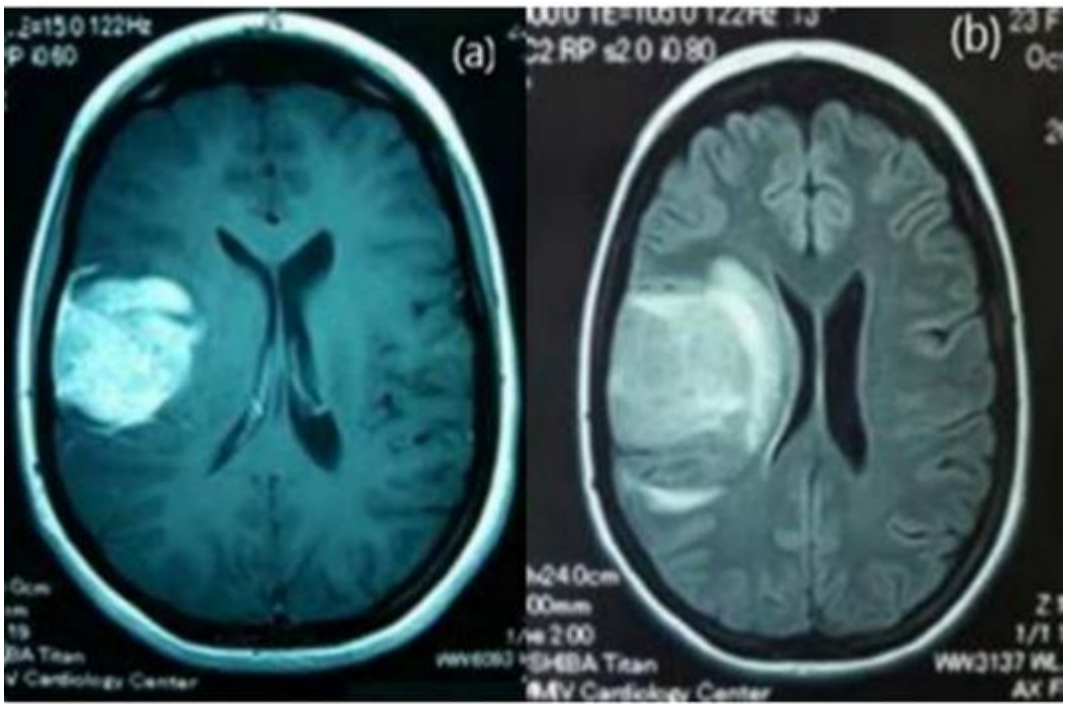

Figure 1 Axial T1-weighted Magnetic resonance imaging (MRI) with contrast enhancement (a) and Flair MRI (b) showing a heterogeneous enhancing mass in the right temporo-parietal region of patient N° 2.

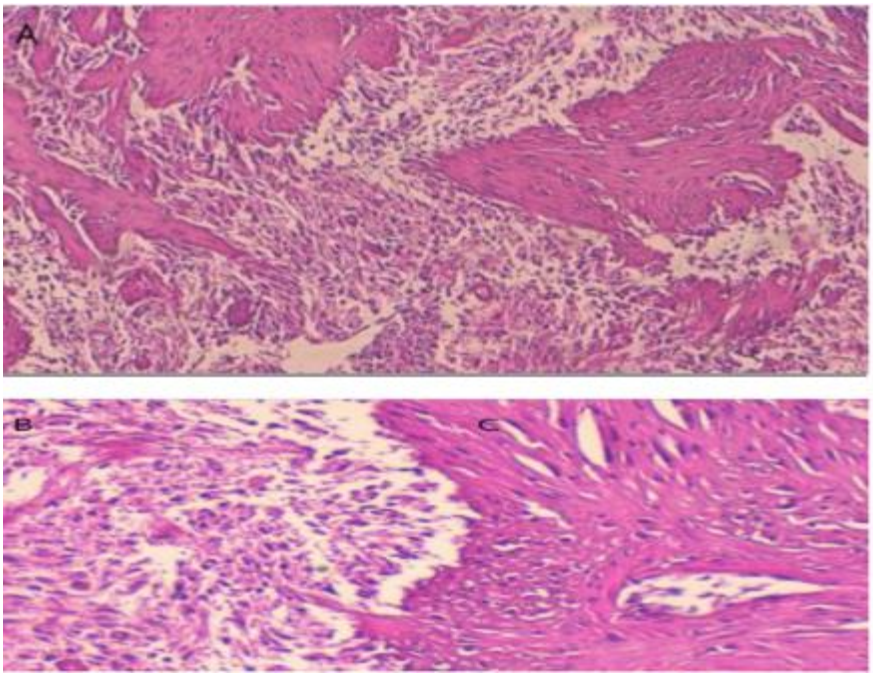

Figure 2 Tumor proliferation with dual glial and sarcomatous component (HES×100); (B) the glial component is made of pleomorphic cells with atypical nuclei and numerous mitoses (HES×200), (C) the sarcomatous component has a spindle cell appearance with cells with hyperchromatic nuclei (HES×200)

2.4 Therapeutic and evolutionary features

Treatment consisted of a complete macroscopic resection for 5 patients, only one patient who did not undergo surgical treatment given his age (Case 1: 81 years old). 4 of 5 patients, surgical treatment was supplemented by adjuvant radiotherapy with temozolomide. Concerning the evolutionary follow-up, recurrences were diagnosed in 1 patient (case 3). One patient died postoperatively (case 6) and for the other 5 patients, they died after a mean follow-up of 9.4 months (range: 2-27 months) (Table 3).

Table 3 Treatments received and monitoring of the 6 cases studied

Cases	Treatment	Survival period
Case N° 1	No surgery Hypofractionated radiotherapy	2 months
Case N° 2	Surgery: temporo-parietal craniotomy on the left side + one maximal macroscopic resection) Adjuvant radiotherapy with temozolomide	5 months
Case N° 3	Surgery: complete macroscopic resection Adjuvant radiotherapy with temozolomide Surgery: total surgical excision Bevacizumab-based chemotherapy	27 months
Case N° 4	Surgery: Left temporo-parietal craniotomy with maximal macroscopic resection Adjuvant external radiotherapy with temozolomide Surgery: 20 mm expansion with inclusion of perilesional edema	06 months
Case N° 5	Surgery: Complete macroscopic resection Adjuvant external radiotherapy with temozolomide	07 months
Case N° 6	Surgery: Complete macroscopic resection No adjuvant radiotherapy	01 months

3 Discussion

Gliosarcoma (GS) is a rare and highly malignant central nervous system (CNS) tumor, it usually occurs in the middle-aged and older patients; it rarely presents in children, with a male predilection [4,5,6]. Equivalent to the literature, 4 of our series of 6 cases consisted of male patients and the mean age was 52.5 years old.

The location of gliosarcoma is usually the supratentorial region and the most common involvement is the temporal lobe. This is followed by the frontal lobe, parietal lobe, and occipital lobe, respectively [4]. The localization of our cases, we had 3 tempo- parietal lobe, 2 temporal and 1 parietal lobe localization.

Regarding the clinical signs of GS are not specific, depending on the site in which the tumor occurs [7]. Analysis of the literature revealed that GS tumor can manifest with intracranial hypertension syndrome characterized by symptoms ranging from headache, projectile vomiting, and hemiparesis up to more severe conditions such as the state of drowsiness and, finally, coma [8]. Han et al explain that this is due to the mass effect given by the tumor and the extensive peri-lesional edema or acute, intra-lesional, or more rarely peri-lesional symptomatic intracranial bleeding [8]. Some of these symptoms appeared in our studied patients (table 2).

To date, there is no specific treatment for GS. Currently, standard GBM treatment is adopted for GS patients with good Karnofsky Performance Status (KPS) [6]. Summarizing the findings reported in the reviewed literature, maximal Safe Resection (MSR) associated with a concomitant Radio- and Adjuvant Chemotherapy (Temozolomide) reduces the mortality rate in both cancers and leads to an increased outcome compared to the single treatment (on average 8–10 months) [6,7,9].

Several previous studies have demonstrated the efficacy of adjuvant chemotherapy to surgery and radiotherapy, more precisely Temozolomide who is affirmed an effective treatment for GS and still represents the most widely used

chemotherapy drug to manage these tumors. However, its benefit is not clear [6,9, 10, 11]. The same protocols were applicated for our case series, only one patient (case N°1) who did not undergo surgical treatment given his age (81 years), and patient N°6 did not respond to these adjuvant radiotherapy sessions, since he died post-operatively.

However, despite the use of standard treatments, the prognosis remains unsatisfactory or even poor [6,10], The median survival period after aggressive treatment is only a few months [5,12]. Previous case reports found that GS has a median survival of 9 months, compared to other forms of GBM associated with an average of 15 months survival [9,11,13]. The median survival time of our cases was 9,4 months.

4 Conclusion

In conclusion, there is a lack of a definitive treatment that significantly improves prognosis for gliosacroma's tumor, the patients' mean survival rate averages is still less than a year even with aggressive surgical treatment coupled with postoperative radiotherapy and chemotherapy. Therefore, more case reports of GS should be conducted, which would allow a clearer diagnosis and improved treatment methods and prognoses.

Compliance with ethical standards

Disclosure of conflict of interest

There are no conflicts of interest.

Statement of informed consent

Patient's consent not required as patients' identity is not disclosed or compromised.

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