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Cerebral gliosarcoma: prognostic factors

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Abstract

The authors report their results in a retrospective study of 6 cases of gliosarcoma. In 3 cases gliosarcoma presented features similar to those of glioblastoma, both at CT scan and macroscopically; in the other 3 cases they resembled meningioma. Average survival varied considerably and was correlatable to the CT features of the lesion (14 months for glioblastoma, 7 for meningioma). It seems likely that patients who have gliosarcoma with CT features suggestive of meningioma may have prolonged survival.

Keywords: CT finding, gliosarcoma, survival.

1 Introduction

Gliosarcoma is a relatively rare malignant primary tumor accounting for 1.7–2.3% of all gliomas and about 8% of glioblastomas [7, 8]. Many reports have focused on the histogenetic and pathological aspects of this tumor, but its CT characteristics were not studied until recently [4–6].

We report 6 cases of cerebral gliosarcomas and discuss the correlations between the CT findings and prognosis of these tumors.

2 Materials and method

Six cases of histologically confirmed cerebral gliosarcoma were examined. Histopathological studies included routine H and E stains as well as immunoperoxidase stains for neuro-specific enolase, GFPA, keratin, S-100, and stains for mucin and reticulin. The histological pattern and staining characteristics of two distinct populations of tumor cells was consistent with gliosarcoma.

All patients had CT brain scans with and without contrast enhancement and all were treated by surgery and postoperative radiotherapy. The radiological, therapeutic, and prognostic features of these 6 patients are reported in table I.

3 Results

There were four women and two men, ranging in age from 56 to 68 years (average age 62 years). The average length of clinical history was three months (range 1–6 months). Neurological symptoms were intracranial hypertension (6 patients) and hemiparesis (4 patients). The tumor was located in the temporal lobe in two patients, in the parietal lobe in one, in the frontal lobe in one, in the parietooccipital lobes in one and in the parieto-frontal lobes in one.

CT scans obtained before the administration of contrast media showed a dishomogenous lesion in three patients and a hyperdense lesion in three. After contrast, enhancement was peripheral in the three dishomogenous lesions, marked and irregular in the three hyperdense lesions (Figures 1–3).

At operation, three tumors showed hard and well-defined borders, between 2 and 3 cm in size in three cases; the other three tumors were larger than 3 cm, soft and infiltrating the cerebral parenchyma. Gross total removal was performed in all patients and fol-

lowed by postoperative whole-brain radiotherapy (total dose 50 Gy).

Histological examination showed a mixture of sarcomatous and gliomatous components in two cases, whereas the gliomatous component was prevalent in two and the sarcomatous component in two.

Average survival in these six patients was 10.5 months (range 6–20 months) and death was always due to a recurrence of the tumor.

4 Discussion

Gliosarcoma is a tumor consisting of neoplastic glial cells and a spindle-cell sarcomatous components. The histological origin of gliosarcoma is controversial; the sarcomatous component might be the result of neoplastic degeneration of the mesenchymal cells, of neoplastic growth of the endothelial vasal elements within the gliosarcoma of glial and sarcomatous neoplastic elements that appear de novo and at the same time [3, 8, 10, 11]. During tumor growth, the glial and sarcomatous elements may be separate or intermixed.

Gliosarcomas are usually situated supratentorially with a predilection for temporal lobes; the second- and third-most common sites are the frontal and parietal lobes. The majority of patients were between 50 and 70 years old [7, 8]. The CT characteristics of gliosarcoma have been described previously and were similar to the ones we observed [5, 6]. It is interesting to note that 1) gliosarcoma normally has CT features similar to that of glioblastoma and/or anaplastic astrocytoma (dishomogenous hyperdensity and large necrotic areas); however, it may also mimic meningioma (hyperdense lesion with marked and rather homogenous enhancement) especially when localized in the vicinity of less homogenous density; 2) it does not possess a large base of attachment on the skull; 3) it is accompanied by peritumoral edema.

Gliosarcoma is considered to have a prognosis rather similar to that of glioblastoma, depending on the grade of gliomas (median survival was 9 months) [3, 6–9]. Clinically, both radiotherapy and chemotherapy have been utilized in the treatment of gliosarcomas, but no definitive effect on survival has been noted [6–9]. However, infantile gliosarcomas, so-called sarcogliomas, may react favorably to treatments [9].

In a recent study of five cases of gliosarcoma, MAIURI [6] observed that two patients with a long survival presented some particular features: 1) radiological and CT appearance suggesting meningioma; 2)

Table I. Summary of our cases

Case	Age (yrs) sex	Clinical presentation [duration (mos)]	Site dimension	Findings on CT Plain	Contrast	Histology	Survival (mos)
1	56 Female	HI-HE [1]	R/PAR 5 cm	DIS	DIS	G	4
2	66 Male	HI [2]	R/T 2 cm	HY	MA	S	16
3	66 Male	HI-HE [2]	L/FR 2 cm	HY	MA	S	14
4	58 Female	HI [6]	R/PAR-FR 5 cm	DIS	DIS	G	7
5	68 Female	HI-HE [3]	L/T 4 cm	DIS	DIS	Mixed	10
6	58 Female	HI-HE [4]	R/P-OC 3 cm	HY	MA	Mixed	12

DIS = dishomogenous; FR = frontal; G = prevalence of the gliomatous component; HE = hemiparesis; HI = intracranial hypertension; HY = hyperdense; L = left; MA = marked; PAR = parietal; OC = occipital; R = right; S = prevalence of the sarcomatous component; T = temporal

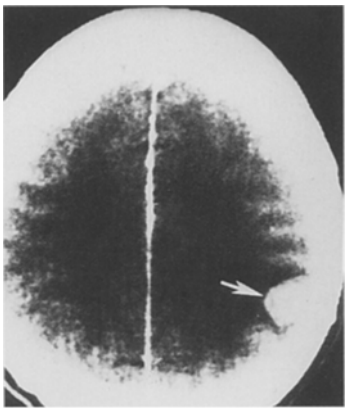

Figure 1. Case 1. A contrast-enhanced CT scan. In the right parietal region is a round lesion with a central area of hyperdense ring-shaped peripheral enhancement with defined limits.

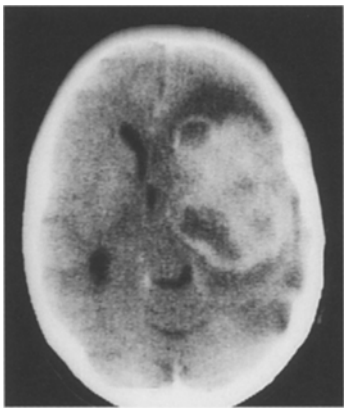

Figure 2. Case 4. CT scan with contrast enhancement a large dishomogenous gliosarcoma showed in the right parieto-frontal region

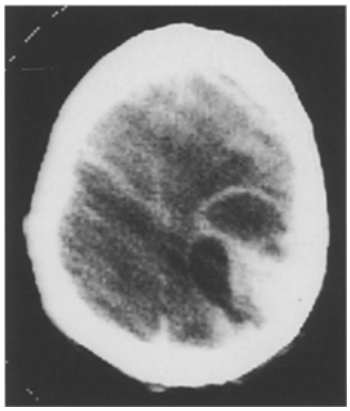

Figure 3. Case 6. CT scan showed a dishomogenous mass in the right parieto-occipital region.

histological prevalence of the sarcomatous component (in 1 of the 2 cases). In our six cases too, average survival was longer (14 vs 7 months) in the three gliosarcomas with the following characteristics: 1) hyperdense CT appearance with marked, irregular enhancement; 2) smaller-sized, hard tumors with well-defined borders at macroscopic examination; 3) prevalence of the sarcomatous component (in 2 of the 3 cases). It, therefore, seems reasonable to confirm MAIURI's theory that the CT features of gliosarcoma correspond to particular macroscopic features that may be correlated to more prolonged survival times. We believe that the longer average survival of gliosarcomas with a CT appearance mimicking meningioma is probably linked to the fact that such tumors can be removed more completely and may be more responsive to radiotherapy, especially if they area small (as in our cases). Similar relationships were also observed in sarcomas of the soft tissue [1].

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