Gemistocytic Glioblastomas: Review of two Cases

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ABSTRACT
We report two cases of de novo Gemistocytic glioblastomas. In case one, a 35 year male presented with features of raised intracranial pressure and rapid neurological deterioration. In case 2; a 73 year old male presented with rapid neurological deterioration and focal neurological deficits. In both cases imaging findings were suggestive of high grade malignancy involving the brain. This was confirmed as gemistocytic glioblastoma after surgical excision. Gemistocytic cells are large astrocytes with plump processes and massive accumulation of glial fibrillary acidic protein (gemistocytes). Their accumulation within astrocytomas may be due to bel-2-mediated escape from apoptosis. In literature, exact incidence of these types of lesions is not known and it needs further evaluation.

Key words: Gemistocytic glioblastomas, Gemistocytes, Glioblasotma

Introduction
Glioblastoma (WHO Grade IV) is the most frequent and malignant type of human brain tumor, occurring at an incidence of two to three new cases per 100,000 population annually for most European and North American countries (1). Despite progress in surgical and adjuvant therapy, the mean survival of patients with this neoplasm is still less than one year (2, 3). Glioblastomas may develop rapidly, with a short clinical history de novo (primary glioblastoma), or more slowly, through progression from low-grade (WHO Grade II) or anaplastic (WHO Grade III) astrocytomas (secondary glioblastoma) (4, 5). In this paper we report two cases of de novo gemistocytic glioblastomas and review the relevant literature.

Case reports
Case 1
This 35-year-old male patient presented with progressively increasing headache of four months duration associated with vomiting and blurring of vision for last 15 days. General and systemic examination was normal. Neurological examination was normal except bilateral papilloedema. CT scan showed a contrast enhancing left frontal mass lesion (Fig.1). The tumor was almost entirely removed surgically. Histological examination revealed the presence of a glioblastoma with gemistocytes and areas of extensive necrosis (Fig. 2). After partial resection of the glioblastoma, the patient received whole brain radiation therapy with a boost on tumor bed and margin. The patient referred after 13 months after...
completion of the radiotherapy with neurological deterioration and a massive recurrence of the lesion however did not do well and expired.

Fig. 1: CT scan of case 1 showing mixed density lesion involving left frontal lobe with mass effect (left), lesion was enhancing after contrast administration (right).

Fig. 2: Photomicrographs of case 1 showing gemistocytic glioblastoma. (H&E staining ×100)

Case 2

This 73-year-old male patient presented with rapidly progressive left sided hemiplegia of seven days duration and altered sensorium of three days duration. General and systemic examination was normal. Neurologically he was in altered sensorium and had grade I/IV weakness in left upper and lower limbs with increased tone and extensor plantar. CT scan showed thick walled contrast enhancing cystic lesion. A right parietal craniotomy was performed and tumor was sub-totally removed. Histology showed glioblastoma (WHO Grade IV) with presence of gemistocytes and areas of necrosis. Subsequently the patient received cranial radiation therapy. The patient present after 15 months after completion of the radiotherapy with neurological deterioration and a massive recurrence of the lesion however did not do well and expired.

Discussion

Gemistocytic cells are large astrocytes with plump processes and massive accumulation of glial fibrillary acidic protein (gemistocytes) (6). Their accumulation within astrocytomas may be due to bel-2-mediated escape from apoptosis (7). Gemistocytes lack proliferative activity possibly indicating terminal differentiation (6-8). Literature shows that low-grade astrocytomas with a significant fraction of gemistocytes progress more rapidly and typically carry a TP53 mutations (6) and p53 mutation (7). Presence of gemistocytic morphology should be considered as evidence of a higher grade astrocytoma (9). As in present case even after almost complete removal of the lesions followed by radiotherapy both the patients had massive recurrence and succumbed to it. The biological basis of unfavorable prognosis in gemistocytic astrocytomas is unclear, since gemistocytes themselves have low proliferative activity, even if present in anaplastic astrocytomas or glioblastomas (6). It has been suggested that the proportion of gemistocytes does not itself affect prognosis (10). Recent reports question the role of gemistocytes as a prognostic factor in diffuse astrocytomas (11). It has been emphasized that there is still a need for studies with sufficient numbers of well-matched gemistocytic and non-gemistocytic astrocytic neoplasms to decide whether upgrading a tumor with ‘significant’ number of gemistocytes is justifiable (9). Present cases showed the presence of gemistocytes in denovo glioblastoma. In literature exact incidence of these types of lesions is not known and it needs further evaluation.

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