Iranian Journal of Pathology (2009)4 (1), 48 - 50

# Case Report

## Gemistocytic Glioblastomas: Review of two Cases

**Amit Agrawal[1], Arvind Sinha[2]**

*1. Dept. of Surgery, Datta Meghe Institute of Medical Sciences, Sawangi (Meghe), India.*
*2. Dept. of Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.*

### 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 bcl-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 gemistocyes 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

*Received: 5 April 2008*
*Accepted: 19 July 2008*
*Address communications to: Dr Amit Agrawal, Department of Surgery, Datta Meghe Institute of Medical Sciences, Sawangi (Meghe), India.*
*Email: dramitagrawal@gmail.com*

completion of the radiotherapy with neurological deterioration and a massive recurrence of the lesion however did not do well and expired.

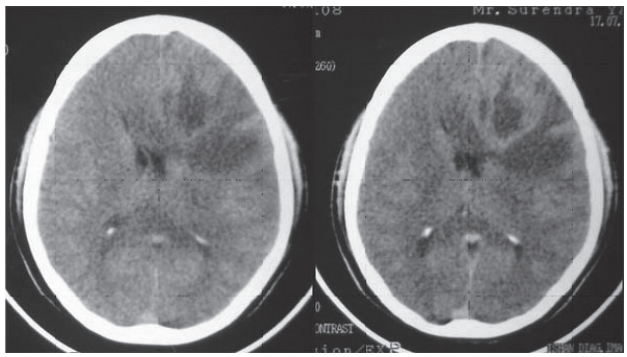

**Fig. 1:** CT scan of case 1 showing mixed density lesion involving left frontal lobe with mass effect (left), lesion was enhancing after contrast administration (right).

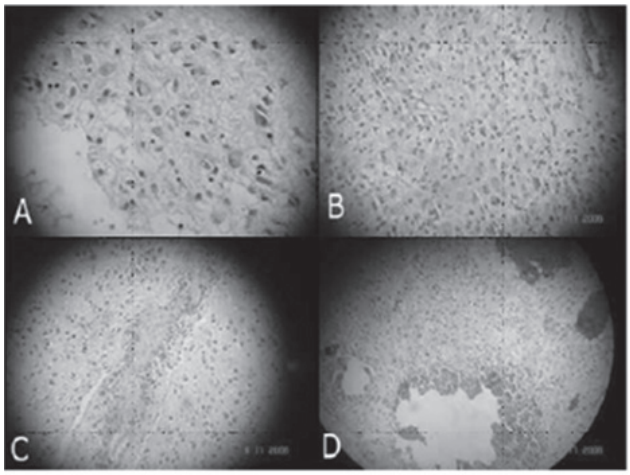


**Fig. 2:** Photomicrographs of case 1 showing gemistocytic gliobalstoma. (H&E staining ×100)

**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 bcl-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 gemistoytes in denovo glioblastoma. In literature exact incidence of these types of lesions is not known and it needs further evaluation.

## Acknowledgements

The authors declare that they have no conflict of interests.

## References

1.Graham DI, Lantos PL. Greenfield's Neuropath-ology. London: Arnold; 1996.

2.Leenstra S, Oskam NT, Bijleveld EH, Bosch DA, Troost D, Hulsebos TJ. Genetic sub-types of human malignant astrocytoma correlate with survival. Int J Cancer

1998;79(2):159-65.

3.Galanis E, Buckner JC, Dinapoli RP, Scheithauer BW, Jenkins RB, Wang CH, *et al*. Clinical outcome of gliosarcoma compared with glioblastoma multiforme: North Central Cancer Treatment Group results. J Neurosurg 1998;89(3):425-30.

4.Kleihues P, Ohgaki H. Genetics of glioma progr-ession and the definition of primary and secondary glioblastoma. Brain Pathol 1997;7:1131–1136.

5.Kleihues P, Ohgaki H. Primary and secondary glioblastoma: from concept to clinical diagnosis. Neuro-Oncology 1999;1:44 –51.

6.Reis RM, Hara A, Kleihues P, Ohgaki H. Genetic evidence of the neoplastic nature of gemistocytes in astrocytomas. Acta Neuropathol (Berl) 2001;102:422-5.

7.Watanabe K, Tachibana O, Yonekawa Y, Kleihues P, Ohgaki H. Role of gemistocytes in astrocytoma progression. Lab Invest 1997;76:277-84.

8.Avninder S, Sharma MC, Deb P, Mehta VS, Karak AK, Mahapatra AK, *et al*. Gemistocytic astrocytomas: histomorphology, proliferative pote-ntial and genetic alterations--a study of 32 cases. J Neurooncol 2006;78(2):123-7.

9.Tihan T, Vohra P, Berger MS, Keles GE. Defin-ition and diagnostic implications of gemistocytic astrocytomas: a pathological perspective. J Neuroo-ncol 2006; 76:175-83.

10.Yang HJ, Kim JE, Paek SH, Chi JG, Jung HW, Kim DG. The significance of gemistocytes in astrocytoma. Acta Neurochir (Wien) 2003; 145:1097-103.

11.Martins DC, Malheiros SM, Santiago LH, Stavale JN. Gemistocytes in astrocytomas: Are they a ignificant prognostic factor? J Neurooncol 2006; 80:49-55.