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Glioblastoma Multiforme with an Oligodendroglial Component: A Report of a Case with Review of Literature

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ABSTRACT

Glioblastomas (GBMs) with an oligodendroglial component (GBMO) are mixed tumors composed of astrocytic and oligodendroglial cells. We report a 53-year-old man with a headache since last week after rising in blood pressure with urinary and fecal incontinence. The headache was persistent and mainly in frontal area and was present early in the morning with subsequent confusion. Computerized Tumor (CT) scanning showed a brain tumor, suspicious for GBM with med line shift. The patient was a candidate for emergency brain surgery and underwent surgery. Microscopically high-grade astrocytic tumor with the fibrillary background, foci of necrosis and focal oligodendroglial elements with clear cytoplasms and fried egg appearance was noted and pathologist reported "GBMO synonymous with grade IV oligoastrocytoma". We emphasize that pathologists should be aware of this entity, thoroughly evaluate the specimen for oligodendroglial component and mention it in the report for prognostic and therapeutic significance.

Key words: Glioblastoma Multiforme, Oligodendroglial Component, GBMO, Case Report
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INTRODUCTION

Glioblastomas (GBMs) with an oligodendroglial component (GBMO) are mixed tumors composed of astrocytic and oligodendroglial cells and accounts for 11.9% of all GBMs [1, 2]. In World Health Organization (WHO) classification, anaplastic glial tumors with necrosis, astrocytic, and oligodendroglial components are known as "glioblastoma with oligodendroglial component" and have a better prognosis than standard glioblastoma [3]. Oligodendroglioma component histologically has typical fried-egg appearance [4]. GBMOs arise in younger patients compared to other forms of GBMs, are more frequently secondary neoplasms with a higher frequency of IDH1 (Isocitrate dehydrogenase) mutations [2]. Among patients with GBMO, younger age at presentation and 1p deletion more significantly promise prolonged survival [2]. The aim of this report is to emphasize correct diagnosis of GBMO as an entity with a better prognosis than GBM with different frequency of mutations for prognostic and therapeutic purposes. .

CASE REPORT

A 53-year-old man was admitted in emergency ward on 3rd February 2018 with a headache since last week after rising in blood pressure with urinary and fecal incontinence. The headache was persistent after control of hypertension. It was pulsatile, mainly in frontal area and was present early in the morning. Evidence of photophobia and phonophobia was not present. The headache was aggravated by Valsalva maneuver. Confusion was noted since yesterday. Neck stiffness, fever, vertigo, diplopia, visual impairment, and history of trauma were not present. The patient had a history of mild intermittent headaches and hypertension. There was no relevant family

history. Drug history was ASA 80 mg/day and Atenolol 40 mg/twice a day. He was a cigarette smoker. Physical examination was unremarkable except for confusion but with obey. The lab data of Hemoglobin, Platelet count, PT, PTT, BS, urea, creatinine, Na, and K were within normal limits. Computerized Tumor (CT) scanning showed a brain tumor, suspicious for GBM with med line shift. The patient was a candidate for emergency brain surgery and underwent surgery on 4th February 2018. Pathologist received the specimen which was consisted of several soft gray tissue fragments totally measuring 2.5*1.5*1 cm macroscopically and high-grade astrocytic tumor with fibrillary background, foci of necrosis (Figure 1), and focal oligodendroglial elements with clear cytoplasms and fried egg appearance microscopically (Figure 2) and reported "GBMO synonymous with grade IV oligoastrocytoma". The patient was alive in follow-up on 13th March 2018.

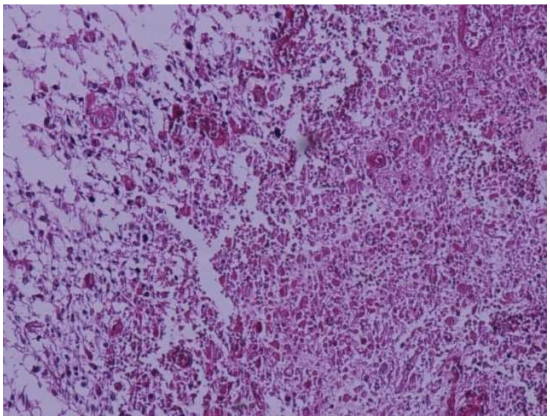

Figure 1: GBMO, High grade astrocytic component with necrosis, Hematoxylin-Eosin staining (x100 magnification)

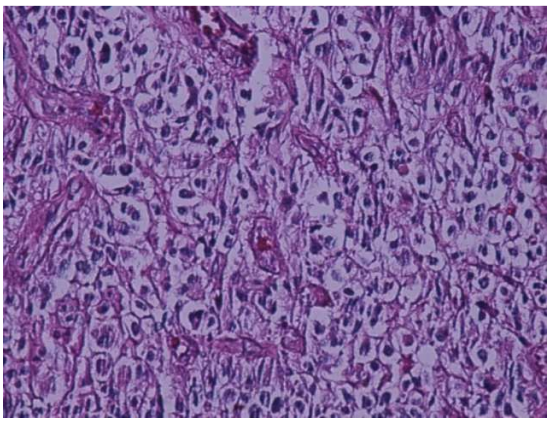

Figure 2: GBMO, Oligodendroglial component, Hematoxylin-Eosin Staining (x 200 magnification).

DISCUSSION

Inter-institutional and inter-observer variations can cause that the diagnosis of mixed gliomas is less reliable and reproducible than pure tumors [1]. Some researchers attempted to reclassify GBMOs with immunohistochemistry and molecular techniques. Kim *et al*., [1] reclassified 29 GBMOs into 11 cases of GBM, IDH-mutant, 16 cases of GBM, IDH-wildtype, and two cases of anaplastic oligodendroglioma, IDH mutant with significant survival difference. Survival was better in gliomas with IDH and Alpha thalassemia/mental retardation syndrome X-linked (ATRX) mutations. Young patients and histologically non-necrotic tumors had also better survival [1]. At the genetic level, Pai *et al*., [5] demonstrated 1p/19q codeletion in 5.1% (3/59) of GBMOs. Others found that genetic aberrations in "standard" GBM and GBMOs are similar, but with a higher rate of Loss of heterozygosity (LOH) on 1p and 19q in the later. These results suggest that GBMO might represent a subgroup of tumors of oligodendroglial origin with a different tumorigenic pathway from the "standard" GBM [6]. Different results was obtained by Laxton *et al*., [7] in the examination of 288 cases of primary GBMs and assessment the molecular markers of 57 GBMO and 50 cases of other primary GBMs that concluded primary GBMO was a subgroup of GBM associated with longer survival and a younger age group, but showed no difference in the frequency of LOH of 1p/19q and IDH1 mutation compared with other primary GBMs. In the study of Joseph *et al.,* [8] IDH1 was expressed in 55% of glioblastomas with the oligodendroglial component. This research supported that most glioblastomas with the oligodendroglial component are secondary variants and IDH1 positivity could provide strong support for glioblastoma with the oligodendroglial component, while essentially excluding small cell glioblastoma. Another study confirmed that GBMO survival was independent of the dominant histopathological subtype including astrocytic or oligodendroglial, but it was significantly associated with the IDH1 mutation [9]. Wang *et al.,* [10] evaluated 219 primary GBMs, of which 40 (18.3%) were confirmed as GBMOs. The GBMO group showed more frequent tumor-related seizures, higher frequency of IDH1 mutation, and longer survival. Oligodendroglioma component was a predictor of longer survival, but the extent of the oligodendroglial component appeared not to be linked to prognosis. They found that the response to aggressive therapy was different. The

GBMO group had no survival advantage with aggressive treatment, whereas a clear treatment effect was observed in the conventional GBM group. They concluded that the presence of an oligodendroglial component may be a useful classification and stratification variable in therapeutic trials of GBMs [10]. Another study did not demonstrate prognostic significance for the oligodendroglial component in a survival model but showed that the presence of pseudopalisading necrosis is a significant predictor of benefit from chemotherapy [11]. The survival analysis revealed that the patients with high-grade oligodendroglial tumor including GBMO significantly indicated better prognosis compared to the patients with high grade pure astrocytic tumors [12]. GBM in young patients should be evaluated for foci of the oligodendroglial component and/or giant cell elements and examined for proliferative index and p53 expression, since these data may have prognostic importance [13].

CONCLUSION

GBMO is a mixed tumor of astrocytic and oligodendroglial cells. Pathologists should be aware of this entity, thoroughly evaluate the specimen for oligodendroglial component and mention it in the report for prognostic and therapeutic significance.

REFERENCES

1. Kim SI, Lee Y, Won JK, Park CK, Choi SH, Park SH. Reclassification of Mixed Oligoastrocytic Tumors Using a Genetically Integrated Diagnostic Approach. Journal of Pathology and Translational Medicine. 2018; 52(1):28-36.
2. Appin CL, Gao J, Chisolm C, Torian M, Alexis D, Vincentelli C, Schniederjan MJ, Hadjipanayis C, Olson JJ, Hunter S, Hao C. Glioblastoma with Oligodendroglioma Component (GBM-O): Molecular Genetic and Clinical Characteristics. Brain Pathology. 2013; 23(4):454-61.
3. Adlekha S, Chadha T, Ragunath A, Sumangala B, George R. Intraoperative diagnosis of glioblastomamultiforme with oligodendroglial and sarcomatous components. Journal of Neurosciences in Rural Practice. 2015; 6(1):81-83.
4. Karsy M, Gelbman M, Shah P, Balumbu O, Moy F, Arslan E. Established and emerging variants of glioblastoma multiforme: review of morphological and molecular features. Folia Neuropathologica. 2012; 50(4):301-21.
5. Pai T, Epari S, Desai S, Wadile A, Gupta T, Goda JS, Moiyadi A, Shetty P, Kane S, Jalali R. Histological spectrum of oligodendroglial tumors: Only a subset shows 1p/19q codeletion. Neurology India. 2017; 65(1):113-20.
6. He J, Mokhtari K, Sanson M, Marie Y, Kujas M, Huguet S, Leuraud P, Capelle L, Delattre JY, Poirier J, Hoang-Xuan K. Glioblastomas with an oligodendroglial component: a pathological and molecular study. Journal of Neuropathology & Experimental Neurology. 2001; 60(9):863-71.
7. Laxton RC, Popov S, Doey L, Jury A, Bhangoo R, Gullan R, Chandler C, Brazil L, Sadler G, Beaney R, Sibtain N. Primary glioblastoma with oligodendroglial differentiation has better clinical outcome but no difference in common biological markers compared with other types of glioblastoma. Neuro-oncology. 2013; 15(12):1635-43.
8. Joseph NM, Phillips J, Dahiya S, Felicella MM, Tihan T, Brat DJ, Perry A. Diagnostic implications of IDH1-R132H and OLIG2 expression patterns in rare and challenging glioblastoma variants. Modern Pathology. 2013; 26(3):315-26.
9. Myung JK, jin Cho H, Kim H, Park CK, Lee SH, Choi SH, Park P, Yoon JM, Park SH. Prognosis of glioblastoma with oligodendroglioma component is associated with the IDH1 Mutation and MGMT methylation status. Translational Oncology. 2014; 7(6):712-19.
10. Wang Y, Li S, Chen L, You G, Bao Z, Yan W, Shi Z, Chen Y, Yao K, Zhang W, Kang C. Glioblastoma with an oligodendroglioma component: distinct clinical behavior, genetic alterations, and outcome. Neuro-Oncology. 2012; 14(4):518-25.
11. Hegi ME, Janzer RC, Lambiv WL, Gorlia T, Kouwenhoven MC, Hartmann C, Von Deimling A, Martinet D, Schmutz NB, Diserens AC, Hamou MF. Presence of an oligodendroglioma-like component in newly diagnosed glioblastoma identifies a pathogenetically heterogeneous subgroup and lacks prognostic value: central pathology review of the

EORTC_26981/NCIC_CE. 3 trial. Acta Neuropathologica. 2012; 123(6):841-52.

12. Kanno H, Nishihara H, Narita T, Yamaguchi S, Kobayashi H, Tanino M, Kimura T, Terasaka S, Tanaka S. Prognostic implication of histological oligodendroglial tumor component: clinicopathological analysis of 111 cases of malignant gliomas. PloS One. 2012; 7(7):e41669.
13. Deb P, Sharma MC, Mahapatra AK, Agarwal D, Sarkar C. Glioblastoma multiforme with long term survival. Neurology India. 2005; 53(3):329-32.