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CASE REPORT

Rapid Malignant Transformation of Low Grade Astrocytoma

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Abstract

Astrocytomas are group of tumors which arise from neoplastic transformation of astrocytes or committed astroglial progenitors. It includes slow growing tumors such as fibrillary astrocytoma or very malignant glioblastoma multiforme. Low grade astrocytomas have been documented to undergo transformation into high grade astrocytoma & the time interval ranges from 4 months to more than 5 years. This report is a case of 52 year old male presenting with rapid [11 weeks] malignant transformation of low grade astrocytoma to high grade astrocytoma-glioblastoma multiforme. CT scan showed right sided fronto-temporal brain tumor, craniotomy & surgical resection of the lesion was done. Tissue was sent for histopathological examination. Histopathological examination earlier showed low grade astrocytoma & later transformed into high grade astrocytoma-glioblastoma multiforme with glomeruloides. Low grade glioma can undergo malignant transformation. It was concluded that histologically confirmed low grade astrocytoma underwent rapid evolution, in less than 4 months time into high grade astrocytoma.

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INTRODUCTION

Astrocytomas are a group of tumor which arise from neoplastic transformation of astrocytes or committed astroglial progenitors. They include slow growing tumors such as fibrillary astrocytoma or very malignant glioblastoma multiforme. Low grade gliomas are primary brain tumors classified as grade I & grade II by WHO grading system, they occur primarily in children & young adults. Patients with low grade gliomas have a more favorable prognosis than patients with high grade gliomas. About 50-75% of patients with low grade glioma, tumor grows continuously & tend to progress to a higher grade, leading to neurological disability & ultimately to death.^{1,2} Malignant gliomas have been reported to arise from either secondary transformation from low grade glioma or de novo lesions.^{3,4} Low grade astrocytoma have been documented to undergo transformation into high grade astrocytoma & time interval ranges from 4 months to more than 5 years, however rapid transformation is rare. To best of our knowledge it is second case report of rapid malignant transformation of low grade astrocytoma.

Case History: A 52 year old male presented to emergency with chief complaint of severe headache & generalized weakness for 1 week. Neurological examination was unremarkable. Approximately 11 weeks after the first surgery he developed left leg paralysis. Neurological examination revealed 3/5 power in left leg. His routine blood investigations were normal. CT scan head showed frontotemporal space occupying lesion. Patient underwent craniotomy and surgical decompression of tumor. Tissue was sent for histopathological examination. Microscopic examination of brain tissue showed low cellularity, gliosis, in absence of increased mitotic activity & vascular proliferation. The microscopic features were consistent with low grade astrocytoma. [Fig1]

The patient followed up and presented with increasing symptoms and 11 weeks later a repeat CT scan head was done which showed right sided frontotemporal brain tumor not communicating to meninges. [Fig2] 11 weeks

after first surgery he again underwent craniotomy and surgical decompression of tumor. Tissue was sent again for histopathological examination. Microscopic examination of brain tissue this time showed increased cellularity with palisading and vascular proliferation, vascular glomeruloides and areas of necrosis. The cells showed marked pleomorphism, anisocytosis, anisonucleosis and abnormal mitosis. The microscopic features were consistent with high grade astrocytoma – glioblastoma multiforme. [Fig3,4]

Based on the findings of light microscopy, immunohistochemical staining was done with EGFR [epidermal growth factor receptor] which was found to be focally positive in low grade astrocytoma and diffusely positive in glioblastoma multiforme.

Discussion:

The present case of intra cranial space occupying lesion which was diagnosed histologically as low grade astrocytoma underwent rapid evolution [within 11 weeks] into high grade astrocytoma- glioblastoma multiforme. Low grade glioma have been documented to undergo transformation into high grade glioma, and the time interval for this transformation has been 5 years in about 50% of patients diagnosed with low grade glioma.^{3,4} Another matter of debate is whether anaplastic diagnosis obtained by a second biopsy or resection in a case previously diagnosed as low grade astrocytoma is due to the paucity of the initial specimen. It is a known fact that the aggressive surgery in low grade tumors achieves a long life expectancy. It has been found that there is a direct relationship between the amount of residual tumor and malignant transformation of tumor.⁵ Fibrillary astrocytoma are primarily composed of aberrant astrocytes, which have tendency to undergo malignant degeneration.^{6,7} The risk of recurrence increases 1.3 times for each centimeter increase in size & is independent of the extent of resection. Larger low grade glioma, like malignant glioma, may have more microsatellite lesions & individual cell invasion, as well as more residual cells following resection, as a consequence of having a larger tumor mass.⁸ The only factors that have been consistently shown to be associated with tumor recurrence¹ or malignant degeneration are preoperative contrast enhancement and tumor size.^{9,10} Epidermal growth factor receptor has been shown to be expressed in approximately 40% of glioblastoma multiforme cases, and reports provide data that EGFR amplification in patients younger than 60 years had a worse prognosis.¹¹

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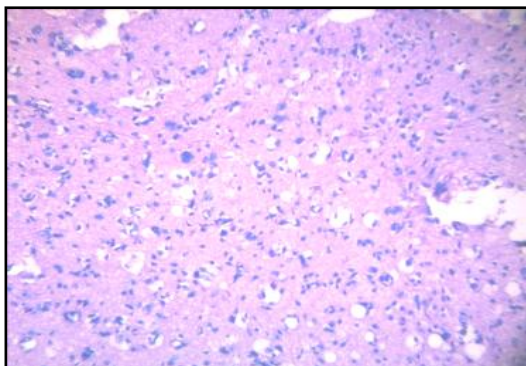


Figure 1:100X; H&E; Low Grade Astrocytoma



Figure 2: CT scan Right Side Frontotemporal Tumour

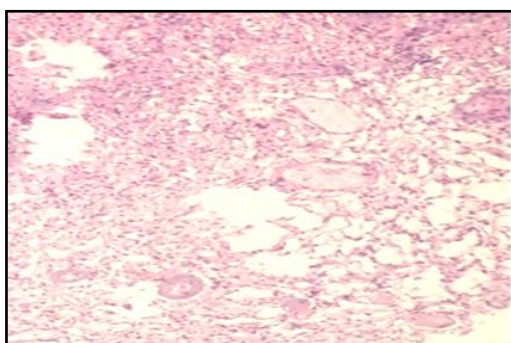


Figure 3:100X; H&E; High Grade Astrocytoma-Glioblastoma Multiforme

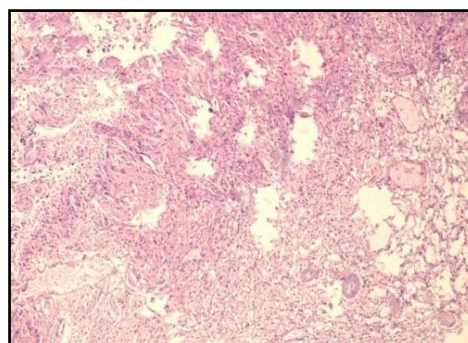


Figure 4:100X; H&E; High Grade Astrocytoma-Glioblastoma Multiforme