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Prevalence of High Grade Glioma Grade III and IV in tertiary care hospital

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I. INTRODUCTION

Tumours of Glial cells are c/a Glioma.Gliomasare classified as grades I to IV based on histology and clinical criteria.(1)

Modern classification of gliomasis based on the World Health Organization (WHO) Classification of Central Nervous System Tumors, first published in 1979 and revised five times since then, most recently in 2021(2,3).

As of the 2021 edition of the WHO classification, gliomasare classified based not only on histomorphologicfeatures but also followed by defining molecular characteristics(2).

The incorporation of molecular features has most notably impacted the classification of astrocyticand oligodendroglialtumors, which are now grouped together as diffuse gliomas, on the basis of growth pattern, behavior, and shared isocitratedehydrogenase (IDH) genetic status Grade I tumours are generally benign and frequently curable with complete surgical resection, occur primarily in children and are believed to represent an entity separate from grade II-IV (seen primarily in adults). Astrocytomasand oligodendrogliomasconsist of astrocytes or oligodendrocytes, respectively, while mixed gliomacontain a mixture of the two cell types. Essentially all Grade II lesions eventually progress to High Grade Glioma(grade III/IV or HGG).

Grade IV tumours[aka glioblastoma] that arise from Low Grade Glioma(LGG) are termed "secondary GBM" to differentiate them from "primary" or "de-novo" GBM as the pathway leading to these two Glioblastomatypes differ by a number of genetic abnormalities and clinical characteristics (4)

Variation in the few known prognostic factors (most of which are themselves highly correlated), e.g. age, performance status, tumour size/location, extent of surgical resection, and histological subtype does not adequately explain the progression and survival differences in these patients.

High Grade Glioma(HGG) typically arise from astrocyticorigins, including glial, oligodendrocytes, and ependymal cells (5). These tumorsare classified by the WHO as either grade III or IV meaning that they are highly malignant tumours with characteristic findings such as hypercellularity, nuclear atypia, and high mitotic activity with or without microvascularproliferation and pseudopalisadingnecrosis (6,5).

HGG include a variety of heterogeneous lesions with differing histologies, but the most common histologiesare anaplastic astrocytoma (WHO Grade III) and glioblastoma(GBM; WHO grade IV).

Although there truly is no one accepted standard of care and treatment algorithms can vary, most experts agree that a gross total resection (GTR) followed by focal irradiation to the tumor bed plus additional chemotherapy is an appropriate treatment approach(7,8)

Multiple high-grade gliomas(M-HGGs) pose diagnostic and therapeutic challenges and their incidence at the time of diagnosis is reported to be between 0.5 and 35% (9,10,11,12,13,14)

There are two entities named multifocal (MF) and multicentric(MC) glioma.

II. MATERIAL AND METHOD

This is a retrospective study conducted in the Department of Pathology, GajraRaja Medical College, Gwalior (M.P.)

Study period was from January 2018 to December 2022 in collaboration with the department of Neurosurgery.

Between January 2018 to December 2022, data collected from biopsy sample submitted for histopathological examination.

All the relevant data were recorded from requisition slip sent along with biopsy sample.

In all the cases detailed clinical history as regarded to their Age, Sex, Site and Microscopic findings were recorded.

Study includes 934 patients diagnosed between the ages of 20–79 years with a histologically confirmed glioma, oligodendro-gliomaor astrocytoma.

In an effort to examine a homogenous study population and to reduce the probability of including individuals with metastatic lesions, individuals with more than one primary cancer (i.e. gliomaand a cancer of another site) were excluded from these analyses, as were patients diagnosed at death (autopsy only).

III. RESULTS

In our study total 934 cases were evaluated

Male preponderance is present with 85% (793/934) male and 15% (141/934) female patients.

Out of Total 214 (23%) cases are high grade gliomaand 720 cases(77%) was of low grade glioma.

In high grade glioma(214 cases);98 cases (45.7%) are grade III and 116 cases (54.3%) are grade IV.

Majority of cases are seen within 50-59 years (26.7%).

Glioma A/C to Different Ages:

21-30	6.5%
31-40	18.9%
41-50	19.5%
51-60	26.7%
61-70	15.4%
71-80	1.77%

Glioma with different Gender:

GENDER	**NO. Of Cases**
MALE	85% (793/934)
FEMALE	15% (141/934)

Glioma of different Types:

GLIOMA	**NO.Of Cases**
LOW GRADE	77% (720/934)
HIGH GRADE	23% (214/934)

Percentage of High Grade Glioma:

HIGH GRADE GLIOMA	**No.of Cases**
GRADE III	45.7%(98/214)
GRADE IV	54.3%(116/214)

IV. DISCUSSION

This retrospectivestudy comprised of detailed study of 934 CNS cases, out of which 214 cases (23%) were of high grade glioma,720 cases(77%) were low grade glioma.

A study done by OstromQT et al (20) Low-grade gliomasaccount for 6.4% of all adult primary CNS tumors, rest percentage of cases was of high grade glioma.

We have large number of cases of brain tumours because of well stablishedNeurology department in our hospital.

In our study out of 934 cases 5 cases (0.5%) were of metastatic from other site where as in the study of JalaliR et al 2007 [(3)]they found 580 cases of primary CNS neoplasm and 78 cases of metastatic tumors.

According to their data primary brain tumors most commonly presented in middle age men as 36% of their patients presented between 19 to 40 years of age and male/ female ratio is 1.5 where as in our study 25.4%

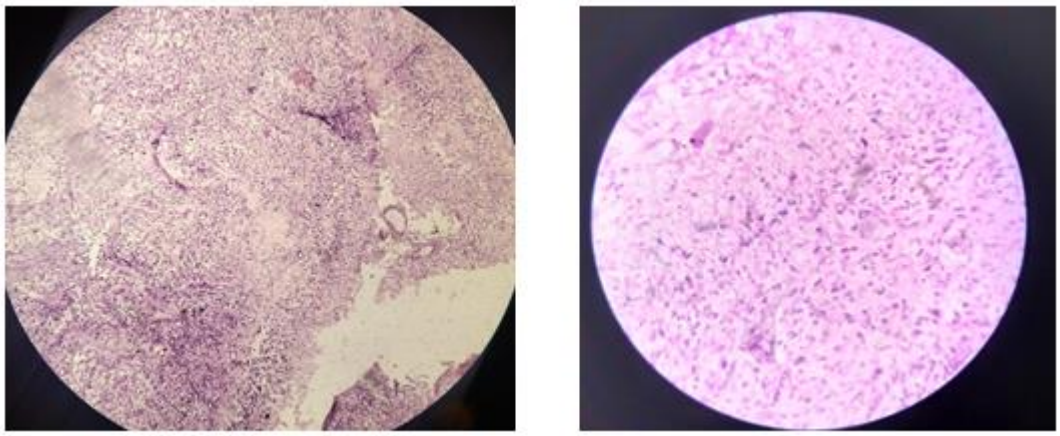
patient presented in this age group and 19.5% between 41 to 50 years and male/ female ratio is 5.6 among all CNS tumors.

In present study astrocytomaswere the most common tumor amongst the glial tumors (74.1%) matches with the study of manigreevaat al 2014[15].

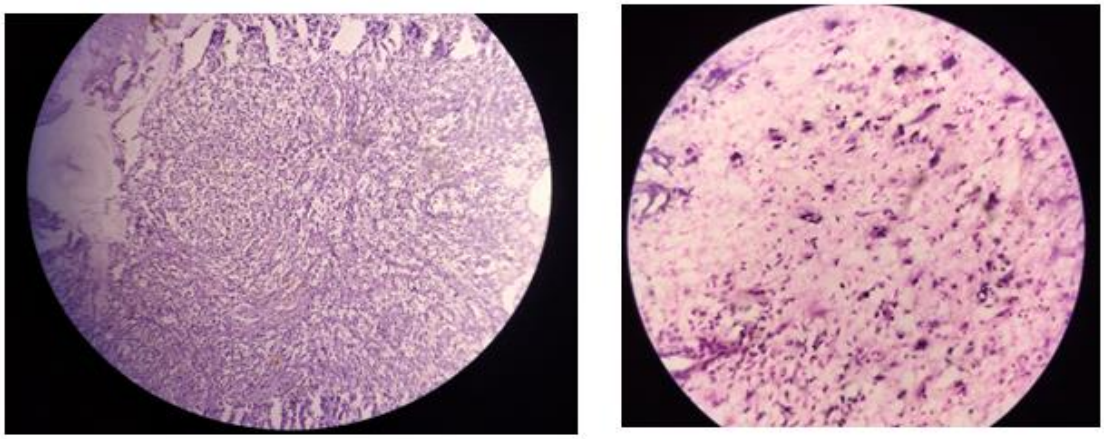
A/C to statistical report of Central Brain TumourRegistry of United States gliomaaccount for 32% of all primary CNS tumour, 17% of which are astrocytictumour,28% of these are glioblastoma[16].

HGG comprises one of the most common CNS tumour among adults this contrasts significantly to paediatric population where this only comprises to 8-12% of all primary CNS tumour[17]

In our study (out of 934 cases) 251 cases (**26%)**was from frontal lobe, 150 cases(**16%**) from fronto-parietal lobe, 200 (**21%**) from fronto-temporal lobe, 180 (**19%**) from temporal lobe, 2 from corpus callosum. This compared to the study done by Simpson JR et al which shows 43% in frontal lobe, 28% in temporal lobe, 25% in parietal lobe and 3% in occipital lobe[18].



Glioblastomawith necrosis and palisading(10X)



Glioblastoma(40X)

V. CONCLUSION

Gliomais the most common CNS malignanyin adults. Males are appears to affected more than females. Low grade gliomasare more commonly present as compare to High grade glioma. In High grade gliomas;Grade III is more commonly present than grade IV.

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