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Research Article

HISTOPATHOLOGICAL SPECTRUM OF CNS TUMOURS IN A TERTIARY CARE REFERRAL CENTRE – A ONE YEAR STUDY

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ABSTRACT
A retrospective study was carried out on biopsy specimens received in Department Of Pathology, PGIMS, Rohtak, for one year. A total of 77 biopsy specimens sent by Neurosurgery Department of the institute during the year were reviewed. The specimens were processed by routine techniques and immunohistochemistry performed wherever necessary. Majority of CNS tumors were malignant with male: female ratio of 1.6: 1 mostly in the age group of 36-50 years. Most neoplasms were found to occur in the anterior fossa than posterior fossa, anterior fossa accounting for 71.42% of the total cases studied. Astrocytictumours constituted the largest category with 43 cases accounting for 55.84% of CNS tumours out of which majority were grade II at the time of diagnosis. Astrocytomas constitute the largest group of primary CNS tumors. In our study, we found that astrocytic tumours are the most prevalent tumours and diffuse infiltrating astrocytomas i.e. grade II is the most common group of astrocytoma in adults.

Keywords: *Spectrum, Tertiary Care Center, Astrocytoma, Meningioma, Immunohistochemistry*

INTRODUCTION
Central nervous system (CNS) tumours constitute 1-2% of all the neoplasms. The most prevalent CNS tumours in the adults are the astrocytictumours (including glioblastoma (40%), followed by metastatic tumours (20%) and meningiomas (15%). In paediatric population, CNS tumours are second most common solid tumours (Jalali and Datta, 2008; Wrensch *et al.,* 2002). In the children, the astrocytictumours (38%) are also the most commonly occurring CNS tumors but are followed by medulloblastomas (19%) and ependymomas (12%). Children are affected by metastatic tumours, but to a much lesser extent than the adults (Arora *et al.,* 2009). Gliomas constitute 38.7% of CNS tumours, with high-grade comprising 59.5% and low-grade 33.1%. The commonest presenting symptoms are headache, vomiting, unsteadiness, visual difficulties, educational or behavioural problems, and seizures. Immunohistochemistry (IHC) has become an important tool in the diagnosis of brain tumours, although conventional hematoxylin-eosin staining is the mainstay for pathologic diagnosis. Glial Fibrillary Acidic Protein demonstration firmly establishes the tumour to be of astrocytic origin and differentiation. GFAP positivity has been seen in all low grade astrocytomas, anaplastic astrocytomas and glioblastoma multiforme (Takei *et al.,* 2007). A number of classifications have been proposed to classify tumours of the CNS. World Health Organization (WHO) proposed a comprehensive classification in 1979 (Louis *et al.,* 2007).

MATERIALS AND METHODS
A retrospective study on biopsy specimens received in Department Of Pathology from Neurosurgery, PGIMS, Rohtak, from January 2012 to December 2012 was carried out. A total of 77 biopsy specimens of CNS SOLs were reviewed. The specimens were processed routinely and IHC performed wherever necessary. The results analysed and data prepared to calculate prevalence and age and sex distribution in our area.

RESULTS AND DISCUSSION
Majority i.e. 97% of CNS tumors presenting as SOL were malignant. Males (61%) outnumbered females (39%) in a ratio of 1.6:1. The patients' age ranged from 3-75 years with highest incidence in 36-50 yrs age group (39%). Anterior fossa was involved in 71.42% of the cases. Tumors in the posterior fossa were

more common in preadolescent children. Astrocytic tumors constituted the largest category with 43 cases accounting for 55.84% of CNS tumors followed by meningiomas (18.18%) and pituitary adenomas (7.8%). 13.95% of astrocytomas were grade I, 44.18% were grade II while grade III and grade IV constituted 20.9% each (Figure 1). Progressively higher grade astrocytic tumors presented in older patients with median age of 33 years for grade I astrocytomas and 54 years for Glioblastoma Multiforme. 3 cases of ependymoma were diagnosed all of which were of papillary subtype. 2 cases of Cerebellar hemangioblastoma and 1 case each of meningeal hemangiopericytoma, craniopharyngioma, extraventricular neurocytoma and malignant neuroendocrine tumor were reported. On immunohistochemistry, out of the 43 cases of astrocytic tumors, all were positive for GFAP along with 3 cases of ependymoma and 9 cases of Glioblastoma Multiforme (Figure 5). Both the cases of Cerebellar hemangioblastoma were GFAP and CD34 positive. Meningeal hemangiopericytoma was CD34 and vWF positive and ER PR negative. Extraventricular neurocytoma showed synaptophysin and NSE positivity.

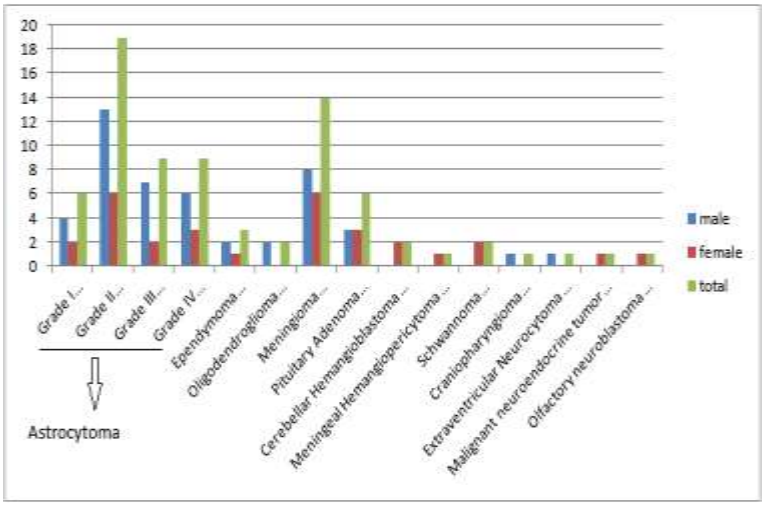

Figure 1: Figure showing number of cases of different primary CNS tumors and male: female ratio
Figure 1: Graph showing relative proportion of various primary CNS tumors and their relative incidence in males and females.

DISCUSSION

Primary tumours of CNS are rare neoplasms in adults constituting about 1-2% of all malignancies. Astrocytic tumors comprise the most common group followed by meningiomas in adults. In children also, astrocytic tumors are the most common followed by medulloblastomas and ependymomas (Jalali and Datta, 2008; Wrensch *et al.*, 2002; Munshi and Jalali, 2009; Grant *et al.*, 1996). In our study, Astrocytomas were found to be the most prevalent CNS tumors in our region followed by meningothelial tumors and pituitary adenomas.

There is general agreement on the differences in the age incidence of different tumour types. Astrocytomas could be found at any age from infancy to over 70 years with the majority however occurring in the first four decades of life. Oligodendrogliomas are most commonly seen in adults but are not uncommon in childhood or adolescence (Arora *et al.*, 2009). Our study revealed that the age incidence was maximum in the group of 36-50 years.

There is, in general, a male preponderance in most parts of the world including Indian subcontinent where sex ratio has been found to be 2.2:1 (Wrensch *et al.*, 2002). In our study, the male: female ratio was found to be 1.6:1 which was in concordance with other Indian studies.

Twenty four percent of the intracranial tumours occur in the cerebral hemispheres. Nearly half of these were of astrocytic series, followed by ependymal tumours and then by glioblastomas. In both the cerebral hemisphere and the brain stem, astrocytomas were the most common neoplasm. Most common location

of ependymoma is supratentorial. The most common location of glioblastomamultiforme is cerebral hemispheres. Oligodendrogliomas are most commonly found in the cerebral hemispheres (Munshi and Jalali, 2009; Grant *et al.*, 1996; Larjavaara *et al.*, 2007; Ironside *et al.*, 2002). In our study anterior fossa was involved in majority of CNS tumors. Tumors of posterior fossa were common in preadolescent children.

IHC plays an important role in the confirmation of diagnosis. GFAP is currently being employed to assist in the diagnosis of human brain tumours. Positive reaction to GFA Protein has been demonstrated in astrocytomas, ependymoma and astrocytic cells of mixed gliomassubependymal giant cell astrocytoma, pleomorphic xanthoastrocytoma, astroblastoma and gliosarcoma (Takei *et al.*, 2007). In our study, GFAP turned out to be a sensitive and specific marker for glial differentiation and its demonstration was very helpful in firmly establishing the astrocytic origin of the tumor.

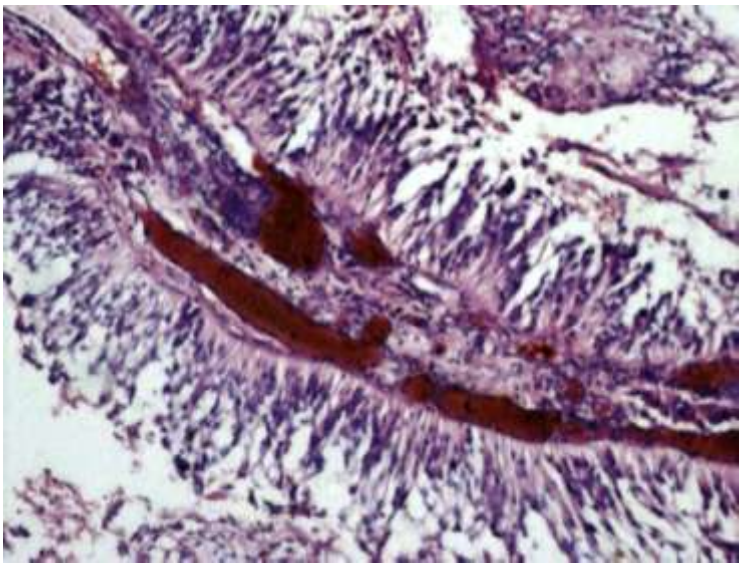

Figure 2: Histopathological section showing pseudorosettes in ependymoma (haematoxylin& eosin stain; 200x)

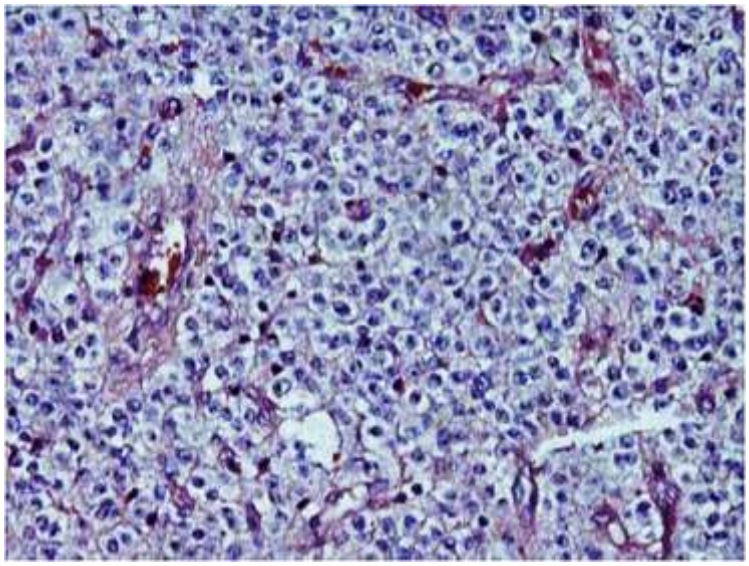

Figure 3: Histopathological section showing clear cytoplasm in oligodendroglioma (haematoxylin& eosin stain; 200x).

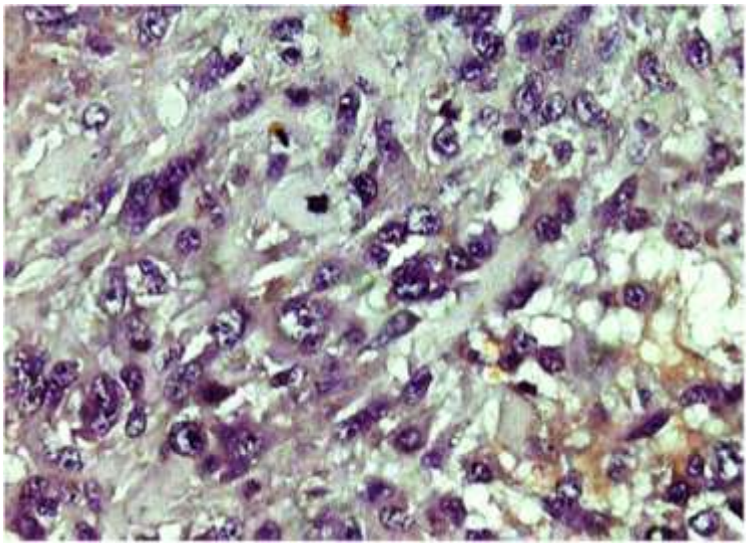

Figure 4: Histopathological section showing mitoses & nuclear atypia in glioblastomamultiforme (haematoxylin& eosin stain; 200x)

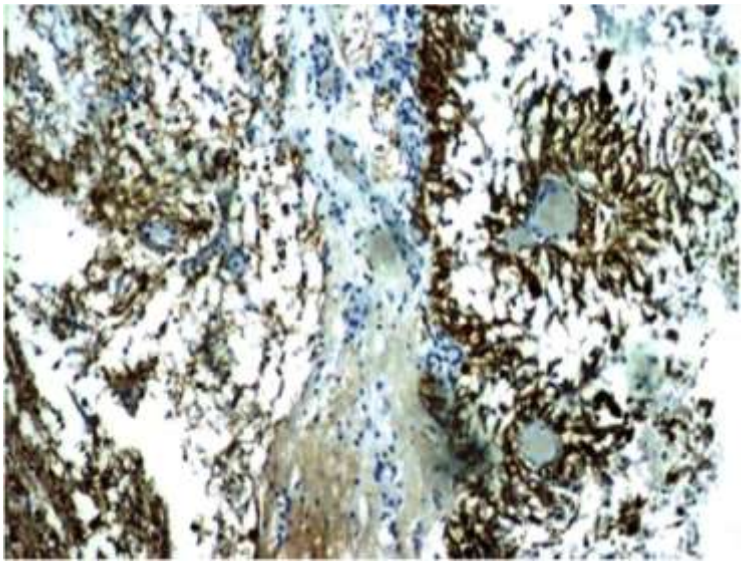

Figure 5: Histopathological section showing GFAP positivity in ependymoma (IHC-GFAP; 200x)

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