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Pathology

Spectrum of Primary Paediatric Brain Tumors –A Single Institutional Experience

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Abstract: Tumors of the central nervous system are the second most common childhood tumor after haematological malignancies [1]. These are the leading cause of cancer-related deaths in children and constitute approximately 35% of all childhood malignancies [2]. The present study analyses the age, sex, location, and histological spectrum of primary pediatric brain tumors in a tertiary care hospital of western India. This is a retrospective study which included 120 primary paediatric brain tumors (<15 yrs of age) in two year duration at tertiary care centre of western India. All the cases of CNS tumors were studied by histopathological examination using H and E staining. Immunohistochemistry was done as and when required. Most of the patients were in the age group of 11-15 yrs. male to female ratio was 1.3:1. Most of the pediatric brain tumors were infratentorial in location. The most common primary pediatric brain tumors were astrocytic tumors (41.6%), followed by medulloblastoma and craniopharyngiomas. The most common astrocytic tumor was pilocytic astrocytoma. There is increase in the incidence of pediatric CNS tumors but a few studies on primary pediatric CNS tumors have been reported in india . The current study is from single largest institution in western India. As compared to western data, incidence of brain tumors in children was found to be less in the present study.
Keywords: paediatric,central nervous system ,tumors.

INTRODUCTION

Tumors of the central nervous system (CNS) are the second most common childhood tumor after haematological malignancies[1]. Tumors of the nervous system are the leading cause of cancer-related deaths in children and constitutes approximately 35% of all childhood malignancies [2]. Pediatric CNS tumors differ significantly from adult brain tumors with respect to sites of origin, clinical presentation, histological features, tendency for early dissemination and prognosis. The predominant CNS tumors in adults are glial neoplasms, meningiomas and metastases, whereas in children, besides gliomas, other major tumors include embryonal neoplasms .The present study therefore analyses the histological spectrum of primary pediatric brain tumors in a single largest tertiary care hospital of western india.

MATERIALS AND METHODS

A hospital based retrospective study on biopsy specimens received at tertiary care centre of western India in two year. A total of 120 biopsy specimens of pediatric brain tumors (<15 yrs of age) were reviewed. Infectious, metastatic lesions and vascular malformations were excluded .The specimens were processed routinely and IHC performed wherever necessary. Results were expressed as percentage and proportions.

RESULTS & DISCUSSION

Pediatric CNS tumors accounted on an average 10.56% of total intracranial tumors. Male to female ratio was 1.3:1. Most of the pediatric brain tumors were infratentorial(60%) in location. Astrocytomas(41.6%) were the commonest tumors followed by medulloblastomas (26.6 %). Craniopharyngiomas (10%)were the third most common tumors followed by and oligodendroglioma(6.6%), ependymal tumors (5%), nerve sheath tumors (3.3%) germ cell tumor(3.3%) and meningeal tumors (3.3%).{Table 1}. The most common astrocytic tumor was pilocytic astrocytoma.

Table-1: Spectrum of primary paediatric CNS Tumors

Pediatric Cns Tumor	No of cases	Percentage (%)
Astocytoma	50	41.6
Ependymoma	6	5
Oligodendroglioma	8	6.66
Medulloblastoma	32	26.66
Cranioparngioma	12	10
Meningioma	4	3.33
Nerve sheath tumor	4	3.33
Germ cell tumor	4	3.33
total	120	

Pediatric CNS tumors form the most concerning group of tumors due to high incidence and mortality. There is rise in incidence of CNS tumors in developing countries with increased availability of diagnostic and healthcare facilities.The exact tumor burden of CNS tumors is underestimated due to lack of complete registration of newly diagnosed cases with cancer registries. Hospital-based prevalence studies therefore are required for estimating the disease burden, management, prognosis and for assessing geographical differences in their molecular and genetic profiles. In contrast to the Western literature, there are few data on pediatric CNS tumors in India.Pediatric CNS tumors accounted for 10.6 % of total intracranial tumors in the present study. It was higher in the study by Jain A *et al.* (14.8%) [4]. As compared to western data, incidence of brain tumors in children was found to be less in the present study.

Majority were in infratentorial location in our study (60%). This was in concordance with studies by Nasir S *et al.* (64.1%) and Hanif G *et al*. and shah SH *et al*. (43.5%) [9,5,11]. Whereas Asirvatham JR *et al*. concluded that pediatric cns tumors were present in supraratentorial compartment more often than the infratentorial compartment, in Rickert *et al.* study, supratentorial-to-infratentorial ratio was 1.1 [7,3].

Male to female ratio was 1.3:1 in the present study.It was similar to studies done by Jain A *et al*. (1.6:1), Shah SH *et al*. (1.1:1), Hanif G *et al.* 3:1), Ahmed N *et al*. (2.5:1), Asirvatham JR *et al*. (1.7:1), Das U *et al*. (1.58:1).whereas in Rickert CH *et al*. study male to female ratio was 1:1.Most of the patients were in the age group of 11-15 yrs [4, 11,5,7,8].

The most common primary pediatric brain tumors were astrocytic tumors (41.6%), followed by medulloblastoma(26.6%) and craniopharyngiomas (10%) in the present study.

This was in concordance with the study by Chen *et al*. who found astrocytomas to be leading tumors (29.2%). The most common primary pediatric brain tumors were astrocytic tumors in Jain A *et al*. (34.7%), Shah SH *et al.* (39%), Hanif G *et al*. (75.8%), Asirvatham JR *et al*. (47.3%), Rickert CH *et al.* (33.6%) studies [12,4,11,5,7,4]. While medulloblastoma was most common in Nasir S *et al*. (33.6%), Ahmed N *et al*. (49.4%), Das U *et al.* studies and ependymoma in Azad TD *et al*. study (17.5%)[9,6,8,10].

CONCLUSION

The present study revealed the histopathological spectrum of primary pediatric CNS tumors in children at largest hospital in western India. There is a rising incidence of pediatric CNS tumors and hence more comprehensive population-based studies are required to determine the cancer burden, management in developing countries.

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