CLINICAL PROFILE OF INTRACRANIAL TUMORS IN CHILDREN LESS THAN 15 YEARS AGE IN A TERTIARY CARE CENTRE OVER A PERIOD OF THREE YEARS PUNE MAHARSHTRA

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Abstract

Introduction: Tumors of the central nervous system are the second most common childhood tumor after leukemia,[1] constituting about 35% of all cancers. According to American Cancer Society Cancer Facts & Figures 2022 more than 10,000 children under 15 years age must have been diagnosed with cancer in 2022. Childhood cancer rates have been rising slightly for the past few decades. After accidents, cancer is the leading cause of death in 1 to 14 years age group . More than 1000children less than 15 years age are expected to die from cancer in 2022.[2]In India, 50%–120% increase in incidence of childhood brain tumors has been noted over the past 3 decades.[3]Various explanations have been proposed for this incidence increase out of which the use of magnetic resonance imaging is the most important one . Boys' age-adjusted cancer incidence rates ranged from 18.6 to 159.6 per million, while girls' rates ranged from 11.3 to 112.4 million. The Southern region of the country had the highest incidence (159.6) of men, while the North-East had the lowest incidence (18.6) of both boys and girls (11.3). Boys were more likely to have leukaemia and lymphoma than girls were, whereas females were more likely to develop brain tumors and leukaemia.

A detailed understanding of the global incidence and distribution of the various neoplasms is crucial for the study needed in the field of childhood CNS cancers. Few reports from lower- and middle-income countries are currently available[7,8,9,] and there is no published database on the profile of pediatric brain tumors in India, which is a very challenging and enormous endeavor.Hence this study was conducted.

Materials And Methods: This is a cross sectional study done over a period of 3 years in a tertiary care centre with a sample size of 42 Children aged between 1month and 15 years diagnosed with any type of intracranial tumors admitted in our institute .After taking consent from parents or caretakers of patient fulfilling the inclusion criteria the patients were enrolled. Detailed history was taken and examination of the patient was done with specific emphasis on CNS examination.MRI/CT BRAIN of the patient was done to study the different radiological findings and was classified as per MRI BRAIN findings

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1. Results

42 cases of intracranial tumors in children presenting at our institute were in the age group of 2-15 years as shown in table

Table 1: Age Group Wise Distribution Of Tumors

AGE(YEARS)	NO OF PATIENTS	PERCENTAGE
<2	4	9.5
2-5	13	31
6-10	12	28.6
>10	13	31
Total	42	100

31% (13) of tumors were in age group of 2-5years 31% (13) of tumors were in age group of >10 years.Only 9.5% (4) were in the age group of less than 2 years

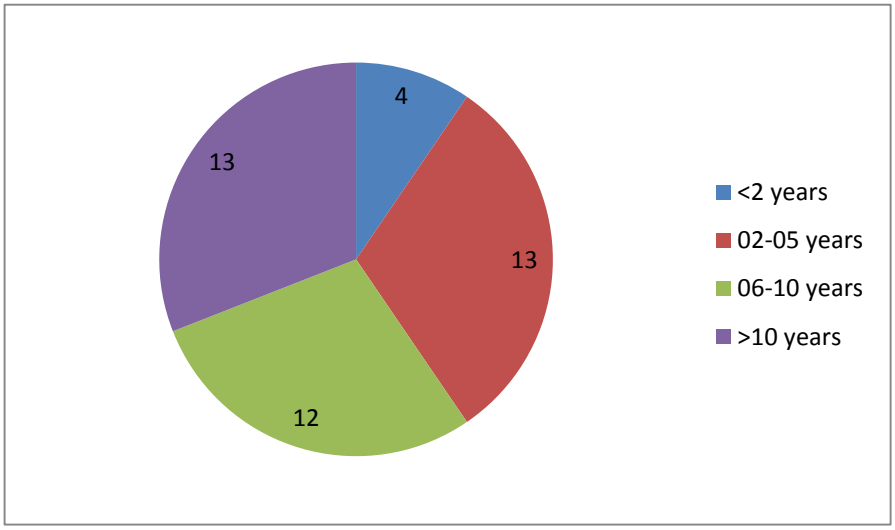

Table 2: Age and Sex Distribution

SEX	AGE DISTRIBUTION		
	No of patients	MEAN	SD
MALE	22	8.35	4.09
FEMALE	20	6.22	3.9

The mean age of distribution among Males was 8.35 years with an SD of 4.09 and females was 6.22 years with an SD of 3.2 with an overall mean age of 7.3 years as shown in table 2. There were 22 (52.4%) boys and 20 (47.6%) girls. The overall male/female ratio was 1.1:1

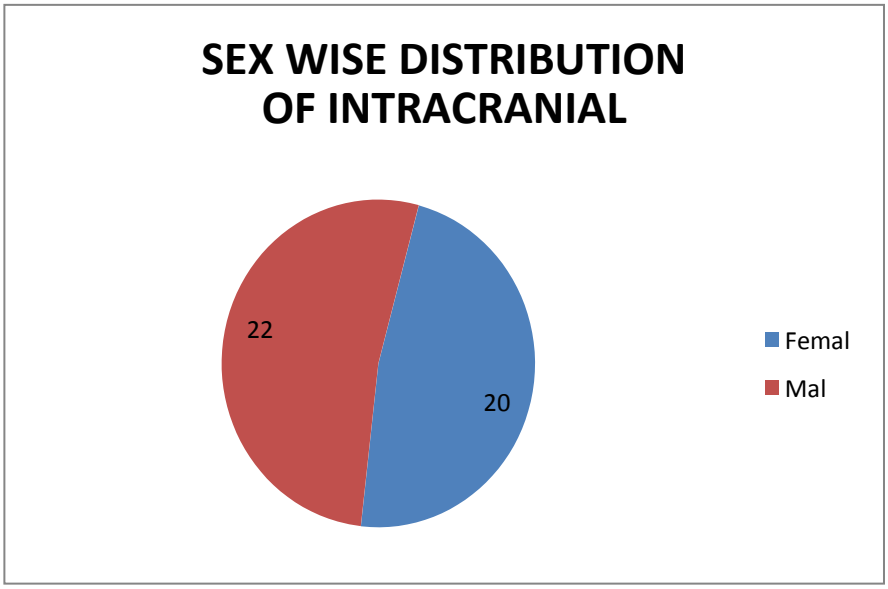

Table 3: Presenting Complaints

PRESENTING COMPLAINTS	NO OF PATIENTS	PERCENTAGE
VOMITING	19	45.2
HEADACHE	16	38.1
SEIZURES	13	31
VISION DISTURBANCES	7	16.7
DROWSINESS / UNCONSCIOUSNESS	7	16.7
WEAKNESS OF LIMBS	6	14.3
IRRITABILITY	4	9.5
NOT GAINING HEIGHT	2	4.8

The most common clinical presentation noted in current study was vomiting (19, 45.2%) followed by headache 16 (38.1%) and seizures 13 (31%) vision disturbances 7 (16.7%)Drowsiness or unconsciousness 7 (16.7%) weakness of limbs 6(14.3%) irritability 4 (9.5%)Not gaining height 2 (4.7%)

Table 4: Clinical Features

EXAMINATION FINDINGS		No of patients
PLANTAR REFLEX	EXTENSOR	24
	FLEXOR	18
PAPILL EDEMA	PRESENT	13
NEUROCUTANEOUSMARKERS	PRESENT	6
CRANIAL NERVEINVOLVEMENT	PRESENT	9
CEREBELLAR SIGNS	PRESENT	10
HYPERREFLEXIA	PRESENT	12
HYPERTONIA DECREASED POWER	PRESENT PRESENT	12 6

Plantar reflex was found to be extensor in 24 (57.1%)Papilledema was present in 30.95% of the patients (13) at the time of presentation.Neurocutaneous markers were observed in 14.2% (6) patients Cranial nerve involvement was observed in 21.4% (9) patients Out of which optic nerve was involved in4.76%(2) patients Occulomotor nerve was involved in 7.14%(3) patients abducens nerve was involved in 7.14%(3) patients Cerebellar signs were present in a total of 10 (23%)patients Decreased power is present in 6 (14.2%) patients Of the 42 tumors, 26 (61.9%) were supratentorial, and 16 (30.09%) were infratentorial.Of the 42 tumors, 26 (61.9%) were supratentorial, and 16 (30.09%) wereinfratentorial.

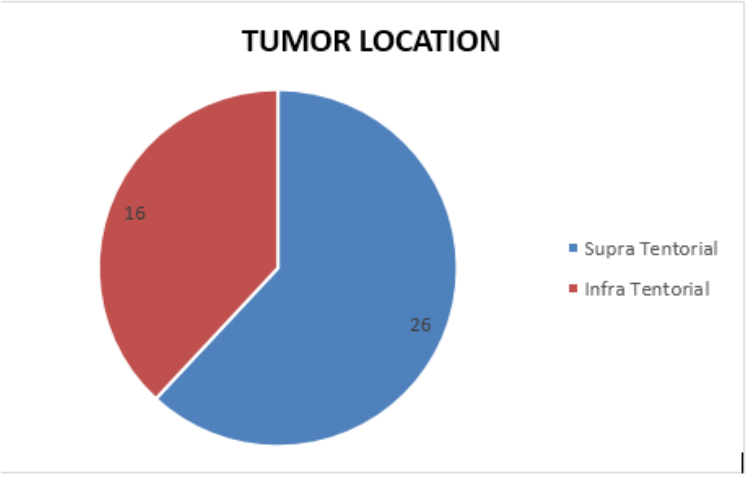

Table 6: Type of Tumors Based on RadiologicalFindings

DIAGNOSIS	NO OF PATIENTS	PERCENTAGE
MEDULLOBLASTOMA	10	23.8
CRANIOPHARYNGIOMA	9	21.4
ASTROCYTOMA	8	19

EPENDYMOMA	6	14.2
OLIGODENDROGLIOMA	2	4.8
HAMARTOMA	2	4.8
CHOROID PLEXUSPAPILLOMA	1	2.4
DESMOPLATICINFANTILE GANGLIOMA	1	2.4
DYSEMBRYOPLASTICNEUROEPITHELIAL TUMOR	1	2.4
GANGLIOGLIOMA	1	2.4
PLEOMORPHIC XANTHOASTROCYTOMA	1	2.4
TOTAL	42	100

As per the WHO 2021 Classification in this cross sectional study, the most common tumor was Medulloblastoma 10 (23.8%). Other common tumors were craniopharyngiomas (9, 21.42%) followed by Astrocytoma (8, 19.05%)

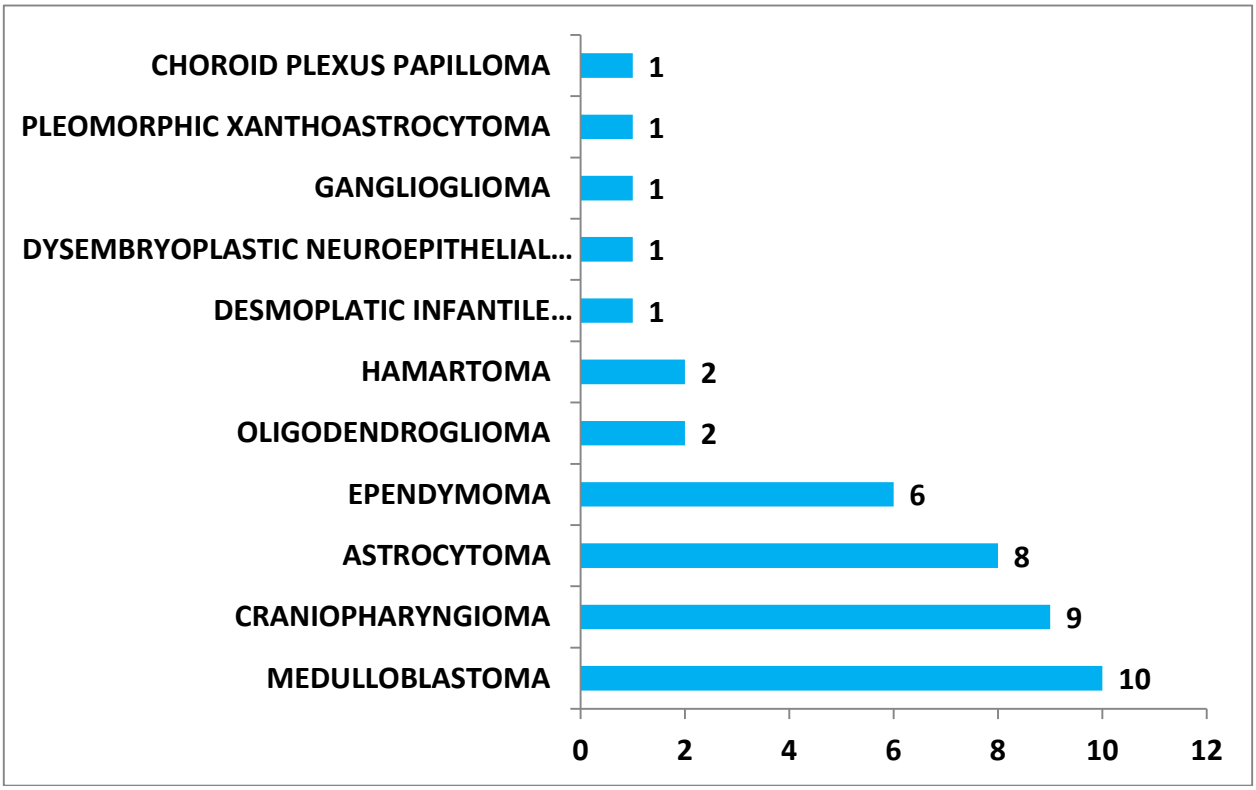

Table 7 : Age Wise Distribution of Type of Tumors Basedon Radiological Findings

DIAGNOSISBASED ONRADIOLOGICAL FINDINGS	AGE DISTRIBUTION IN YEARS				
	<2	2-5	6-10	>10	TOTAL
MEDULLOBLASTOMA	1	5	1	3	10
CRANIOPHARYNGIOMA	1	2	4	2	9
ASTROCYTOMA	1	2	2	3	8
EPENDYMOMA	0	0	3	3	6
HAMARTOMA	1	1	0	0	2
OLIGODENDROGLIOMA	0	1	1	0	2
CHOROID PLEXUSPAPILLOMA	0	1	0	0	1
DESMOPLATIC INFANTILE GANGLIOMA	0	1	0	0	1
DYSEMBRYOPLASTICNEUROEPITHELIAL TUMOR	0	0	1	0	1
GANGLIOGLIOMA	0	0	0	1	1
PLEOMORPHIC XANTHOASTROCYTOMA	0	0	0	1	1
TOTAL	4	13	12	13	42

Medulloblastomas were found predominantly in the age group of 2-5 years 5 out of 10 (50%).Craniopharyngiomas were found most commonly in age group of 6-10 years 4 out of 9 (44.4%).Astrocytomas had an almost equal age group distribution. Ependymomas were seen only in the age groups of 6-10 years and >10 years with almost equal distribution.

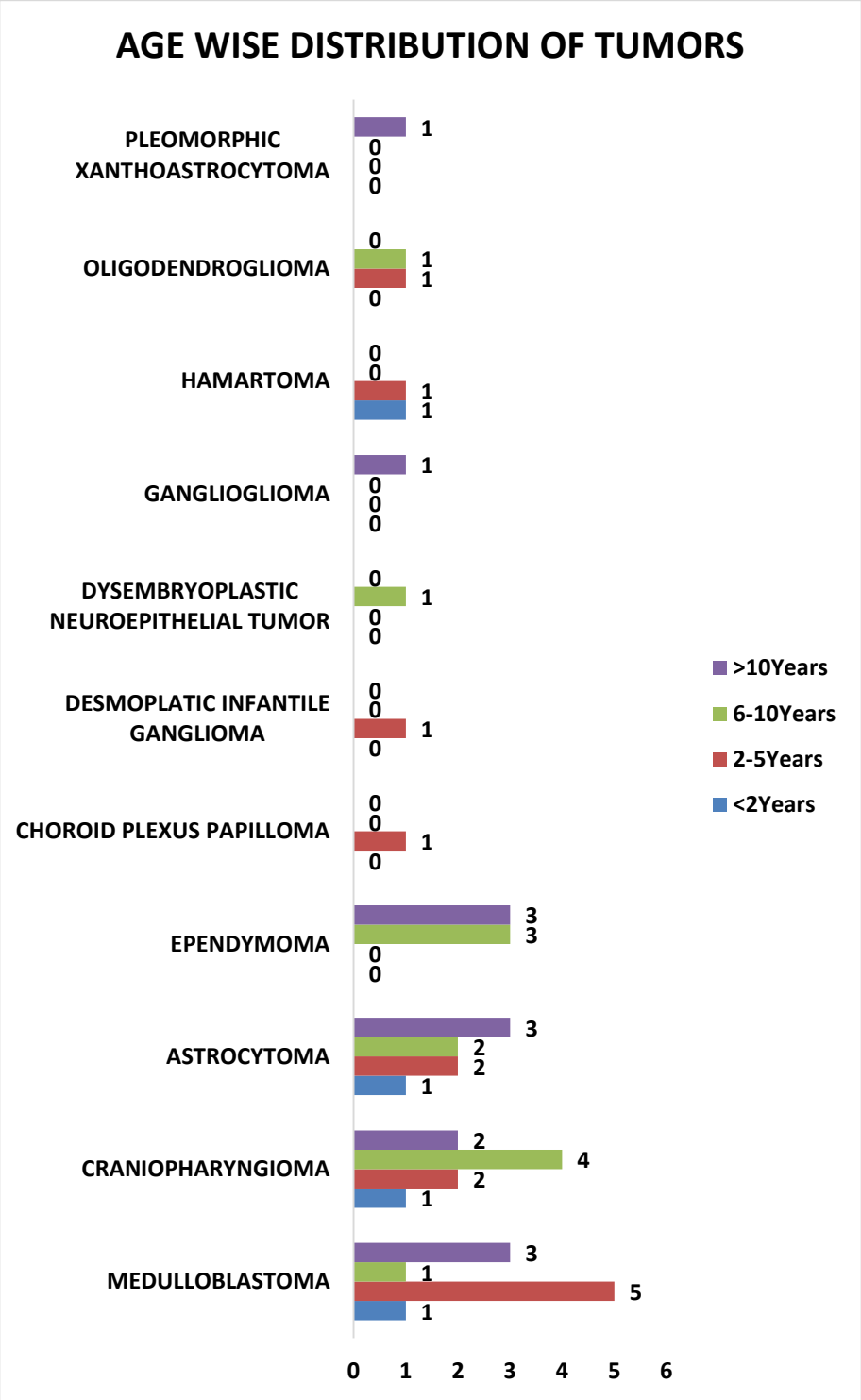

TABLE 8 : SEX WISE DISTRIBUTION OF TYPE OF TUMORS BASEDON RADIOLOGICAL FINDINGS

DIAGNOSIS BASED ON RADIOLOGICAL FINDINGS	SEX		Total
	Male	Female	
MEDULLOBLASTOMA	4	6	10
CRANIOPHARYNGIOMA	6	3	9
ASTROCYTOMA	4	4	8
EPENDYMOMA	4	2	6

PLEOMORPHIC XANTHOASTROCYTOMA	0	1	1
OLIGODENDROGLIOMA	1	1	2
HAMARTOMA	1	1	2
GANGLIOGLIOMA	1	0	1
DYSEMBRYOPLASTIC NEUROEPITHELIAL TUMOR	1	0	1
DESMOPLATIC INFANTILE GANGLIOMA	0	1	1
CHOROID PLEXUS PAPILLOMA	0	1	1
TOTAL	22	20	42

Medulloblastoma has a female predominance (6 out of 10) 60% where as Craniopharyngiomas had a male predominance (6 out of 9) 66.6% astrocytoma was distributed equally among both the sexes

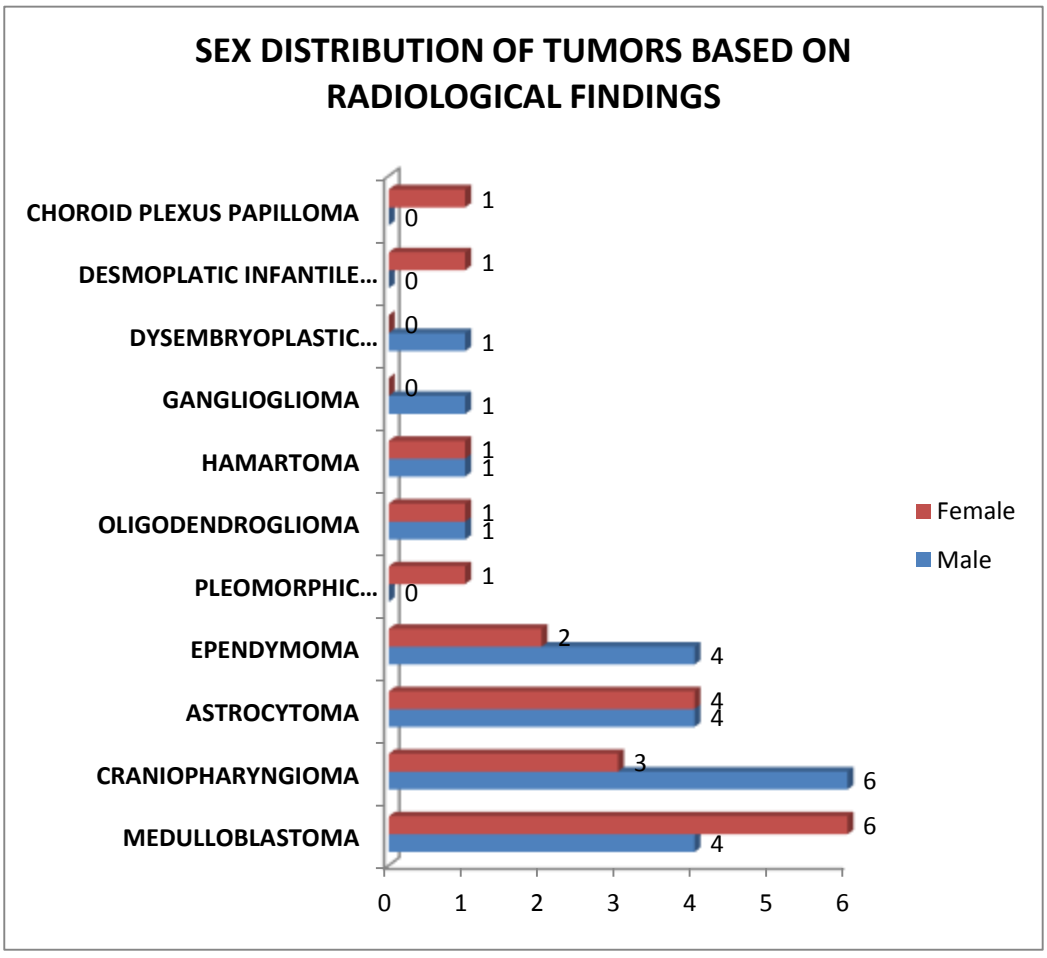

TABLE 9: TREATMENT GIVEN

Treatment Given	No of patients	Percentage
Conservative Management	17	40.4
Tumor Excision	25	59.5
Tumor Excision VP Shunting	3	7.1
Tumor Excision with Radiotherapy	2	4.8

Surgical resection alone was done in 25(59.5%) of patients.Surgical resection with Ventriculoperitoneal shunting was done in 3 patients(7.1%).Surgical resection with radiotherapy was done in 2 patients (4.8%).17 (40.4%) were conservatively managed and referred to a cancer centre

2. Discussion

In present study 42 cases were enrolled

Mean age in current study is 7.3 years with highest incidence among age group of 6-10 years age 30.9% . Studies from China, Japan, and France have reported highest incidence in 1–4 years, 5–9 years, and 5–9 years, respectively.[23 24 25]

A retrospective study from India with a larger sample size of 1043 patients reported the mean age of 10.9 years.[22] These differences from nearly the same geographic area can be due to small sample size in present study.

Global statistics indicate that men are more likely than women to get CNS malignancies. [19 23 24] Despite the fact that the current study's male to female ratio was higher than most western research (1.1:1), men were nonetheless affected more than women. This may be the result of discrimination against women seeking medical care in India.

The most common presenting complaint in present study is vomiting 19 (45.2%) followed by headache 16 (38.1%) similar to study from Siberia[10] and Recent study from south India[12]

In the Present study Plantar reflex was found to be extensor in 24 (57.1%) Papilledema was present in 30.95% of the patients (13) at the time of presentation.Hyperreflexia and hypertonia present in 28% of patients each .Facial nerve was involved in 7.14%(3) patients downward deviation of eye in one patient . Cerebellar signs were present in a total of 10 (23%) and Decreased power is present in 6 (14.2%) patients compared to to a Danish review of 55 children[28]where Cerebellar signs were seen in 17% and hyperreflexia (11%) increased muscle tone seen in 7% facial palsy in 9% downward deviation of eye in one patient Papilledema in 10% of the patients.

In the Present study tumor location was supratentorial in 26 (61.9%) and infratentorial in 16 (30.09%) In contrast to study from Mexico[27]where 62.7% tumors were infratentorial and 37.3% were supratentorial

The majority of the malignancies in the current investigation were embryonic. Medulloblastomas made up 23.8% of the tumors, followed by craniopharyngiomas (21.4%) and astrocytomas (19%). According to a similar study from the Kanchi Kamakoti Institute in Chennai[12], medulloblastomas were the most prevalent tumor (28.6%).

According to Indian data on central nervous tumors: A summary of published work. South Asian J Cancer. 2016 the five most frequent tumors were astrocytoma (47.3%), Medulloblastoma (11.4%), craniopharyngioma (9.7%), ependymal tumors (4.8%), and nerve sheath tumors (4.1%).[13]in contrast to current study where medulloblastoma was the most common tumor (23.8%) followed by craniopharyngiomas (21.42%) and Astrocytoma (8, 19.05%).In other studies from Brazil, Nigeria, Pakistan, Medulloblastoma was the second most common tumor .[141516]

In the current study Surgical resection alone was done in 25(59.5%) of patients.Surgical resection with Ventriculoperitoneal shunting was done in 3 patients(7.1%).Surgical resection with radiotherapy was done in 2 patients (4.8%).17 (40.4%) were conservatively managed and referred to a cancer centre compared to a similar study [12] where Surgical resection was done in 36 (69%) patients.52.7% of all surgical resections were described as gross total resections, and 37.7% as subtotal resections. In 5.5% of cases, only biopsy was performed; in 4.1% of cases, there was no surgery. About 20 cases of CSF diversion were performed, of which 16 required a ventricular-peritoneal shunt and 4 required an endoscopic third ventriculostomy. In this research, only biopsy wasn't performed.

SUMMARY

- Total 42 cases were enrolled in this study
- Patients enrolled in the study were in the age group of 1 month -15 years with most of the patients in age group 2-5 years age
- There were 22 (52.4%) males and 20 (47.6%) females overall male/female ratio was1.1:1.
- The mean age of distribution was 7.3 years
- The most common clinical presentation was vomiting (19, 45.2%) followed by headache 16 (38.1%) and seizures 13 (31%)
- Plantar reflex was found to be extensor in 24 5(7.1%) patients out of which 62.5% patients had supratentorial tumors
- Papilledema was present in 30.95% of the patients (13) at the time of presentation out ofwhich 7 were infratentorial tumors
- Cranial nerve involvement was observed in 21.4% (9) patients Out of which 7 cases were diagnosed with (77.7%) supratentorial tumors
- Cerebellar signs were present in a total of 10 (23%)patients out of which 8(80%) werediagnosed to have infratentorial tumors
- 42.8% tumors of the Present study were found to be malignant
- 61.9% were supratentorial tumors.
- Most common tumor was Medulloblastoma 10 (23.8%) followed by craniopharyngiomas

(9, 21.42%) and Astrocytoma (8, 19.05%)

- Medulloblastomas were found predominantly in the age group of 2-5 years (50%) with female predominance (60%).Craniopharyngiomas were found most commonly In age group of 6-10 years (44.4%) with male predominance (66.6%).Astrocytomas had an almost equal age group distribution and equal distribution among sexes .
- Surgical resection alone was done in 25(59.5%) of patients.(40.4%) were conservatively managed and referred to a cancer centre
- 5 patients have expired during the course of study out of which 3 were infratentorial tumors all of which are medulloblastomas

3. Conclusion

The peaks of age groups effected by intracranial tumors are 2-5 years and 10 to 15 years with most of the patients having vomiting as their chief complaint hence patients of these age groups have to be properly evaluated especially when the duration of symptoms is chronic and associated with non gastrointestinal symptoms like headache and seizure.clinical examination with specific emphasis on central nervous system examination gives us clues about the location of tumor.Present study contributes to the literature regarding epidemiological and clinical aspects of intracranial tumors in children in India.

By building a comprehensive database of data from every region of India, akin to the CBTRUS Central Brain Tumor Registry of the United States, it will be possible to determine if the current study accurately represents regional prevalence or whether there is bias.

Limitations

1. This is a tertiary care hospital centre study
2. Relatively small sample size
3. Follow up was not done in Present study

Recommendation

The diagnosis of CNS tumors should be kept In mind if there is persistent vomiting and headache child should be evaluated. Parents and community must be made aware to identify clinical features of intracranial tumors and must be advised to present to the hospital for early evaluation and treatment

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