

Study of Space Occupying Lesions of Brain in Children

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Received: October 2020

Accepted: October 2020

ABSTRACT

Background: ICSOL (Intracranial space occupying lesion) is common among children and leads to morbidity and mortality in absence of early diagnosis and treatment. The study was conducted with objectives to study epidemiology, etiology, clinical presentation, therapeutic modalities and outcome of patients of ICSOLs. **Methods:** This retrospective observational study has been conducted in civil hospital, Ahmedabad for the duration of Jan 2017 to June 2018 in department of paediatrics, of age group 1month-12 years, to have ICSOL confirmed by radiological investigation. **Results:** The present study shows ratio of 1.35% (n=70) among total patients admitted during this duration (n=5176). Out of 70 patients 58.5% (n=41) were male and 41.4% (n=29) female. 80% (n=56) patients were between 1-10 years age. 34.2% (n=24) belonged to class 5 of socioeconomic status and 61% (n=43) were fully immunized and 8% (n=6) were unimmunized. Vomiting (70% (n=49)) and headache (42.8% (n=30)) being most common presenting complain. 68.5% (n=48) had signs of raised ICP and 48(68.5%) patients out of 70 had motor system involvement. Of all SOL 67% (n=47) were supratentorial, 25% (n=18) were infratentorial and 7% (n=5) were involving both regions. Infective origin was most common etiology (62.8% (n=44)) of which brain abscess being most common (30% (n=21)) followed by tuberculoma 21.4% (n=15). Brain tumors were 28.5% (n=20) of which craniopharyngioma being most common (7% (n=5)). 48% (n=34) out of 70 patients required surgical management. Overall mortality in present study was 8.5% (n=6). **Conclusion:** Every patient presenting with signs of raised ICP and motor system involvement should be thoroughly investigated for intracranial space occupying lesions and managed medically or surgically as needed to decrease morbidity and mortality.

Keywords: Intracranial space occupying lesion, Tuberculoma, Supratentorial, raised ICP.

INTRODUCTION

The term Intra-cranial space occupying lesion is generally used to identify any lesion inside the cranial cavity, which increases the volume of intracranial contents and leads to a rise in the intracranial pressure. It includes any neoplasm, benign or malignant, primary or secondary, as well as any acute or chronic inflammatory lesion, a parasitic mass lying within the cranial cavity, any hematoma, different types of cysts and vascular malformations.^[1] ICSOL is common among children and leads to morbidity and mortality in the absence of early diagnosis and treatment.^[2]

Most of study outside india showed neoplasm as most common lesion in ICSOLs. In Matson's study neoplasms accounted for 93.7% of ICSOLs and in Roose & Miller study it accounted for 85%.^[2] Ramamurthy et al,^[3] in India found that all neoplasms accounted for 54.7% and tuberculomas alone accounted for 43.6%. In India, Yashodhara et al (2015),^[4] has mentioned that granulomatous lesions (Tuberculoma and NCC) accounted for nearly 82.5% and neoplasms only 12.5%. This difference is may be due to low incidence of

granulomatous lesion of infective origin in developed countries.

CNS tumors are the most common malignancy in childhood and adolescence and overall mortality among this group approaches 30%. The national cancer Institute (NCI)'s SEER program reported slight predominance of infratentorial tumor location (43.2%) than supratentorial region (40.9%).^[5]

This study was conducted with objectives to study epidemiology, etiology, clinical presentation, therapeutic modalities and outcome of patient of ICSOLs.

Aims and Objectives:

The current study was performed with the following aims & objectives:

1. To study the frequency of ICSOLs amongst hospitalised children.
2. To study demographic profile of children having ICSOLs.
3. To study various etiologies of ICSOLs in children.
4. To study the outcome.

MATERIALS AND METHODS

It is retrospective observational hospital based study conducted at Civil hospital Ahmedabad (Tertiary care hospital) from 1st Jan, 2017 to 30th June, 2018. The sample is an inclusive sample with no selection. All children after informed consent from parents aged 1month to 12 years who were diagnosed as

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intracranial SOL after confirmation by neuroimaging admitted or referred at civil hospital Ahmedabad during study period were included.

Inclusion Criteria

1. Age of patient between 1 month to 12 years
2. Intracranial SOL proven by imaging.

Exclusion Criteria

Patients with intracranial hemorrhage and hematoma a predefined proforma were used to obtain information and data was analysed.

RESULTS

Males were 41 and females were 29 with Male to female ratio of 1.4:1. It was comparable to other studies. [Table 1]

In present study, children having ICSOLs were same in age group 1-5 yrs and 6-10yrs i.e 40% which comprised 80% of all patients. Extremes of ages were less commonly affected (<1 years and >10 years). [Table 2]

Only 8.6% of children were unimmunised [Table 3]. 91.4% patients were fully immunised to partially immunise.

In present study, overall 60% children had various grades of malnutrition. [Table 4]

- The most common presenting symptom was vomiting (70%) followed by haedche (42.8%). Increasing head size & speech abnormality were the least frequent complaint in children 2.8% and 4.2% respectively.

- Signs of raised intracranial tension were the most common abnormal neurological manifestations (68.5%) followed by Motor system involvement also seen in 65.7%. cerebellar signs and gait abnormalities were least frequent. [Table 5]

- -In present study, frequency of ICSOLs were same in the age group of 1-5 years and 6-10 years. . Infective & inflammatory lesions were common in the all age groups. Brain tumors were least frequent in children < 1 year &> 10 years age group. Males are affected more overall. [Table 6]
- Overall supratentorial lesions (67.1%) were more common than infratentorial (25.7%). Infective & inflammatory SOLs (62.8%) were more common than tumors (28.5%). Amongst the infective & inflammatory SOLs the brain abscess (30%) was the most common SOL followed by tuberculomas (21.4%). All these SOLs were predominantly supratentorial in origin (34 vs. 6).
- Amongst the tumors Craniophryngioma (25%) was the most common followed by Ependymoma & Glioma (20% each). Out of these, infratentorial lesions were more common than supratentorial (12 vs. 7) except Craniophryngioma. Arachnoid cyst was the most common miscellaneous SOLs (7.1%). [Table 7]
- Out of 70 patients 34 patients required surgical management. Overall mortality in this study is 8.3%. Out of this 6 expired, 3 patient were of brain abscess and 3 patients were of tubercular meningoencephalitis stage 3. [Table 8]

Table 1: Sex distribution of included patients

Sex distribution	Total (n=70)	Rashmi et al, ^[6] 2016 (n=72)	Yashodhara et al, ^[4] 2015 (n=40)
Male	41 (58.5%)	58.33 %	52.5%
Female	29 (41.4%)	41.66%	47.5%
M:F	1.4:1	1.4:1	1.1:1

Table 2: Age distribution of patients

AGE	M (n=41)	F (n=29)	%	Rashmi et al[6]	Yashodhara et al[4]
1 MO to <1 year (n=7)	6	1	10	8.3%	-
1 to 5 years (n=28)	16	12	40	73.61%	7.5%
6 to 10 years (n=28)	14	14	40		92.5%
>10 years (n=7)	5	2	10	18.05%	

Table 3: Immunisation status of patients

Immunisation Status	Male (N=41)	Female (N=29)	Present Study	Yashodhara Et Al
Fully Immunised (N=43)	26	17	91.4%	80%
Partially Immunised (N=21)	11	10		
Unimmunised (N=6)	4	2	8.6%	20%

Table 4- Nutritional status of patients

Nutritional Status	Male	Female
Normal (n=28)	14	14
PEM 1 (n=2)	1	1
PEM 2 (n=7)	3	4
SAM (n=14)	12	2
Moderate undernutrition (n=13)	9	4
Severe Undernutrition (n=6)	2	4

Table 5: Symptoms and Signs of patients

Symptoms	Number (%)	SIGNS	Number (%)
Headache	30 (42.8%)	Abnormal posture	14 (20%)
Vomiting	49 (70%)	Cranial nerve involvement	11 (15.7%)
Increase head size	2 (2.8%)	Signs of raised ICP	48 (68.5%)

Focal convulsion	23 (32.8%)	Signs of meningeal irritation	22 (31.4%)
GTC convulsion	27 (38.5%)	Motor system	46 (65.7%)
Altered sensorium	22 (28.5%)	-monoparesis	4 (5.7%)
Motor weakness	16 (22.8%)	-hemiparesis	18 (25.7%)
Vision disturbance	7 (10%)	-paraparesis	6 (8.5%)
Speech abnormality	3 (4.2%)	Gait abnormality	4 (5.7%)
		Cerebellar signs	1 (1.4%)

Table 6- Type of SOL according to age and sex

Etiology	<1 Yr	1-5	6-10	>10	Male	Female
Infective/inflammatory (n=43)	5	17	16	5	27	16
Brain tumor(n=21)	1	9	10	1	10	11
Others(n=6)	1	2	2	1	3	3
Total(n=70)	7	28	28	7	40	30

Table 7- Etiology of SOL

Etiology of SOL	Supratentorial	Infratentorial	Mixed	Number (%) (n=70)
Infective/inflammatory	34	6	4	44 (62.8%)
Brain abscess	19	2		21 (30%)
Tuberculoma	7	4	4	15 (21.4)
Neurocysticercosis	8			8 (11.4%)
Brain tumors	7	12	1	20 (28.5%)
Craniopharyngioma	5			5 (7.1%)
Medulloblastoma		2	1	3 (4.2%)
Cavernoma	1			1 (1.4%)
Glioma	1	3		4 (5.7%)
Ependymoma		4		4 (5.7%)
Astrocytoma		2		2 (2.8%)
Pineal gland adenoma		1		1 (1.4%)
Others	6			6 (8.5%)
Arachnoid cyst	5			5 (7.1%)
Tuberous sclerosis	1			1 (1.4%)
	47(67.1%)	18(25.7%)	5(7.1%)	

Table 8: Management and outcome

Surgical management	Number (%) (n=34)	Outcome	Number (%) (n=70)
Omayya shunt	3 (4.2%)	Discharge	52 (74.2%)
VP shunt	12 (17.1%)	Expired	6 (8.3%)
Burr hole	8 (11.4%)	Dama/Lama	6 (8.3%)
Craniectomy and removal of lesion	9 (12.8%)	Transfer to cancer department	6 (8.3%)
Trans nasal trans sphenoidal endoscopic removal	1 (1.4%)		
Modified radical mastoidectomy	1 (1.4%)		

DISCUSSION

- Total No. of admissions during this study period in paediatric department were 5176 children out of which 70 had ICSOLs confirmed by imaging which constituted 1.35% of total admissions. The exact proportion may be slightly high as few children may have been directly admitted to neurosurgical unit referred for operative interventions. Exact incidence has not been described in literature but relative frequency in comparison to other studies was there. Rashmi et al 2016,^[6] showing 0.57% and Nisha et al 2017,^[7] showing 0.89%. Overall male predominated in every age group [Table 2]. The observed difference was statistically not significant as p value is 0.3242. We observed children having lower socioeconomic strata were more affected.
- 94.1% patients are immunized (fully/partially) [Table 3]. Increasing awareness & free of cost facility for vaccination at nearby centre may have resulted in good vaccine coverage. According to etiology wise, Overall in all age groups male

predominated to females.[Table 6] The observed difference was statistically not significant as p-value is 0.4812. Overall no difference was observed in distribution of SOLs in various age groups as pvalue is 0.8706. [Table 6]. Overall supratentorial lesions (67.1%) were more common than infratentorial (25.7%). This observation was statistically significant as p-value is 0.0003 [Table 7]. Medical management in form of antiepileptics, antitubercular drugs, antibiotics, medications to reduce ICP were used as and when required. 34 (47.2%) patients required surgical management. [Table 8]. Due to availability of advanced radiodiagnosis timely exact diagnosis was obtained and 52(74.2%) patients were discharged and 6(8.3%) were transferred to cancer department for further management. [Table 8]

CONCLUSION

Every patient presenting with signs of raised ICP and motor system involvement should be thoroughly investigated for intracranial space occupying lesions

and managed medically or surgically as needed to decrease morbidity and mortality.

REFERENCES

1. Sir John Walton; Intracranial tumor ; Brains Diseases of the Nervous system 9th ed. P. 143 - 175
2. Matson D Neurosurgery of infancy and childhood, second edition. Charles C. Thomas: springfield. Illinois. 1969:772
3. Ramamurthi B. Intra-cranial tumors in India:incidence and variations. International Surgery.1973; 58 (8): 542-47
4. Yashodhara P Reddy AT, Prospective study of intracranial space occupying lesions in children in correlation with C.T. Scan. Int J Sci Res IJSR, 2015;4(2);1-8
5. Nelson textbook of paediatrics edition 21 vol2:2666
6. Rashmi Thanvi; A Study of Intracranial Space Occupying Lesions inChildren; Original research paper,GJRA,Volume-5, Issue-7, July – 2016,pg 253-254
7. Nisha prajapati; Study of intra-cranial space occupying lesion in children at tertiary care centre, Ahmedabad, Gujarat, India;Original research article; Int J ContempPediatr. 2017 Nov;4(6):2193-2195.

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How to cite this article: Patel J, Shah CD, Akhni S. Study of Space Occupying Lesions of Brain in Children. Ann. Int. Med. Den. Res. 2020; 6(6):PE15-PE18.

Source of Support: Nil, **Conflict of Interest:** None declared