Online ISSN: 2581-3935
Print ISSN: 2589-7837

International Journal of Medical Science and Diagnosis Research (IJMSDR)

Available Online at www.ijmsdr.com

Volume 2, Issue 6; November-December: 2018; Page No. 34-39

To Know The Radiological Spectrum of ICSOL in Pediatric Age Group.

***Dr. Mangilal Barman[1] and Dr. Suresh Kumar[2]**

[1]Associate Professor, Govt. Medical College, Ratlam, M.P.

[2]Associate Professor, NSCB Medical College, Jabalpur

Abstract:

Background: This prospective study was done in the Department of Radiodiagnosis NSCB Medical College, Jabalpur. A total of 82 patients presenting with signs, symptoms or radiologically suspicious findings of ICSOLS in pediatric outpatient and inpatient department in NSCB Medical College, Jabalpur over a period of 01 year.

Method: Referred for radioimaging were subjected to a MRI brain evaluation with contrast wherever needed. Other findings like past history, family history, food habits, pattern of headache, CSF analysis, chest Xrays, previous CT scan reports etc, if available, were considered wherever relevant. 12 patients were later lost in follow up and were not considered in the final tabulations.

Conclusion: Majority of patients in our study group belonged to the age group 5-9 years (33%). The percentage of males (54%) presenting with ICSOLs was slightly higher than females (46%) with Male: Female ratio approximately 1.2:1 Headache (77%) was the main presenting complaint followed by seizure(53%), fever(28%), vomiting (26%) and ataxia (10%), focal neurological deficits (11%) and papilloedema (11%). Vomiting and ataxia were more common in infra tentorial lesions while seizures were found more commonly in supra tentorial lesions.

Multiplelesions (68%) were more common than single lesions in our study. Multiple lesions mainly belonged to infective etiology. Intraaxial lesions (84%) were more common than extra axial lesions in our study.

Keywords: Radiological, Spectrum, MRI, ICSOL & Paediatrics

INTRODUCTION

The term "Icsol" includes lesions which strengthen in volume to displace general neural structures and lead to increase in intracranial tension. These lesions give rise to the following three groups of symptoms in general.

1. Neurological phenomena caused by irritation or destruction of brain tissue, e.g, focal seizures (Jacksonian epilepsy) and paralysis.

2. Features of raised intracranial tension (Ict)

3. False localizing signs:

(a) These are neurological phenomena arising from secondary effects of the lesions. As a result of herniation of neural tissue under the falx cerebri or downward herniation straight through the tentorium cerebrlli and foramen magnum, pressure effects on other parts of the brain develop.

(b) Contre-Cup effect: This is pressure result

Corresponding author: Dr. Suresh Kumar

caused on the side opposite to the side of lesion when a space occupying lesion expands. The midline structures such as brainstem may be pushed towards the opposite free margin of the tentorum cerebelli to give rise to compression of the general side as well. In addition to these genera features different lesions may produce symptoms definite to their nature.

For example, brain abscess may be linked with fever and other signs of infection. Subarachnoid hemorrhage may be linked with signs or meningeal irritation.[1]

The discovery of Computed Tomography by G.N. Hounsfield in 1972 has been a milestone in medical diagnostic imaging as cross sectional imaging took a step into diagnostic radiology. With the introduction of CT, especially with contrast, it became possible to diagnose many of the brain lesions, but there were certain limitations. For instance, CT is not a very good modality for imaging posterior fossa and pitutary, is associated with high radiation exposures especially in children and shows beam hardening artifacts. The assessment of extension of lesion and involvement of important neurovascular structures is also limited. Many small lesions are easily missed on CT.[2]

These limitations have largely been overcome with MRI. MRI with its multiplanar capabilities and superior contrast resolution is now the modality of choice. In the last decades, MRI approaches have evolved into the most powerful and versatile imaging tool for brain tumor diagnosis, prognosis, therapy evaluation, monitoring of disease progression and planning of neurosurgical strategies. Itprovides excellent soft tissue contrast, which makes it the imaging modality of choice for ICSOLs. MRI has helped in the early diagnosis as well as localization of the ICSOL and has brightened the prognosis of mass lesions.[3]

Material & Method

This prospective study was done in the Department of Radiodiagnosis NSCB Medical College, Jabalpur. A total of 82 patients presenting with signs, symptoms or radiologically suspicious findings of ICSOLS in pediatric outpatient and inpatient department in NSCB Medical College, Jabalpur over a period of 01 year and referred for radioimaging were subjected to a MRI brain evaluation with contrast wherever needed. Other findings like past history, family history, food habits, pattern of headache, CSF analysis, chest Xrays, previous CT scan reports etc, if available, were considered wherever relevant. 12 patients were later lost in follow up and were not considered in the final tabulations.

Magnetic Resonance Imaging evaluation of brain using 3Tesla MRI scanner was performed after obtaining informed consent. The study was conducted from March 2017 to March 2018 after getting approval by Institutional Scientific Review Board.

INCLUSION CRITERIA

All pediatric patients showing ICSOLS on MRI

EXCLUSION CRITERIA

1. General contraindications to MRI such as pacemakers, aneurysmal clips, cochlear implants, contrast allergy etc.
2. Patient’s parents/guardian not willing to give consent.
3. Patients with ICSOLS of traumatic origin.
4. Bony lesions of skull having intracranial extensions.
5. infarcts

STATISTICAL ANALYSIS

Statistical analysis of data was done using SPSS software version. 26 and theresults were evaluated using Mann-Whitney U test.

AXIAL T1-W(a) **AXIAL T2-W (b)**

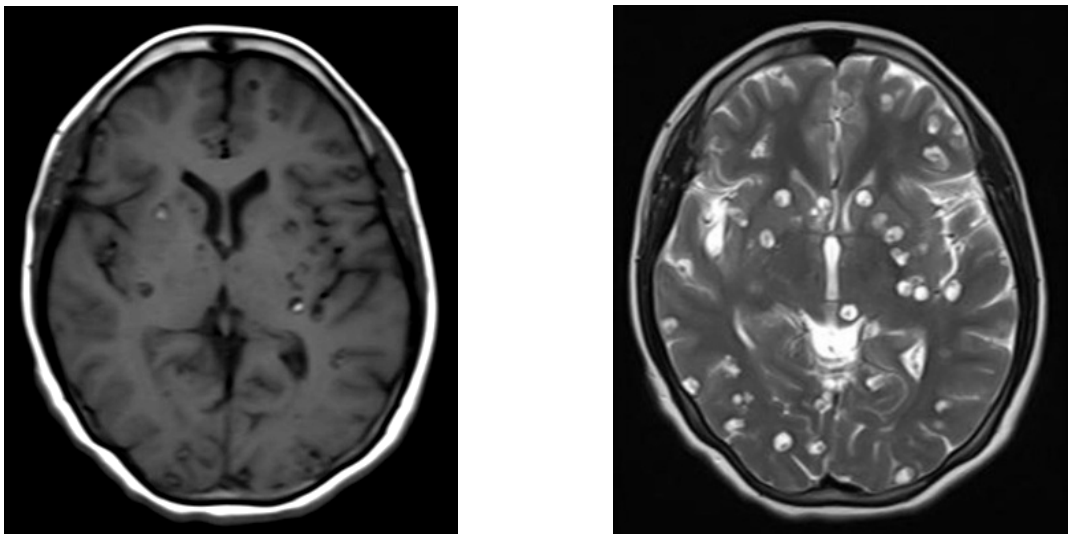


Figure 1: Multiple cystic lesions showing slight hyperintensity than CSF on TI(a) and T2(b)

Results:

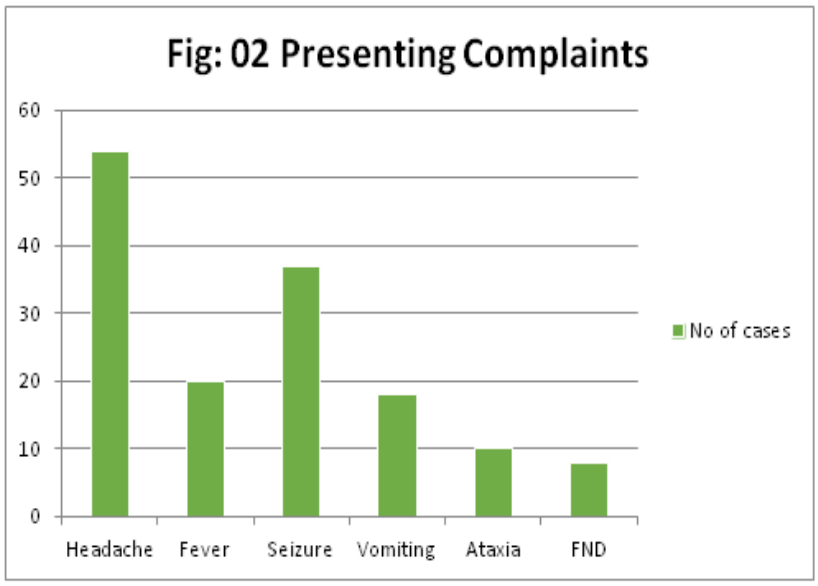
Table 1: Age distribution of cases

Sr. No.	AGE IN YRS	NO. OF PATIENTS	PERCENTAGE (%)
1	0-4	14	20
2	5-9	23	33
3	10-14	20	28
4	15-17	13	19
	TOTAL	**70**	**100**

Table 2: Presenting complaints

Sr. No.	Presenting Complaint	No. of cases	Percentage %
1	**Headache**	**54**	**77**
2	**Fever**	**20**	**28**
3	**Seizure**	**37**	**53**
4	**Vomiting**	**18**	**26**
5	**Ataxia**	**10**	**14**
6	**FND ***	**8**	**11**
7	**Papilloedema**	**8**	**11**

*FND: Focal Neurological Deficit



Headache (77%) and Seizure (53%) were the most common presenting complaints.

Table 3: Distribution of cases on the basis of location and age group

S. No.	Location		10 and below 10 yrs.		Above 10 yrs.	
1	Supratentorial		10		4	
2	Infratentorial	Brain Stem	2		1	
		Cerebellum	4			
		4th Ventricle	6			

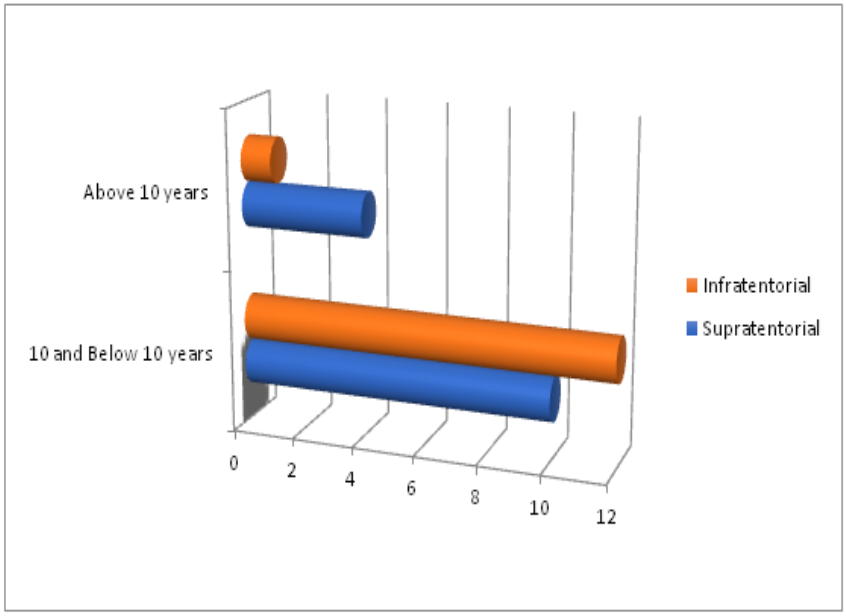


Figure 3: Infratentorialtumours (54%)were more common below 10 yrs. of age and supratentorial (15%)were more common above 10 yrs.

Table 4: Multiplicity of lesions

	No. of lesions	Percentage
Single	**48**	**68**
Multiple	**22**	**32**

Single lesions (68%) were more common than Multiple lesions in our study

Table 5: INTRAAXIALVS. EXTRAAXIAL LESIONS

	No. of cases	Percentage
Intraaxial	**59**	**84**
Extraaxial	**11**	**16**

Intraaxial lesions (84%) were more common than extra axial lesions in our study

Discussion

With this background, we attempt in our study to determine the role of Magnetic Resonance Imaging, DWI and its corresponding ADC values in particular along with MRS, in characterizing ICSOLs. The major aim of the present study was to study the MRI spectrum of ICSOLs in pediatric patients and to characterize and differentiate congenital, infective and neoplastic lesions on the basis of MRI sequences and to assess the accuracy of MRI in doing so with histopathology as gold standard. Lesions were further characterized into different subtypes and the accuracy of MRI was assessed. In cases where differential diagnosis was given, only the most likely diagnosis was considered in interpretation and tabulated. Further tumors were graded into low and high grade.

This prospective study was done in the Department of Radio diagnosis NSCB Medical College, Jabalpur. A total of 82 patients with clinical or radiological suspicion of ICSOL and those whom MRI has been advised by their consultants, were subjected to Magnetic resonance imaging of brain with contrast, using 3T MRI scanner. The reference standard used in our study, consisted of HPE follow up. The final study group comprised of 70 patients as rest of them lost follow up or lacked HPE or laboratory profile correlation.

Patients of age group between 0-17 years were included in our study. In the present study, the most common age group encountered was between 5-9 years(33%). Similar observations were seen in the studies of Matson et al and Nisha Prajapati et al[4]. Males slightly predominated our study constituting 54% of the total study population. Male to female ratio was found to be 1.2:1.The incidence of ICSOLs in males was 58% in the study of Rashmi Thanvi et al[5] and 48% in the study of P Yashodhara et al[6]. These observations correlate well with our study.

In our study, headache (77%), seizure(37%) and fever(28%) were the main presenting complaints followed by vomiting(18%), ataxia(10%), focal neurological deficits(11%) and papilloedema(11%).Similar clinical profile was seen in the study of P Yashodhara et al[6] and N.A. Hemaet al[(7)].Seizures were present more in supratentorial ICSOLs while ataxia and vomiting were found more in infratentorial ICSOLs.

Conclusion

Majority of patients in our study group belonged to the age group 5-9 years (33%). The percentage of males(54%) presenting with ICSOLs was slightly higher than females(46%) with Male: Female ratio approximately 1.2:1 Headache

(77%) was the main presenting complaint followed by seizure(53%), fever(28%), vomiting(26%) and ataxia(10%), focal neurological deficits (11%) and papilloedema (11%). Vomiting and ataxia were more common in infra tentorial lesions while seizures were found more commonly in supra tentorial lesions.

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