Intracranial cysts in pediatric age group: Incidental or developmental?

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Introduction

Intracranial cysts are fluid-filled sacs within the brain. There is a diversity of intracranial cysts with different incidences within the childhood period. In addition there is a growing awareness about co-morbidities and the consequences of intracranial cysts.

Although it has been reported that they are mostly benign and asymptomatic, intracranial cysts can cause headache, epileptic seizures, increased intracranial pressure, hydrocephalus, ophthalmological symptoms, sensorineural hearing loss and neuropsychiatric problems. The size and the localisation of the cysts may have effect on symptomatology.

The leading type of intracranial cyst among childhood period is arachnoid cysts. The incidence of arachnoid cysts rises in cases with Down syndrome, schizencephaly, mucopolysaccharidosis and neurofibromatosis demonstrating an increased prevalence with underlying abnormalities of the brain.

It has been postulated that some of the cysts might be caused by a pathological process during developmental stages. That may be the reason of high rates of co-morbid conditions.

Objectives

The present study aimed to evaluate cystic findings in children who were admitted to the department of pediatric neurology regardless of the symptomatology. The type, localization, and accompanying clinical findings had been aimed to be documented.

Material and Methods

The study designed as a retrospective study. Children who were admitted to the Clinic of Pediatric Neurology and who had an MRI between years of 2016- 2021 enrolled in the study. Ethical approval had been taken from NEU Ethical Committee. The MRI scans evaluated by the same radiologist and primary intracranial cysts had been enrolled in the study. Demographic and clinical findings had been evaluated from the hospital's database and patients' files. Statistical Package for Social Sciences (version 17.0; IBM, Armonk, NY) was used for statistical analysis.

Results

Table 1. Some socioeconomic and clinical characteristics of participants

Characteristics	n	%
Sex		
Male	36	46.2
Female	42	53.8
Complaint		
Seizure	37	47.4
Headache	17	21.8
Developmental delay	12	15.4
Other*	12	15.4
Primary diagnosis		
Epilepsy	33	42.5
Headache syndrome	16	20.5
Developmental delay	13	16.7
Other**	16	20.5
Presence of more than one diagnosis	49	62.8
Seizure at least one	42	53,8
Mental retardation		
Present	20	25,6
Not present	54	69,2
Not documented	4	5,1
Motor retardation		
Present	22	28,2
Not present	53	67,9
Not documented	3	3,8
Neuropsychiatric diagnosis		
Present ***	9	11,5
Not present	60	76,9
Not documented	9	11,9

*vertigo, tinnitius, trauma, sacral dimple, syncopy, loss of consiousness, numbness.

** healthy, PHACE syndrome

*** ADHD (7 patients), behavioural problems (2 patients)

Table 2. Findings on MRI

Findings	n	%
Site of cyst		
Midline	32	41.0
Left	19	24.4
Right	17	21.8
Bilateral	10	12.8
Localization		
Midline	32	41.0
Temporal	23	29.5
Multifocal	6	7.7
Frontal	5	6,4
Occipital	5	6.4
Parietal	3	3.8
Cerebellar	3	3.8
Parahippocampal	1	1.3
Size of cyst		
<10mm	29	37.2
≥10mm	49	68.8
According to axial structures		
Intraaxial	22	28.2
Extra axial	56	71.8
According to tentorium cerebri		
Infratentorial	17	21.8
Supratentorial	61	78.2

Table 3. Findings according to the localization of the cyst

Localization	Sex (male/female)	Seizure (+/-)	Epilepsy (+/-)	Mental retardation (+/-)	Motor retardation (+/-)	Neuropsychiatric findings (+/-)	Size of the cyst (<10mm/≥10mm)
Temporal/ Extratemporal	14/9 22/33 P=0.092	15/8 25/30 P=0.192	12/11 25/30 P=0.588	4/18 16/36 P=0.265	4/18 18/35 P=0.172	5/15 4/45 P=0.060	11/12 18/37 P=0.208
Midline/ Extramidline	10/21 26/21 **P=0.046***	14/17 28/19 P=0.211	12/19 25/22 P=0.210	9/21 11/33 P=0.634	8/22 14/31 P=0.679	3/24 6/36 P=0.702	11/20 18/29 P=0.801
Intra-axial/ Extraaxial	8/14 28/28 P=0.277	20/2 22/34 **P=0.000***	17/5 20/36 **P=0.001***	5/15 15/39 P=0.811	7/13 15/40 P=0.516	4/14 5/46 P=0.179	11/11 18/38 P=0.142
Supratentorial/ Infratentorial	30/31 6/11 P=0.310	38/23 4/13 **P=0.005***	33/28 4/13 **P=0.026***	18/41 2/14 P=0.139	20/39 2/14 P=0.095	7/47 2/13 P=0.970	25/36 4/13 P=0.188

Among 78 patients 36(46,2%) were male and 42(53,8%) were female. The mean age was 7±5,4 years. The most frequent complaint of attendance was a seizure (47,4%). Approximately one over four had mental and/or motor retardation. Nine (11,5%) of them had a neuropsychiatric diagnosis.
Most of the cysts were located at the midline (41%). Mostly located extra-axial (71,8%) and supratentorial (78,2%). Most frequently arachnoid cysts had been observed with a percent of 64.1. The second leading type was pineal cysts(15.4%). The rest were porencephalic cyst, neuroglial cysts, and others (subependymal cyst and choroidal fissure cyst) with a percent of 10.3 (8 cases), 7,7 (6 cases), and 2,6 (2 cases) respectively.

The majority of the cysts were ≥10mm. They were mostly located at the midline (41%). Among lobes of the brain, they were mostly located within the temporal lobe (29,5%).

Among 78 patients one of them with arachnoid cyst required emergent neurosurgical attemption due to increased intracranial pressure presented with seizure and papilledema.

The history of seizure, epilepsy, presence of mental retardation, and neuropsychiatric problems was evaluated according to the population ratios based on z approximation in which signifiifantly higher rates had been observed among cases with intracranial cysts (p:0,00*).

Conclusions

The prevalence of seizure, epilepsy, mental retardation, and the presence of neuropsychiatric status were high in patients with intracranial cysts.

There must be an awareness of increased co-morbidities in children with intracranial cysts. Especially for the early evaluation and management of developmental delay and neuropsychiatric problems.

In addition there may be need of neurosurgical attemptions either at the time of diagnosis or in the follow up.

Further studies are required in this field.

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