ORIGINAL ARTICLE

COMPUTED TOMOGRAPHY IN COMPLICATED CHILDHOOD MENINGITIS STUDIES

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ABSTRACT

OBJECTIVE: To use computed tomography scan to visualize the intracranial complications of meningitis. **DESIGN:** Retrospective analysis of the clinical and radiology records of children who underwent CT scans between January 1, 2021, and December 31, 2021. **SETTING:** Sandemen Provincial Hospital Quetta at Radiology department. **SUBJECTS:** Fourty two patients under the age of 15 years who had serious meningitis that had been diagnosed clinically and in a lab. **RESULTS:** We found fever (86.1%), convulsions (83.3%), vomiting (52.4%), headache (35.7%) which were the presenting features that made necessary the request for CT scan brain. Communicating hydrocephalus (42.9%), subdural effusion (19%), diffuse cerebral infarction (19%) and cerebral abscess (4.8%) which was the common findings in CT scan in patients. **CONCLUSION:** Computed tomography is a practical and reliable method for identifying meningitis-related intracranial complications in children. The outcome of the patients will be improved by prompt and precise detection of conditions like hydrocephalus, abscess in brain, and subdural effusion. In order to lessen the long-term neurological effects of this disorder early detection by computed tomography are the options available.

Key words: Computed tomography, meningitis

Introduction

Meningitis in children despite advances in diagnostic and treatment techniques remains one of the most common conditions associated with high morbidity and mortality in children.[1] Vascular thrombosis, infarction and brain abscess can be diagnosed by computed tomography (CT).[2-3] Clinical indications for CT are rare, and not all children with meningitis should undergo routine procedures.[4] Computed tomography (CT) is an essential tool in acute diagnoses of pediatric disease, particularly clinical brain pathology.[5-6] In many studies it showed that CT scan is common tool in determination of childhood brain pathology.[7-8] The aim of our study was to use of head CT scans in a tertiary care hospital setting to assess CT scan abnormalities for appropriate referral of patients with complex diseases. To demonstrate the need for analysis needs to treat surgically and to determine whether the CT information was helpful for diagnostic or therapeutic purposes.

Material and Methods

Fourty two (42) patients below the age of 15 years in children who were sent to the radiology department of Sandemen Provincial Hospital Quetta who diagnosed clinically and laboratory as case of meningitis were retrospectively studied and analyzed from 1st Jan, 2021 to 31st Dec 2021. In a period of one year they were analyzed in form of request forms, CT scan

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reports and the patient history notes which included age, gender, clinical signs and symptoms and the time when CT scan was performed.

Results

The study which included fourty two pediatrics patients retrospectively a period of one year who were below 15 years of age. Among these patients sixteen 16 (38.1%) were male and twenty six 26 (61.9%) were female. (Tab.1)

Age in (Years)	Male	Female	Total	%age
0-5	10	15	25	59.5%
6-10	4	8	12	28.6%
11-14	2	3	5	11.9%
Total	**16**	**26**	**42**	

Table 1: Gender and age distribution in children with meningitis

The most common complaints were fever in 88.1% followed by convulsions in 83.3%, vomiting in 52.4% and headache in 35.7%. Patients presented with fever along convulsion and vomiting simultaneously at same time in many patients. (Tab.2)

Chief complaints	Patients number	Percentage
Fever	37	88.1%
Convulsions	35	83.3%
Vomiting	22	52.4%
Headache	15	35.7%

Table 2: Chief Complaint of Patients

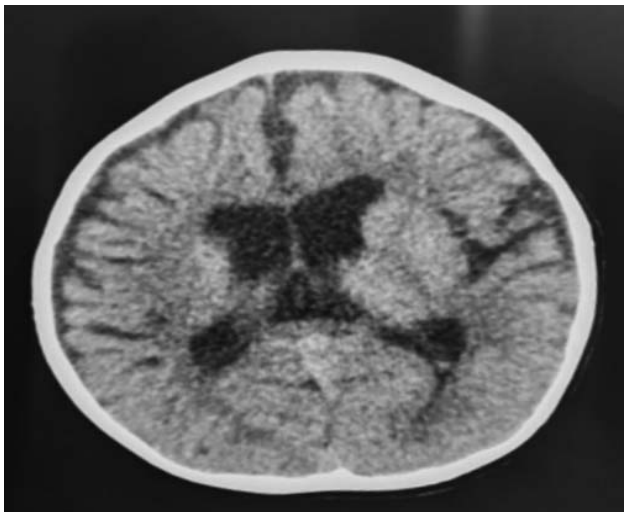

Figure 1: 6-Year-old child with dilated ventricles

In the result of CT scan findings were communicating hydrocephalus was found around in 18 (42.9%) patients with bilateral subdural effusion in 8 (19%) patients, discrete cerebral infarcts in 8 (19%) patients, hypo dense areas with peripheral ring enhancement in cerebral abscess in 2 (4.8%) patients while 2 (4.8%) patients CT brain scan were normal and we found 4 (9.5%) patients combined with Hydrocephalus and cerebral infarct.

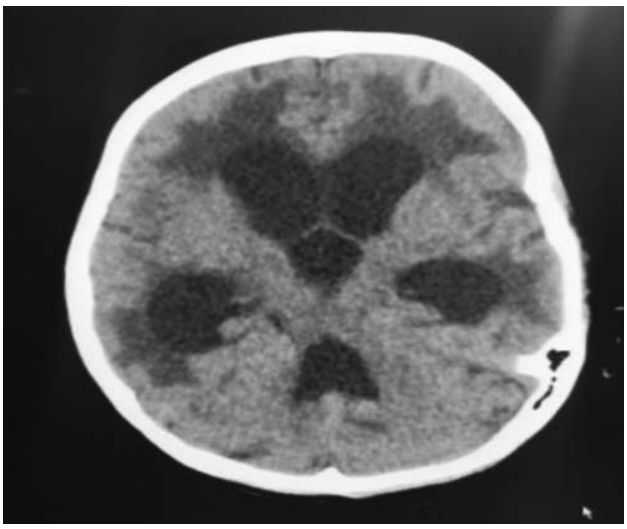

Figure 2: Finding of dilated ventricles communicating type and periventricular hypodensities (infarcts)

Findings in CT scan brain	Patients number	%age
Communicating Hydrocephalus	18	42.9%
Subdural effusion	8	19%
Cerebral infarct	8	19%
Cerebral abscess	2	4.8%
Normal	2	4.8%
Hydrocephalus with Cerebral infarct	4	9.5%

Table 3: Findings of CT scan brainin meningitis

Discussion

Meningitis is one of common cause to which children underwent CT brain and complications and indications of CT scan head among children with meningitis has been supported in many previous studies.[4] Children prone to early complications of meningitis due to rapid brain growing and it is essential to minimize the complications of meningitis and to minimize the bad

prognosis.[9-10] From this study, it can be seen that patients between age of 1 to 5 years in complicated meningitis commonly referred for CT and among fourty two patients studied in which fourty patients found worse complication on CT scan and two patients had only normal scan emphasizing clinician to look prompt to early diagnosis and management. In our study the serious complication seen was communicating hydrocephalus in around 42.9% while in another study of Machingaidze PR et al found it around 54.6% little higher to our study.[11] Among fourty two patients we studied found subdural effusion in 19% patients while in other study of Azhar S et al found it around 33%.[12] These effusions which can be drained surgically if referred to neurosurgeon. Cerebral infarction leads to brain atrophy changes with worse neuro behavioral outcomes and it results from arteritis and venous thrombosis.[9,13]

As this we found around 19% in our study while a study at Nigeria by Eze KC et al found it around 12.12%.[14] Hydrocephalus with Cerebral infarct found was 9.5%. In our retrospective study we found 2% patients with normal CT findings. So keeping these data which we found in retrospective study it is strongly indicated that children who were diagnosed as a case of meningitis should be underwent a CT head to influence early therapeutic management. Our study showed that CT scan for children are costly and difficult to obtain in backward areas like Balochistan. Children particularly under the age of two are more sensitive to radiation due to their rapid brain development.[15] Children are more likely to manifest radiation damage, including cancer, because they have longer life expectancies.[15] Furthermore studies showed that a single head CT exposes kids to 200-600 times more radiation than chest radiography.[16] In comparison to CT brain, MRI in children delivers less radiation exposure and more explicit and accurate data in terms of minor complications of meningitis attributable its better soft tissues contrast resolution; nevertheless, MR requires more operator participation during processing and takes longer to complete. On the other hand, CT is more quickly and simply performed. A well-conducted CT will produce more accurate diagnostic data than a poorly-conducted MR, according to Arthurs.[17] Due to the length of MR, there is a danger of oversedation, which can lead to respiratory depression. In conclusion, choosing between CT and MR should be done on a case-by-case basis, putting efficacy first and avoiding radio-phobic attitudes. This is especially true for young children. Of course, pricing, urgency, and machine availability and affordability are also important factors.

Conclusion

Computed tomography is a practical and reliable method for identifying meningitis-related intracranial complications in children. The outcome of the patients will be improved by prompt and precise detection of conditions such as hydrocephalus, abscess in brain, and subdural effusion. In order to lessen the long-term neurological effects of this disorder, prevention, adequate treatment, and early detection are the only options available.

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