

## Aseptic meningitis in children

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### ABSTRACT:

**Background:** A clinical condition of meningeal inflammation known as "aseptic meningitis" occurs when common bacterial agents are not detectable in the CSF. The present study was conducted to evaluate aseptic meningitis cases in children. **Materials & Methods:** 78 children with aseptic meningitis of both genders underwent a thorough clinical examination. Recorded were the clinical presentation, test results in blood and CSF, length of antibiotic therapy, length of hospital stay, and outcome. **Results:** Out of 78 children, boys were 42 and girls were 36. The mean antimicrobial therapy >2 days was seen in 24, antimicrobial therapy <2 days in 40 and no antimicrobial therapy in 14 patients. Duration of fever was 26.2 hours, duration of hospitalization was 4.5 days, WBC counts / mm<sup>3</sup> was 12640, lymphocytes >50% in 38, hemoglobin (mg/dl) was 12.1 and C-reactive protein was 7.2 mg/dl. **Conclusion:** Given the high incidence of aseptic meningitis in infants and children, a thorough case investigation is necessary.

**Key words:** Aseptic meningitis, Children, fever

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### INTRODUCTION

A clinical condition of meningeal inflammation known as "aseptic meningitis" occurs when common bacterial agents are not detectable in the CSF.<sup>1</sup> Non-polio human enteroviruses (NPHEV) account for 80% to 92% of cases in which a pathogen is identified, making them the most common recognized cause of aseptic meningitis. Within the picornavirus family, enteroviruses are a genus that comprises human enterovirus A, B, C, and D as well as types 1, 2, and 3 of poliovirus.<sup>2</sup> Numerous ailments, including encephalitis, hand-foot-mouth disease, herpangina, febrile sickness, and aseptic meningitis, can be brought on by the NPHEV. On rare occasions, NPHEV can result in serious infections that have fatal consequences, like myocarditis and newborn sepsis. Although isolated instances can happen at any time of the year, epidemics that occur in the summer and fall account for the majority of occurrences.<sup>3</sup>

Based on the etiology, meningitis is typically divided into aseptic and bacterial cases. The majority of cases of aseptic meningitis are caused by viruses; it is typically diagnosed as an exclusion case due to the absence of bacterial signs; also, its case fatality and neurologic sequelae rates are typically lower.<sup>4</sup> While

less prevalent than aseptic meningitis, bacterial meningitis is associated with a higher risk of morbidity and mortality.<sup>4</sup> Depending on the environment and whether access to proper care is available, case fatality rates from bacterial meningitis in low- and middle-income countries range from 22% to 73%. Furthermore, almost 50% of children who survive bacterial meningitis experience neurologic aftereffects such as hearing loss, behavioral issues, and intellectual impairments.<sup>5</sup> The present study was conducted to evaluate aseptic meningitis cases in children.

### MATERIALS AND METHODS

The present study comprised of 78 children with aseptic meningitis of both genders. Parental consent was obtained before starting the study.

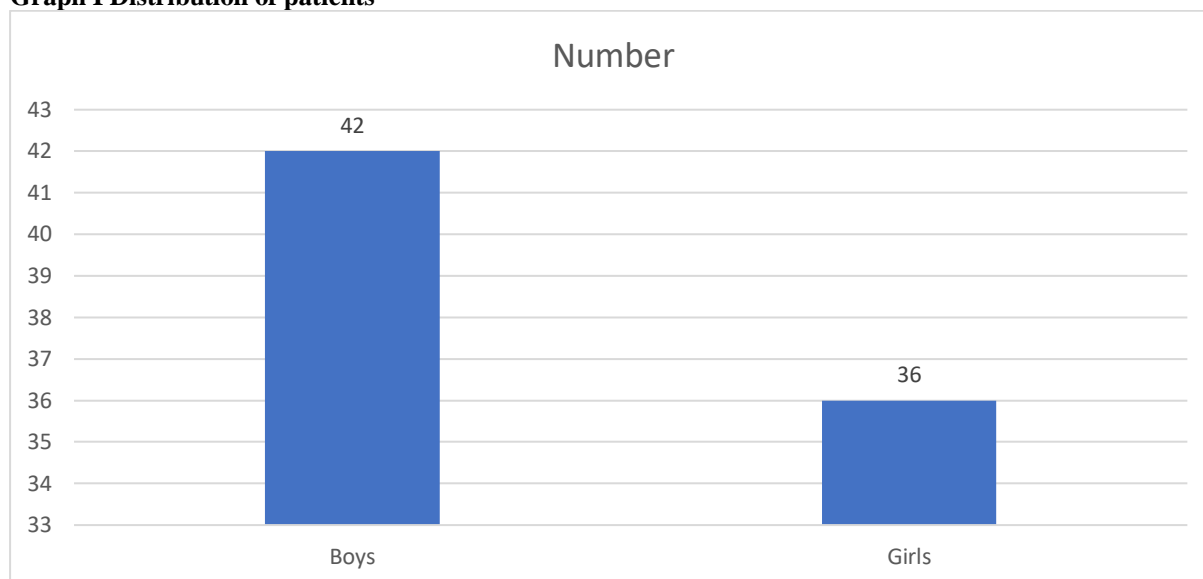
Data such as name, age, gender etc. was recorded. A thorough clinical examination was performed. Recorded were the clinical presentation, test results in blood and CSF, length of antibiotic therapy, length of hospital stay, and outcome. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

### RESULTS

**Table I Distribution of patients**

Total- 78		
Gender	Boys	Girls
Number	42	36

Table I, graph I shows that out of 78 children, boys were 42 and girls were 36.

**Graph I Distribution of patients****Table II Assessment of parameters**

Parameters	Mean
Antimicrobial therapy >2 days	24
Antimicrobial therapy <2 days	40
No antimicrobial therapy	14
Duration of fever (Hours)	26.2
Duration of hospitalization (Days)	4.5
WBC counts / mm <sup>3</sup>	12640
Lymphocytes >50%	38
Hemoglobin (mg/dl)	12.1
C-reactive protein (mg/dl)	7.2

Table II shows that mean antimicrobial therapy >2 days was seen in 24, antimicrobial therapy <2 days in 40 and no antimicrobial therapy in 14 patients. Duration of fever was 26.2 hours, duration of hospitalization was 4.5 days, WBC counts / mm<sup>3</sup> was 12640, lymphocytes >50% in 38, hemoglobin (mg/dl) was 12.1 and C-reactive protein was 7.2mg/dl.

## DISCUSSION

Meningitis is thought to claim the lives of 164 000 children worldwide each year. Meningitis kills about 52,000 children in India every year, making up 2% of all pediatric fatalities. Timely diagnosis of bacterial meningitis is essential for appropriate management and best possible results. Timely lumbar puncture (LP) to detect bacteria or their markers is essential for the diagnosis of bacterial meningitis. However, compared to symptoms found in older children or adults, the clinical presentation of meningitis in infants—who make up the majority of cases of pediatric meningitis—is ambiguous and can resemble other febrile disorders.<sup>6</sup>

Furthermore, because the clinical manifestations of aseptic meningitis and bacterial meningitis are indistinguishable, it is imperative to diagnose bacterial infections in the cerebrospinal fluid (CSF). Meningitis can be fatal, and there is a high prevalence of sequelae. For this reason, clinical symptoms with low specificity and high sensitivity are generally utilized to catch all cases.<sup>7</sup> The widespread availability of drugs in India has further confounded the clinical and

laboratory picture of meningitis, making it more difficult to diagnose bacterial meningitis and determine the best course of treatment using basic microbiological techniques.<sup>8</sup> Antibiotics are known to quickly sterilize the CSF, which makes it difficult to identify germs by culture. Moreover, the effect of antibiotic pretreatment on several laboratory markers of meningitis, like the total white blood cell (WBC) count.<sup>9</sup> The present study was conducted to evaluate aseptic meningitis cases in children.

We found that out of 78 children, boys were 42 and girls were 36. Neuman et al<sup>10</sup> in their study two hundred twenty-one cases of bacterial meningitis caused by *H. influenzae*, *N. meningitidis*, and *S. pneumoniae* were identified. The age of infected children ranged from 1 month to 18 years, with a mean and median age of 38.1 months and 13 months, respectively. Fifty-two percent of the children were female, 83% were Caucasian and 16% were African-American. Before the routine use of Hib conjugate vaccine, Hib was the bacterial species responsible for the greatest proportion of cases (average of 58%/year). The absolute number of cases of bacterial

meningitis attributable to HIB declined after 1991 to an average of 2.5 cases/year. The number of cases of meningitis caused by *S. pneumoniae* and *N. meningitidis* have remained relatively stable between 1988 and 1998. The case fatality rates for children with meningitis caused by *H. influenzae*, *S. pneumoniae*, and *N. meningitidis* were 0.0%, 9.2%, and 7.5%, respectively. Most cases of meningitis due to HIB occurred in children who had not been immunized. Three children who received the polysaccharide vaccine developed meningitis due to HIB; there were no failures of the conjugate vaccine.

We found that mean antimicrobial therapy >2 days was seen in 24, antimicrobial therapy <2 days in 40 and no antimicrobial therapy in 14 patients. Duration of fever was 26.2 hours, duration of hospitalization was 4.5 days, WBC counts / mm<sup>3</sup> was 12640, lymphocytes >50% in 38, hemoglobin (mg/dl) was 12.1 and C-reactive protein was 7.2 mg/dl. Of the 14145 references that were initially found, 10 satisfied our inclusion requirements, according to Curtis et al.<sup>11</sup> Concern regarding the occurrence of meningitis was raised by a history of bulging fontanel (likelihood ratio [LR]: 8.00 [95% confidence interval (CI): 2.4-26]), neck stiffness (7.70 [3.2-19]), seizures (outside febrile-convulsion age range) (4.40 [3.0-6.4]), or restricted feeds (2.00 [1.2-3.4]). Examining the patient revealed that the likelihood of meningitis was independently increased by jaundice (LR: 5.90 [95% CI: 1.8-19]), being toxic or moribund (5.80 [3.0-11]), meningeal signs (4.50 [2.4-8.3]), neck stiffness (4.00 [2.6-6.3]), bulging fontanel (3.50 [2.0-6.0]), Kernig sign (3.50 [2.1-5.7]), tone up (3.20 [2.2-4.5]), fever of >40°C (2.90 [1.6-5.5]), and Brudzinski sign (2.50 [1.8-3.6]). Meningeal symptoms were not present (LR: 0.41 [95% CI: 0.30-0.57]), and an atypical scream (0.30 [0.16-0.57]) reduced the probability of meningitis.

Michos et al<sup>12</sup> in their study the medical records of children who had as discharge diagnosis aseptic or viral meningitis were reviewed. A total of 506 children, median age 5 years, were identified. The annual incidence rate was estimated to be 17/100,000 children less than 14 years of age. Most of the cases occurred during summer (38%) and autumn (24%). The dominant clinical symptoms were fever (98%), headache (94%) and vomiting (67%). Neck stiffness was noted in 60%, and irritation in 46% of the patients. The median number of CSF cell count was 201/mm<sup>3</sup> with polymorphonuclear predominance (>50%) in 58.3% of the cases. Enterovirus RNA was detected in CSF in 47 of 96 (48.9%) children tested. Children with positive enterovirus PCR had shorter hospitalization stay as compared to children who had negative PCR or to children who were not tested

(P=0.01). There were no serious complications or deaths. Enteroviruses accounted for approximately one half of cases of aseptic meningitis. PCR may reduce the length of hospitalization and plays important role in the diagnosis and management of children with aseptic meningitis.

## CONCLUSION

Authors found that given the high incidence of aseptic meningitis in infants and children, a thorough case investigation is necessary.

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