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Original Research

Assessment of cases of aseptic and bacterial meningitis in children- A clinical study

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ABSTRACT:
Background: The present study was conducted to assess the cases of aseptic and bacterial meningitis in children. **Materials & Methods:** 48 Children aged >30 days to <24 months of clinically suspected meningitis were enrolled. Aseptic and bacterial meningitis cases were compared. **Results:** Simple seizure was seen 13 in aseptic cases and in 10 in bacterial meningitis, complex seizure in 12 and 13 cases in aseptic and bacterial meningitis respectively., altered consciousness in 12 and 13 in aseptic and bacterial meningitis respectively, fever in 22 and 17, stiff neck in 11 and 7, bulging fontanelle in 6 and 3, shock in 8 and 5 and rash in 15 and 12 cases respectively. The difference was significant (P< 0.05). **Conclusion:** Common symptoms were fever, stiff neck, bulging fontanelle, shock and rash. Maximum cases were of aseptic meningitis.
Key words: Bacterial meningitis, Children, Seizure

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INTRODUCTION

Globally, meningitis is estimated to kill 164 000 children each year. In India approximately 52 000 children die each year from meningitis; this accounts for 2% of all deaths in children <5 years of age.[1] Although the rate of disease associated with meningitis is lower than other major causes of childhood morality, the high case fatality rates and neurologic sequelae in survivors result in considerable emotional and financial burden on the family and presents a major challenge to the health care system in financial and human resources.[2]

Bacterial meningitis can cause death if not treated early and aggressively both in the developed and developing countries. Untreated, the mortality approaches 100%, and even with the current antibiotics and advanced pediatric intensive care, the mortality rate of disease is approximately 5% to 10%.Worldwide, the neurological aftereffects of the meningitis in the survivors following the hospital discharge approaches 20%. Risks of long-term disabling secondary results were highest in low-income countries, where the burden of bacterial meningitis is the greatest. Most of these reported results could have been averted by vaccination with Hib, pneumococcal, and meningococcal vaccines.[3]

The clinical and laboratory picture of meningitis is further complicated by the widespread availability of antibiotics, reducing the utility of standard microbiological methods in confirming bacterial meningitis and in formulating appropriate treatment difficult.[4] Antibiotics are known to rapidly sterilize the CSF, making identification of bacterial by culture problematic.[5] Additionally, the impact of pretreatment with antibiotics on other laboratory indicators of meningitis, such as the total white blood cell (WBC) count, glucose, or protein in the CSF, are

not consistent, which makes the differentiation of bacterial versus aseptic meningitis difficult. Molecular tests, such as latex agglutination test (LAT).[6] The present study was conducted to assess aseptic and bacterial meningitis cases in children.

MATERIALS & METHODS

The present study was conducted among 48 Children aged >30 days to <24 months of clinically suspected meningitis. Parents of all children were informed regarding the study and their consent was obtained. Ethical clearance was obtained before starting the study. Data such as name, age, gender etc. was recorded. CSF samples were examined for total WBC count, WBC differential, Gram staining, protein concentration, glucose concentration, and bacterial culture using chocolate agar plates incubated at 37°C in a CO_2 enriched atmosphere. Aseptic and bacterial meningitis cases were compared. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 48		
Gender	**Boys**	**Girls**
Number	28	20

Table I shows that out of 48 children, boys were 28 and girls were 20.

Table II Assessment of parameters

Parameters	Aseptic (25)	Bacterial (23)	P value
Simple seizure	13	10	0.09
Complex seizure	12	13	
Altered consciousness	12	13	0.01
Fever	22	17	
Stiff neck	11	7	
Bulging fontanelle	6	3	
Shock	8	5	
Rash	15	12	

Table II, graph I shows that simple seizure was seen 13 in aseptic cases and in 10 in bacterial meningitis, complex seizure in 12 and 13 cases in aseptic and bacterial meningitis respectively, altered consciousness in 12 and 13 in aseptic and bacterial meningitis respectively, fever in 22 and 17, stiff neck in 11 and 7, bulging fontanelle in 6 and 3, shock in 8 and 5 and rash in 15 and 12 cases respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters

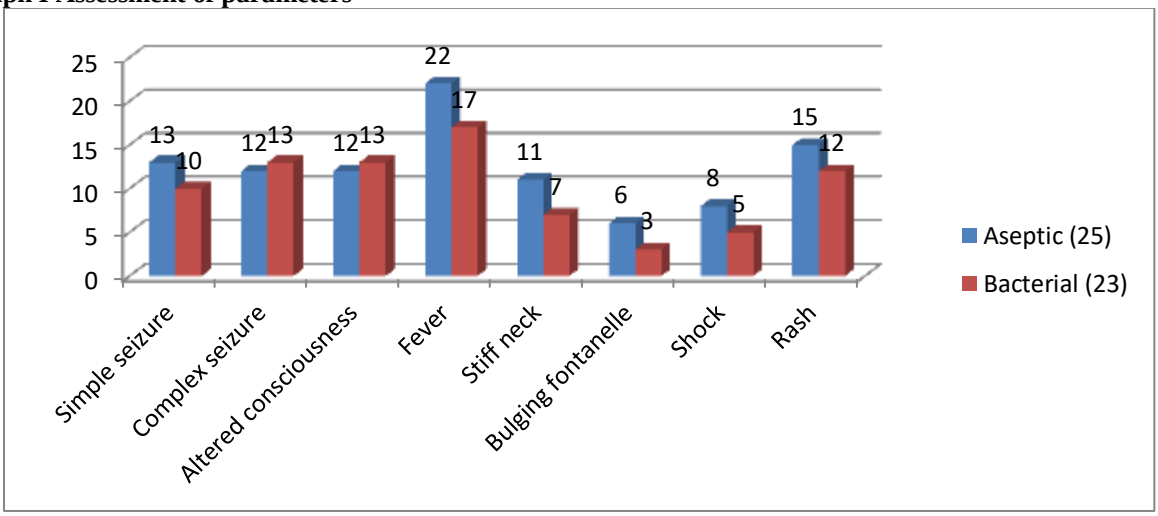

Table III Characteristics of the CSF of cases

Parameters	Aseptic (Mean)	Bacterial (Mean)	P value
WBC/mm^3	224.5	316.4	0.01
Neutrophils	34.5	52.1	0.05
Glucose, mg/dL	54.2	43.7	0.1
Protein, mg/dL	124.6	431.6	0.01

Table III shows that mean WBC/mm^3 was 224.5 and 316.4 in aseptic and bacterial meningitis respectively, neutrophils count was 34.5% and 52.1% in aseptic and bacterial meningitis respectively, glucose level was 54.2 mg/dL and 43.7 mg/dL in aseptic and bacterial meningitis respectively, protein was 124.6 mg/dL and 431.6 mg/dL respectively. The difference was significant (P< 0.05).

DISCUSSION

Clinical signs and symptoms of bacterial meningitis are notoriously nonspecific in very young children, and "classic" meningeal signs often are not present.[7] However, continuing to explore possible methods to clinically differentiate children with bacterial meningitis from other illnesses is critical, particularly in resource-poor clinical settings such as often seen in India where the capability to conduct a LP and accurately test the specimen promptly are limited.[8] Distinguishing aseptic from bacterial meningitis is not always easy due to considerable overlap in clinical symptoms and laboratory findings. Uncertainty in diagnosis results in prolonged hospitalization and unnecessary use of antibiotics.[9] The present study was conducted to assess aseptic and bacterial meningitis cases in children

In present study, out of 48 children, boys were 28 and girls were 20. Fitzwater et al[10] found that a total of 2564 children with suspected meningitis were enrolled over 45 months; 156 cases of aseptic and 51 cases of bacterial meningitis were identified. Stiff neck and bulging fontanelle were more common in bacterial meningitis (P < .05), but were present in <15% of patients. The World Health Organization and American Academy of Pediatrics classifications for high suspicion of bacterial meningitis were met in 84% and 88% of cases of bacterial meningitis, respectively, but were also present in 54% and 74% cases of aseptic meningitis. Culture and gram stain were positive in 7 (14%) and 4 (8%) cases of bacterial meningitis.

We found that simple seizure was seen 13 in aseptic cases and in 10 in bacterial meningitis, complex seizure in 12 and 13 cases in aseptic and bacterial meningitis respectively., altered consciousness in 12 and 13 in aseptic and bacterial meningitis respectively, fever in 22 and 17, stiff neck in 11 and 7, bulging fontanelle in 6 and 3, shock in 8 and 5 and rash in 15 and 12 cases respectively. Michos et al[11] found that 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/mm3 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.

We found that mean WBC/mm^3 was 224.5 and 316.4 in aseptic and bacterial meningitis respectively, neutrophils count was 34.5% and 52.1% in aseptic and bacterial meningitis respectively, glucose level was 54.2 mg/dL and 43.7 mg/dL in aseptic and bacterial meningitis respectively, protein was 124.6 mg/dL and 431.6 mg/dL respectively.

The laboratory confirmation of viral meningitis was based upon isolation of the causative agent in cell cultures. While this method is useful, a high degree of technical skill is required and several days are needed before viral growth and identification. Thus, results are not available at the time when management decisions must be made. Because of the large number of serologically distinct types of enteroviruses, serology also cannot be used as a routine tool in the diagnosis of aseptic meningitis.[12]

CONCLUSION

Authors found that maximum cases were of aseptic meningitis. Common symptoms were fever, stiff neck, bulging fontanelle, shock and rash.

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