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RESEARCH ARTICLE

A STUDY OF CLINICAL PROFILE AND COMPLICATIONS OF MENINGITIS AND ITS CO-RELATION WITH CEREBRO-SPINAL FLUID EXAMINATION

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ABSTRACT

Meningitis is the inflammation of the meninges, a protective membrane that surrounds the brain and the spinal cord. To reduce the mortality and morbidity owing to meningitis, an early establishment of the diagnosis and early institution of therapy are imperative. Therefore, we conducted this study with the main objectives of examining the specific clinical features with which our patients in a tertiary care setting presented, and also the abnormalities in the CSF biochemistry. Aim of this study is to study the clinical profile and CSF examination in patients of meningitis. The study was an observational randomised case study carried out from September 2017 to September 2018 at C.U. Shah Medical College and Hospital, Surendranagar (Gujarat), which is a tertiary care centre. Most of the patients were in the age group of 21-40 years (42%) of age. This is followed by 41-60 years (28%) of age. We observed a male preponderance among the cases, 31(62%) of males as compared to 19(38%) of females. Among mean value of CSF biochemistry highest mean lymphocytes count and mean glucose level were observed in the patients of viral meningitis, highest mean protein level and mean leukocytes count were seen in bacterial meningitis and highest mean ADA level was seen in tuberculous meningitis.

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INTRODUCTION

Meningitis is one of the medical emergencies related to infectious diseases, which is potentially associated with a high rate of complications (Ferri, 2010). Meningitis is the inflammation of the meninges, a protective membrane that surrounds the brain and the spinal cord. However, this inflammation not only involves the meninges but also spreads to the subarachnoid space and to the cerebrospinal fluid (CSF) contained within it (Centers for Disease Control Prevention, 2008). The causes of meningitis may be broadly classified as infectious (bacterial, viral, fungal) and noninfectious (cancer-related, systemic lupus erythematosus, drug induced, head trauma, and brain surgery). The most common types of meningitis are pyogenic (bacterial) meningitis and tuberculous meningitis (TBM) (Viral Meningitis, 2014). Although meningitis is a notifiable disease in many countries, its exact incidence rate is unknown; however, in the decade from 1990 to 2010, an estimated global figure of approximately 420,000 deaths were associated with meningitis (Tunkel et al., 2004). Although culture is considered to be the gold standard, CSF turbidity, bacteria on direct Gram stained preparation and

pleocytosis, increase in protein and decrease in sugar are preliminary indicators. However, culture for fastidious organism is difficult and time consuming and produce false negative results; hence the detection of soluble antigens in CSF in suspected cases by the latex particle agglutination test is considered an important diagnostic tool which has a high sensitivity, specificity, simplicity in execution, rapidity, and interpretation. To reduce the mortality and morbidity owing to meningitis, an early establishment of the diagnosis and early institution of therapy are imperative (GBD, 2015). There is a need to distinguish between the type of meningitis based on the clinical features and the CSF biochemistry as there are varying grades of urgency as well as different treatment strategies involved in the management of each type of meningitis. Therefore, we conducted this study with the main objectives of examining the specific clinical features with which our patients in a tertiary care setting presented, and also the abnormalities in the CSF biochemistry (proteins, glucose, white blood cells (WBCs), lymphocytes, and adenosine deaminase (ADA)).

Aims and objectives

- To study the clinical profile and CSF examination in patients of meningitis.
- To study the various complications associated with meningitis

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MATERIALS AND METHODS

The study was an observational randomised case study carried out from December 2015 to September 2017 at C.U. Shah Medical College and Hospital, Surendranagar (Gujarat), which is a tertiary care centre. Fifty patients of meningitis admitted to the medicine wards were taken as cases. The study protocol was approved by the institutional research review board and ethics committee.

Inclusion criteria: All patients of first ischemic stroke presenting within 24hrs of symptom onset in hospital.

- Age >14 years of age of either sex.
- Signs and symptoms of meningitis.
- Complications of meningitis.

Exclusion criteria

- Cerebrovascular stroke either ischemic or hemorrhagic.
- Subarachnoid haemorrhagic.
- Non infectious meningitis.
- CNS neoplasm.

Observation: Most of the patients were in the age group of 21-40 years (42%) of age. This is followed by 41-60 years (28%) of age. We observed a male preponderance among the cases, 31(62%) of males as compared to 19(38%) of females.

It is observed that most common type was viral meningitis 22 cases(44%) followed by bacterial meningitis 17 cases(34%) then tuberculous meningitis 11 cases(22%). It is observed that patient with diabetes mellitus has higher propensity of development of meningitis as compared to others. It is observed that highest no. of cases of meningitis were obtained in the month of April followed by February and May. It was observed that highest no. of cases of tuberculous meningitis were obtained in the month of September, bacterial meningitis in the month of March and viral meningitis in the month of April.

In all types of meningitis, the most prominent symptom was fever which is followed by altered mental status. Headache was maximum observed in the cases of viral meningitis(72.72%) followed by bacterial meningitis(64.7%) and tuberculous meningitis(63.6%). Seizures were maximum observed in the cases of tuberculous meningitis(45.45%) followed by viral meningitis(36.36%) and bacterial meningitis (29.41%). Among all cases neck rigidity was prominent sign in tuberculous and bacterial meningitis however in viral meningitis most prominent sign was Brudzinski's neck sign. Among all complications hyponatremia was observed in all three types of meningitis. Among all cases nearly clear CSF was seen in tuberculous and viral meningitis and turbid CSF was seen in bacterial meningitis. Cob-web formation was seen in tuberculous meningitis. Among all CSF pictures highest mean protein level was seen in bacterial meningitis and highest mean leukocytes count were seen in bacterial meningitis and highest mean ADA level seen in tuberculous meningitis and highest mean lymphocytes counts and mean glucose level was seen in viral meningitis. It was observed that Gram stain is positive in the 11 cases(22%), ZN stain was positive in 1 case(2%) and culture and sensitivity was seen in 20 cases(40%).

It was observed that most common pathogen isolated was *Escherichia coli* followed by *Mycobacterium tuberculosis* and *Streptococcus pneumoniae*. Among all cases of meningitis highest death rate was seen in tuberculous meningitis. Highest worsen rate was seen in bacterial meningitis. Highest improved rate was seen in viral meningitis.

Summary and Conclusion

This observational case study was done from September 2016-September 2017 at C.U. Shah Medical College And Hospital. Patients of meningitis admitted on the basis of clinical profile and then categorized into 3 groups bacterial, viral and tuberculous meningitis on the basis of CSF examination.

Key Findings includes

- Age ranged for meningitis was between 15 to 81 years. Most of the patients were in between the age of 21-40 years.
- This study included 50 patients in which 31 male patients and 19 female patients were present which reflecting male preponderance.
- Out of 50 patients 22 patients were of viral meningitis, 17 patients were of bacterial meningitis and 11 patients were of tuberculous meningitis which reflecting viral meningitis preponderance.
- Among all risk factors diabetes mellitus was most common risk factor found in 11(22%) patients which was followed by smoking which was present in 7(14%) patients.
- Maximum numbers of patients of meningitis were present in the month of April(14%), followed by the month of February(12%) and the month of May(12%).
- Among common presenting symptoms fever was found most common in 45(90%) patients which was followed by altered mental status in 39(78%) patients, headache in 34(64%) patients and other symptoms.
- Among all signs neck rigidity was most common found sign in 31(62%) patients, followed by Brudzinski's sign in 28(56%) patients and Kernig's sign in 8(16%) patients.
- 35 out of 50 patients had developed complications. Among all complications hyponatremia was most common complication to be observed in 27(77.014%) patients, followed by cranial nerve palsy in 7(20%) patients, acute stroke in 6(17.14%) patients, hydrocephalus in 6(17.14%) patients, septic shock in 4(11.42%) patients, ARDS in 2(5.71%) patients, DIC in 1(2.86%) patients, ICH in 1(2.86%) patients, tuberculoma in 1(2.86%) patients.
- Among macroscopic appearance of CSF clear appearance observed most common in the patients of viral meningitis 20/22(90.9%) patients, turbid/cloudy appearance observed most common in bacterial meningitis 13/17(76.47%) patients, cob-web appearance most common found in tuberculous meningitis 9/11(81.81%) patients.
- Among mean value of CSF biochemistry highest mean lymphocytes count and mean glucose level were observed in the patients of viral meningitis, highest mean protein level and mean leukocytes count were seen in bacterial meningitis and highest mean ADA level was seen in tuberculous meningitis.
- 20 out of 50 patients observed with positive culture and sensitivity of CSF. Most common organism isolated was

E.coli in 7/20(35%) patients followed by, Streptococcus pneumonia in 4/20(20%) patients, Mycobacterium tuberculosis in 4/20(20%) patients, Staphylococcus aureus in 3/20(15%) patients, Pseudomonas aeruginosa in 1/20(5%) patients, Klebsiella species in 1/20(5%) patients.

- Among all types of meningitis highest death rate was seen in tuberculous meningitis 1/11(9.09%) patients followed by bacterial meningitis 1/17(5.88%) patients and highest improvement was seen in viral meningitis 21/22(95.45%) patients.

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