



ORIGINAL RESEARCH PAPER

General Medicine

TO STUDY THE CLINICAL AND ETIOLOGICAL PROFILE AND IT'S CORRELATION TO LABORATORY PARAMETERS IN CASES OF ACUTE MENINGOENCEPHALITIS CASES.

KEY WORDS: Meningitis, Meningoencephalitis, Pneumococci, Tubercular, Viral, Fungal.

Dr. Priyanka Singh*	Department of Gen. Medicine, N.S.C.B. Medical College & Hospital, Jabalpur (M.P.). *Corresponding Author
Dr. Shivendra Nagiya	Department of Gen. Medicine, N.S.C.B. Medical College & Hospital, Jabalpur (M.P.).
Dr. Hemant Tilgam	Department of Gen. Medicine, N.S.C.B. Medical College & Hospital, Jabalpur (M.P.).

ABSTRACT

Introduction: Meningitis is a clinical syndrome characterized by inflammation of meninges. The classic triad of meningitis consists of fever, headache and neck stiffness. Pneumococcal meningitis is the most common bacterial cause of meningitis. Most patients recover completely if appropriate antibiotic therapy is instituted promptly. Tubercular meningitis is a very critical disease in terms of fatal outcome and permanent sequelae, requiring rapid diagnosis and treatment. Death may occur as a result of missed diagnosis and delayed treatment. Enterovirus is the most common cause of viral meningitis. Cryptococcal meningitis may be seen especially in persons with defective cell mediated immunity. Encephalitis primarily involves the brain, it often involves the meninges as well (meningoencephalitis). There are no studies done till now showing the clinical, etiological profile and outcome in patients with meningitis and meningoencephalitis. There are some studies done in children but not in adults. Distinguishing the etiologies also helps in terms of both reducing antibiotic usage and hospital bed occupancy and reassuring contacts of cases and health care staff of a non-bacterial cause. As there are fewer developments in therapies for viral meningitis and there remain no effective therapies for most pathogens, this study is done to emphasise the importance of early diagnosis, so that prompt management is given at appropriate time. **Aim:** To establish the cause and to identify the clinical differences between causes and outcome in adults with meningitis and meningoencephalitis in a tertiary care hospital, and role of CRP in meningitis. **Materials And Methods:** In the present study, we recruited 93 patients who presented with meningitis and meningoencephalitis who fulfilled the inclusion criteria. Proforma is used to collect data needed. Data are statistically analysed. **Results:** Among the 93 patient with meningo-encephalitis in this study, the common initial presenting symptoms were fever (89%) and Vomiting (89%) >altered sensorium> headache and neck pain and stiffness>Focal neurological deficit> seizure. Fever was the most common initial presenting symptom. 86 patients (92.5%) had fever and headache (92.5%). Headache was associated with vomiting in some of the patients. 45 patients had both fever and headache. 58 patients had altered sensorium in the course of illness, varying from drowsiness to deep coma. Only 45 patients had all the three triad – headache, fever and altered sensorium. **Conclusion:** In the present study we found that, most of the patients with meningoencephalitis were males and young adults. Surprisingly, tuberculous meningitis was the most common overall cause in our study. Both viral meningo encephalitis and pyogenic meningitis constituted most of the cases of acute Meningoencephalitis. Tuberculous meningitis was the most common cause in patient with subacute meningitis. All patients with chronic presentation had tuberculous meningitis. We came across atypical presentation of cryptococcal meningitis in a non HIV patient. 47 patients recovered well without neurological deficits.

INTRODUCTION

Meningitis is a clinical syndrome characterized by inflammation of meninges. The classic triad of meningitis consists of fever, headache and neck stiffness¹. Bacterial meningitis occurs in about 3 people per 100,000 annually in western countries. Population-wide studies have shown that viral meningitis is more common at 10.9 per 100,000² population. Bacterial (pyogenic) meningitis is a pyogenic inflammation of meninges and subarachnoid cerebrospinal fluid (CSF) and is characterized by neutrophilic pleocytosis in CSF³. Pneumococcal meningitis is caused by streptococcus pneumonia, a gram positive coccus and is the most common bacterial cause of meningitis. Meningococcal meningitis is caused by gram-negative diplococcus- Neisseria meningitidis. Most patients recover completely if appropriate antibiotic therapy is instituted promptly³. Tubercular meningitis is a very critical disease in terms of fatal outcome and permanent sequelae, requiring rapid diagnosis and treatment⁴. Tuberculous meningitis should be a strong consideration when a patient presents with clinical picture of meningoencephalitis, especially in high risk groups, including persons with malnutrition, those with abuse alcohol or drugs and patients with known retroviral infection. Death may occur as a result of missed diagnosis and delayed treatment⁴.

herpes, mumps, measles and HIV. Enterovirus is the most common cause of viral meningitis. A septic meningitis is an illness characterized by serious inflammation of the meninges, usually with an accompanying CSF lymphocyte pleocytosis. Clinical manifestations vary with headache and fever predominating. The illness is usually mild and runs its course without treatment, however some cases can be severe and life threatening.

There are no studies done till now showing the clinical, etiological and outcome in patients with meningitis and meningoencephalitis. There are some studies done in children but not in adults.

Distinguishing the etiologies also helps in terms of both reducing antibiotic usage and hospital bed occupancy and reassuring contacts of cases and healthcare staff of a non-bacterial cause. As there are fewer developments in therapies for viral meningitis and there remain no effective therapies for most pathogens, this study is done to emphasise the importance of early diagnosis, so that prompt management is given at appropriate time.

Aims & Objectives

1. To study the clinical and etiological profile and its correlation to laboratory parameters in cases of acute meningoencephalitis cases.

World-wide causes of viral meningitis include enterovirus,

2. To study serum c-reactive protein levels in differentiating bacterial meningitis from viral meningitis
3. Serum CRP can be used as best as most sensitive bedside prognostic indicator of bacterial infection.

Background

Meningitis is defined as the inflammatory process of the membranes that surround the brain and spinal cord. Meningitis is also referred to as arachnoiditis or leptomeningitis. Meningitis affects the arachnoid, pia and csf. When the meninges, the subarachnoid space, and the brain parenchyma are all frequently involved in the inflammatory reaction it is defined as meningoencephalitis. Meningitis was initially recognized in the early 1800's. Even until the beginning of 20th century bacterial meningitis was nearly 90% fatal. This shows that the disease is most virulent and causes a great deal of mortality and morbidity. The advent of the antibiotics in the beginning of the twentieth century brought a cure to meningitis. In spite of antibiotics the sequelae of meningitis after completion of treatment is a great burden to the society. Meningitis can occur in any age group but the extremes of age group are the most dreadfully affected. The immune compromised states also lead to a high mortality and morbidity. The overall case fatality rate of bacterial meningitis in adult patients is around 30%¹⁰⁻¹². Moreover, in the emergency setting differentiating bacterial meningitis from other causes such as fungal, tubercular, viral, neoplastic, toxic or autoimmune causes is extremely difficult.

Etiology:

S. pneumonia is the most common cause of bacterial meningitis in adults > 20 years of age, accounting for nearly half the reported cases (1.1 per 100,000 persons per year). The predisposing condition may include pneumococcal pneumonia, acute or chronic pneumococcal sinusitis or otitis media, CSF rhinorrhea, head trauma with basilar skull fracture, alcoholics, diabetes, splenectomy, hypogammaglobulinemia and complement deficiency. Gram negative bacilli infection can be suspected in patient with chronic and debilitating disease such as diabetes, cirrhosis, chronic urinary tract infection and alcoholism.

Epidemiology:

The illness occurs at all ages and no racial differences are known. It tends to occur 3 times more commonly in males than females. Epidemiology of infectious meningitis reflects that of the infectious agent. Polio, Coxsackie and ECHO virus are spread by direct person to person transfer of infected or pharyngeal secretion or by feco oral route. Enteroviruses are worldwide in distribution and humans are the only known natural hosts for these viruses. Infections with these viruses increase during late summer and early fall in the US⁸. The incubation period of enter viruses varies widely⁸.

Pathophysiology:

Infectious meningitis results when the protective barriers of the brain - skull, meninges and blood brain barrier are over come by the infecting agent. Meningitis can result either by the hematogenous route (as in tuberculous meningitis, HIV meningitis, arboviruses, respiratory viruses etc.) or by neurotropic spread of the agent as in herpesvirus, rabies and polio⁷. Predisposing factors include otitis media, immune suppression, pneumonia, sinusitis and pre-existing diabetes.

Clinical features of bacterial meningitis:

It can present as acute fulminantly over few hours or sub acute over days. The classical clinical trial of meningitis is fever, headache and nuchalrigidity. But the classic triad may not be present in some patients. Nausea, vomiting and photophobia may be the associated features. Altered level of consciousness occurs in 77.5% of patients. Seizure may be seen in 20-40% of patients. Focal seizures occur mainly due to focal arterial ischemia or infarction, cortical venous thrombosis with haemorrhage or focal edema. Generalized seizure activity and

status epilepticus might occur due to hyponatremia, cerebral anoxia. Major cause of obtundation and coma in bacterial meningitis is due to raised ICP.

Tuberculous Meningitis

This remains an important cause of childhood hospital admissions, mortality and permanent disability in India. Tuberculosis produces a basal meningitis thereby causing damage especially to basal structures - brain stem, cranial nerves and basal ganglia. The illness usually has a sub acute onset with 3 clinical stages. In stage I, symptoms are nonspecific with irregular fever, irritability, occasional vomiting, headache, lethargy or malaise. Stage II is characterized by appearance of meningeal signs, convulsions or neurodeficits while stage III is accompanied by coma, deceleration and persisting deficits⁹. Prognosis is closely related to the stage of the disease in which it is diagnosed and treatment is started. A high index of suspicion is therefore extremely important to prevent permanent disability. A study from Lucknow revealed 5 clinico-laboratory features which are suggestive of TB Meningitis in patients hospitalized with meningoencephalitis: a prodromal stage of >7 days, extrapyramidal signs, focal deficits, optic atrophy and CSF pleocytosis with >50% lymphocytes⁹.

Clinical and biochemical advantages: CRP is the fastest reacting and most sensitive indicator of an acute inflammatory reaction. It is a useful aid in preliminary differentiation between acute bacterial and viral infections with sensitivity and specificity rates of 100% and 98% respectively.¹⁰ The increase in plasma concentration of CRP, varying from several fold increases with slight tissue lesion to hundred folds with severe lesion, renders the CRP concentration a very good semi quantitative indicator of the inflammatory process. Since the survival time of CRP in the circulation is shorter than that of other acute phase reactants remission is quickly reflected in a falling CRP concentration.¹¹ The falling CRP is a sensitive indicator of recovery from infection and provide the earliest check to therapeutic response. The slide agglutination tests of anti CRP covered particles is the simple qualitative and quantitative test, sufficiently specific and most sensitive.¹²

The serum CRP (S-CRP) can be used to differentiate pyogenic meningitis or acute meningitis due to other causes. S-CRP of more than 48 mg/L is sensitive and specific for bacterial infection. A fall in the S-CRP concentration is a sensitive indicator of recovery from infection and provides an earliest clue to the therapeutic response, long before a fall in temperature.¹³

MATERIAL AND METHODS

This prospective observational study will be carried out in the department of medicine NSCB medical college hospital Jabalpur. We intend to enroll at least 93 of acute meningoencephalitis attending the outpatient department as well as getting admitted in the wards of department of medicine of our college. This study will be approved by institutional ethical committee and written informed consent will be obtained from all participants before inclusion in the study.

Study Design: Prospective Observational Study. Hospital based (single center) Cross sectional study.

Study Area: Department of Medicine, N.S.C.B.M.C.H., Jabalpur

Duration Of Study: 1st March, 2020 to 31st August 2021.

Study Group: The study will be conducted in the Wards & ICU of Department of Medicine, N.S.C.B.M.C.H., Jabalpur (M.P)

Sample size: Total Samples - 93

Inclusion Criteria:

Patients fulfilling the diagnostic criteria for encephalitis. People willing to give consent for CSF lumber puncture. Age more than 14 years.

Exclusion Criteria:

People not willing to give consent for CSF lumber puncture. Age criteria less than 14 year of age. Known case of Rheumatic heart disease (According to modified Jones criteria). Patients with organic central nervous system disease, endocrine disorders, uremia, severe electrolyte disturbances, and drug reactions.

RESULT

Table 1 Distribution Of The Participants According To Gender

S.No.	Gender	Number of Case(N=93)	Percent
1.	Male (1.0)	47	50.5
2.	Female (2.0)	46	49.5
	Total	93	100.0

Out of the total 93 study participants, 47(50.5) were males and 46(49.5%) are Females.

Table 2 Distribution Of The Participants According To Age Group

S.No.	Age group	Male	Female	Number of case (n=66)
1	14-20	15	13	28(30%)
2	21-30	8	6	14(15%)
3	31-40	12	8	20(21%)
4	41-50	7	7	14(15%)
5	51-60	2	6	8(9%)
6	>60	3	6	9(10%)
	Total	47	46	93(100%)

Age wise distribution of the study participants in the above table shows most of the patients were of young adults <50 yr of age group. 8 patients were in the group of 51-60, 9 patients were elderly adults >60 yr age group. This younger age predominance was also found in the study of the Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center.

Table 3 Distribution Of The Participants In Case Of The Seizures

	SEIZURE	
SEIZURE	N (93)	(%)
GCTS	5	5.4%
FOCAL	11	11.9%
NO	77	82.8%
TOTAL	93	100%

16 patients had seizures during the course of illness. 5 patients had generalized tonic clonic seizures. 11 patient had focal motor seizures.

Table 4 Distribution Of The Participants On The Basis Of Etiology

Sex	CSF analysis					
	Bacterial M		Viral M		Tubercular M	
	N (31)	%	N (25)	%	N (37)	%
Male	13	41.94%	15	60.00%	19	51.35%
Female	18	58.06%	10	40.00%	18	48.65%
Total	31	100%	25	100%	37	100%

Table 5 Distribution Of The Participants As Per Age Group And Etiology

Age Group	CSF analysis					
	Bacterial M		Viral M		Tubercular M	
	N	%	N	%	N	%
15-20	8	25.81%	10	40.00%	10	27.03%

21-30	8	25.81%	3	12.00%	4	10.81%
31-40	5	16.13%	7	28.00%	7	18.92%
41-50	3	9.68%	2	8.00%	9	24.32%
51-60	3	9.68%	2	8.00%	3	8.11%
61-70	3	9.68%	1	4.00%	3	8.11%
>70	1	3.23%	0	0.00%	1	2.70%
Total	31	100%	25	100%	37	100%

Among 93 patients, 37 patients were diagnosed as Tuberculous meningitis. 31 patients were diagnosed as pyogenic meningitis; 25 patients were diagnosed as viral meningoencephalitis. Thus in comparison to the study done Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center, my study also has male and younger predominance and Tubercular meningitis was the most common cause found which was followed by Bacterial meningitis and then Viral meningitis.

Table 6 Co-relation Of S-CRP With Bacterial Meningitis Cases

Serum CRP(mg/l)	CSF analysis	
	Bacterial M	
	N	%
<6	3	9.68%
6-12	0	0.00%
12-24	2	6.45%
24-48	7	22.58%
>48	19	61.29%
Total	31	100%

In my study out of 93 patient, 31 patient was found as bacterial meningitis which had s-crp value mostly ranging between >24 mg/l, out of them 19 patient had s-crp value>48 mg/l (61.29%). Most of them had poor prognosis and presented with altered sensorium and high grade fever and other focal neurological deficit and had radiological finding in the form of leptomeningeal enhancement and hydrocephalus followed by infarct in 3 cases. These 3 patients even died after few days of admission despite of giving empirical treatment.

Table 7 Co-relation Of S-CRP With Tubercular Meningitis Cases

Serum CRP(mg/l)	Tubercular M	
	N	%
<6	0	0.00%
6-12	3	8.11%
12-24	15	40.54%
24-48	17	45.95%
>48	2	5.41%
Total	37	100%

In case of tubercular meningitis, out of total 93 patient, 37 patient were diagnosed on the basis of csf analysis, clinical finding, radiological evidence and biochemical parameter with s-crp as tubercular meningitis. most of the case out of 37 had s-crp value between intermediate range (12-48) mg/l and 2 patient had range between >48 mg/l which had miliary tuberculosis. These 2 patient had poor prognosis as well and presented with altered sensorium and high grade fever with other focal neurological deficit and had radiological finding in the form of hydrocephalus with multiple infarct. 3 patients had crp value between (12-48) were presented with seizure and headache and had infective granuloma as positive radiological finding.

Table 8 Co-relation Of S-CRP With Viral Meningitis Cases

Serum CRP (mg/l)	Viral M	
	N	%
<6	19	76.00%
6-12	3	12.00%
12-24	2	8.00%

24-48	0	0.00%
>48	1	4.00%
Total	25	100%

In case of viral meningitis, out of total 93 patient, 25 patient were diagnosed on the basis of csf analysis, clinical finding, radiological evidence and biochemical parameter with s-crp as viral meningitis. most of the case out of 25 had s-crp value range <6mg/l (19 patients) followed by 3 patient had range between 6-12 mg/l followed by 2 patient had range between 12-24 mg/l and 1 patient exceptionally had s-crp more than 48 mg/l who had sepsis also.

Table 9 Table Showing Positive MRI And CT Findings In Different Etiological Meningitis

Radiological Findings (CT and MRI)	Number of Cases	Percent
(0) Normal	44	47.3
(1) Meningeal Enhancement	8	8.6
(1,2,4) Meningeal Enhancement, Hydrocephalus, Vasculitic infarct	2	2.2
(1,4) Meningeal Enhancement, Vasculitic infarct	1	1.1
(2) Hydrocephalus	8	8.6
(2,3) Hydrocephalus, Granuloma	1	1.1
(2,4) Hydrocephalus, Vasculitic infarct	3	3.2
(3) Granuloma	4	4.3
(3,4) Granuloma, Vasculitic infarct	1	1.1
4 Vasculitic infarct	12	12.9
(4,5) Vasculitic infarct, Other findings	1	1.1
(5) Other findings	8	8.6
Total	93	100

0 = Normal , 1 = Meningeal Enhancement , 2 = Hydrocephalus, 3 = Granuloma, 4= Vasculitic infarct, 5 = Other findings (Thrombosis, Sinusitis, Icsol, Gliosis)

Table 10 Co-relation Of S-CRP With Bacterial Meningitis Cases

Serum CRP(mg/l)	CSF analysis	
	Bacterial M	
	N	%
<6	3	9.68%
6-12	0	0.00%
12-24	2	6.45%
24-48	7	22.58%
>48	19	61.29%
Total	31	100%

In my study out of 93 patient, 31 patient was found as bacterial meningitis which had s-crp value mostly ranging between >24 mg/l, out of them 19 patient had s-crp value >48 mg/l (61.29%). Most of them had poor prognosis and presented with altered sensorium and high grade fever and other focal neurological deficit and had radiological finding in the form of leptomeningeal enhancement and hydrocephalus followed by infarct in 3 cases. These 3 patients even died after few days of admission despite of giving empirical treatment.

Table 11 Co-relation Of S-CRP With Tubercular Meningitis Cases

Serum CRP(mg/l)	Tubercular M	
	N	%
<6	0	0.00%
6-12	3	8.11%
12-24	15	40.54%
24-48	17	45.95%
>48	2	5.41%
Total	37	100%

In case of tubercular meningitis, out of total 93 patient, 37 patient were diagnosed on the basis of csf analysis, clinical finding, radiological evidence and biochemical parameter

with s-crp as tubercular meningitis. most of the case out of 37 had s-crp value between intermediate range (12-48) mg/l and 2 patient had range between >48 mg/l which had miliariytuberculosis. These 2 patient had poor prognosis as well and presented with altered sensorium and high grade fever with other focal neurological deficit and had radiological finding in the form of hydrocephalus with multiple infarct. 3 patients had crp value between (12-48) were presented with seizure and headache and had infective granuloma as positive radiological finding.

DISCUSSION

The present study entitled “to study the clinical and etiological profile and it's correlation to laboratory parameters in cases of acute meningoencephalitis” was carried out in the Department of General Medicine, NetajiSubash Chandra Bose Medical College & Hospital, Jabalpur (M.P) after taking ethical clearance from Institutional Ethics Committee. The study duration was of one and half year from 1st March 2020 to 31st August 2021. The mean age of the study participants was 35.37 years with maximum study participants i.e. 14 to 50 years of age and the most of the patient were male and young adults which is similar to the findings found in The Tamil nadu Dr. MGR Medical University (prospective observational study) done in June 2014 – 2015¹⁴. In our present study on the basis of Etiology Tubercular Meningitis was found most common over all cause, which was followed by Bacterial and viral Meningitis which is similar to the findings found in The Tamil nadu Dr. MGR Medical University (prospective observational study) done in June 2014 – 2015¹⁴. Among 93 patients, 37 patients were diagnosed as Tuberculous meningitis. 31 patients were diagnosed as pyogenic meningitis; 25 patients were diagnosed as viral meningoencephalitis. Thus in comparison to the study done Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center,¹⁴ my study also has male and young predominance and Tubercular meningitis was the most common cause found which was followed by Bacterial meningitis and then Viral meningitis. In case of clinical of profile. Among the 93 patient with meningoencephalitis in this study, the common initial presenting symptoms were fever (89%) and Vomiting (89%) > altered sensorium> headache and neck pain and stiffness>Focal neurological deficit> seizure. Fever was the most common initial presenting symptom. 86 patients (92.5%) had fever and headache (92.5%). Headache was associated with vomiting in some of the patients. 45 patients had both fever and headache. 58 patients had altered sensorium in the course of illness, varying from drowsiness to deep coma. Only 45 patients had all the three triad – headache, fever and altered sensorium. The similar finding was also found Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center.¹⁴ Showing positive MRI and CT findings also added major contribution in differentiating the type of meningitis as well as prognosis of the disease. The most common radiological finding noticed in the study was vasculitic infarct followed by hydrocephalus followed by meningeal enhancement, granuloma and the other findings including (Thrombosis, Sinusitis, Icsol, Gliosis). Though they are not useful in the usual viral meningitis but may help to exclude other diagnosis. These Imaging is particularly helpful in later stage of TBM which shows basal enhancement and hydrocephalus. The similar findings was also noticed in the study done in Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center.¹⁴ (Hydrocephalus caused by tuberculous meningitis: clinical picture, CT findings and results of shunt surgery) and a study done by K. Fatema 2020, by K H Chan 2005 (TBM – CT study 1992). In our present study on the basis of Etiology Tubercular Meningitis was found most common over all cause, which was followed by Bacterial and viral

Meningitis. In case of bacterial meningitis. In my study out of 93 patient, 31 patient was found as bacterial meningitis which had s-crp value mostly ranging between >24 mg/l, out of them 19 patient had s-crp value >48 mg/l (61.29%). Most of them had poor prognosis and presented with altered sensorium and high grade fever and other focal neurological deficit and had radiological finding in the form of leptomenigeal enhancement and hydrocephalus followed by infarct in 3 cases. These 3 patients even died after few days of admission despite of giving empirical treatment. This shows Bacterial etiology is associated with high serum CRP level in comparison to viral meningitis, where out of 25 cases of viral meningitis 19 patient had significantly CRP value < 6 mg/l and 3 patient had between 6 – 12 mg/l which concludes that serum CRP level estimation can be very helpful in differentiating viral meningitis from bacterial. Though in Tubercular meningitis most of the patient had serum CRP level in intermediate range except two patient who had serum CRP level more than 48 mg/l. These findings also found similar in the study of Konatham Rambabu Kathyayani M K M (The significance of serum c- reactive protein estimation in acute meningitis in adults), (Clinical epidemiology unit, Madras Medical college, Brown et al. (1978), D Diculencu¹⁵, E Miftode, T Turcu, D Buicu (The value of C-reactive protein for the differentiation of bacterial meningitis from viral meningitis), José Diego Santotoribio, Juan Francisco Cuadros-Muñoz, Natalia García-Casares (Comparison of C Reactive Protein and Procalcitonin Levels in Cerebrospinal Fluid and Serum to Differentiate Bacterial from Viral Meningitis). (JMED association Thai 2005 sep.) also concluded that S-CRP can help in differentiating between bacterial and Aseptic Meningitis, Frizzo et al. Quad Sclovo Diagn. 1987, Lars-Olof Hansson, Gudmundur Axelsson, Tommy Linne, Elisabeth Aurelius & Lars Lindquist Pages 625-630 Published online: 08 Jul 2009 (Serum C-reactive Protein in the Differential Diagnosis of Acute Meningitis), R Mary et al. Ann Biol Clin (Paris) 2003 [Acute meningitidis, acute phase proteins and procalcitonin], J Sutinen et al. Infectious disease (Etiology of central nervous system infections in the Philippines and the role of serum C-reactive protein in excluding acute bacterial meningitis (1998 to 1999)

CONCLUSION

In this study, most of the patients with meningoencephalitis were males and young adults. Surprisingly, Tuberculous meningitis was the most common overall cause in this study. This observation is in contrast to the Western literature. Viral etiology in the most common one in western population. Both viral meningo encephalitis and pyogenic meningitis constituted most of the cases of acute Meningoencephalitis. Tuberculous meningitis was the most common cause in patient with sub acute meningitis. Diagnosis of tuberculous meningitis was challenging; clinical presentation, CSF studies, and brain imaging features helped to make a diagnosis of tuberculous meningitis. Estimation of C-reactive protein in serum is the cheapest, sensitive and specific test to differentiate bacterial from viral infections. It is a simple qualitative as well as quantitative test and can be done as a bed side investigation. With serum C-reactive protein, a definite aetiological diagnosis can be made rapidly at the time of admission itself. A serum CRP level of less than 6 mg/l with clinical signs of meningeal infection is a definite indicator of viral meningitis. A serum CRP level of more than 48 mg/l with clinical signs of meningeal infection is a definite indication of bacterial meningitis. Preadmission treatment with steroids causes a fall in CRP levels in bacterial meningitis. Serum CRP has 68% predictive value in adults. The rapid differentiation facilitates an early, accurate and appropriate therapy thereby reducing the mortality and morbidity rates, the overall cost of the treatment and the duration of hospitalization. Serum CRP can be used as the best and most sensitive bedside prognostic indicator of bacterial infections. Meningeal infections have a definite male predominance. Altered level of consciousness at the time of

admission is associated with bad prognosis and high case fatality rate (28%). Among the 93 patient with meningoencephalitis in this study, the common initial presenting symptoms were fever (89%) and Vomiting (89%) > altered sensorium > headache and neck pain and stiffness > Focal neurological deficit > seizure. Fever was the most common initial presenting symptom. 86 patients (92.5%) had fever and headache (92.5%).

Limitations

1. Due to COVID 19 pandemic, limited number of study participants could be taken.
2. The study participants were taken only from the tertiary care center; hence these were not representatives of the general population and therefore the results cannot be generalized.

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