ORIGINAL RESEARCH PAPER

Volume-7 | Issue-3 | March-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY OF ACUTE FEBRILE ENCEPHALOPATHY IN UTTARAKHAND REGION BASED ON PATIENTS' CLINICAL PROFILE AND GEOGRAPHICAL CONDITIONS

Medicine

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ABSTRACT

Acute febrile encephalopathy is characterized by altered mental status accompanied by or followed by short febrile illness (less than 15 days) and may be related with pyogenic meningitis, viral meningoencephalitis, tubercular meningitis, cerebral malaria and sepsis associated encephalopathy. Bacterial meningitis is represented by an acute purulent infection within the subarachnoid space results in decreased consciousness, seizures, raised intracranial pressure and stroke. Immunocompetent adult patients with viral meningitis present signs of headache, fever, and meningeal irritation coupled with an inflammatory CSF profile. Tuberculosis can attack any nervous tissue including the meninges, brain and the spinal cord. We conducted a data based study in continuation of our previous studies to elucidate the association of acute febrile encephalopathy with clinical profile of patients and geographical area where do the patients belong.

KEYWORDS

Fever, Japanese encephalitis, Meningitis, Mortality

Introduction

A patient with altered mental status accompanied by or followed by short febrile illness fall under a clinical condition "acute febrile encephalopathy" (AEF). (1) Infections are predominant cause for febrile encephalopathy (2). Infections may arise due to altered cellular and humeral immunity, physiologic changes, delayed wound healing, advancement of chronic infection, consumption of immunoc ompromised drugs and geographical area. (3). It is a major and important task to differentiate the AFE from other CNS infections like bacterial meningitis, tubercular meningitis and cerebral malaria. A wide variety of CNS disorders including infectious and non-infectious may mimic encephalitis therefore it is difficult to establish viral diagnosis. In India, the incidence of encephalitis is unknown. (4) Previous studies has shown the etiology and mortality of AEF (5,6,) but in the present study, we collected the data from our previous studies (7,8) to determine association of acute febrile encephalopathy with other conditions, geographical area and their effects on mortality.

Aims of the study

- To determine the number of patients admitted in the hospital every month
- To determine the distribution of patients related with hilly and plane areas
- To determine the presence of comorbid conditions and its association with mortality
- To determine the correlation of geographical area of patients with their survival rate

Material and methods

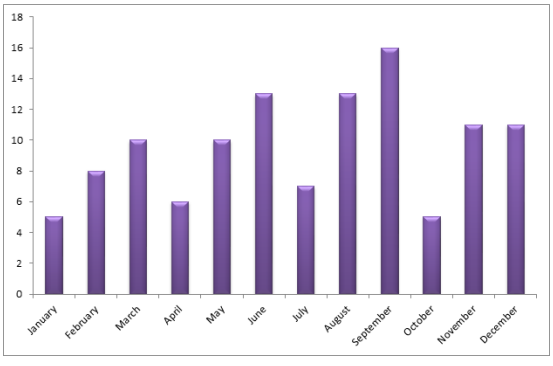
This study was conducted on 115 patients admitted to Government Medical College and associated Dr. Sushila Tiwari Government Hospital, Uttrarakhand, India, during August 2012-July 2014. All the admitted patients present complaints of fever of less than 15 days duration and altered mentation either at onset or following fever and lasting for at least 24 hours. A pre-designed questionnaire was used to obtain a data which incorporated personal information, clinical profile, associated risk factors and investigations. This was done after explaining the purpose of this study and obtaining written informed consent.

Results

- **Monthly admission of patients admitted to hospital**

Maximum number of patients (49%) was admitted in the rainy season from June to September. An equal number of 11(9.5%) patients were admitted in the month of November and December of winter season. There was acute fall in number of patients in month of January which is extremely cold period especially in hill region. The burden of patients with encephalitis and cerebral malaria in rainy season reached maximum. (Figure 1)

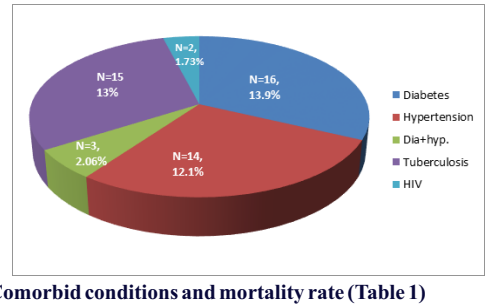
Figure 1



- **Presence of Comorbid conditions**

Total 45 patients (39.13%) were diagnosed with one or more comorbid conditions. Sixteen (13.9%) patients were diabetic, 14 (12.1.0%) were hypertensive, and 3 (2.06%) patients were found with both diabetes and hypertension. Fifteen patients (13.0%) were diagnosed with extracranial tuberculosis. Two patients were seropositive for HIV and two had cardiovascular diseases. (Figure 2)

Figure 2



- **Comorbid conditions and mortality rate (Table 1)**

Table 1

Comorbidity	No. of patients		Total
	Mortality	Survival	
Present	12 (30.8%)	27 (69.2%)	39
Absent	13 (17.1%)	63 (82.9%)	76

p value=0.09 (insignificant)

Mortality was 12 (30.8%) in patients associated with comorbid conditions and 13 (17.1%) in patients without comorbid conditions. Higher mortality rate in patients with comorbid conditions was found statistically insignificant.

- **Distribution of patients on basis of geographical condition**

Patients admitted in hospital came from both hilly and plain terrain of the state. Fifty five (47.8%) patients were from hill areas and 60 (52.2%) were from plain (Terai) region. The etiological diagnosis was correlated with geographical distribution as follows. (Table 2)

Table 2

Etiology	Geographical condition	
	Hilly	Plain
APM	22 (46.8%)	25 (53.2%)
AVM	12 (48%)	13 (52%)
TBM	8 (40%)	12 (60%)
CM	3 (42.9%)	4 (57.1%)
SAE	2 (40%)	3 (60%)
DE	1 (50%)	1 (50%)
EE	1 (50%)	1 (50%)
Cryp.M	1 (50%)	1 (50%)

*** APM – Acute pyogenic meningitis, AVM- Acute viral meningocephalitis,**

TBM- Tubercular meningitis, CM- Cerebral malaria, SAE- Sepsis associated encephalopathy,

Cryp.M- Cryptococcal meningitis, DE-Dengue encephalopathy, EE- Enteric encephalopathy,

Twenty two (46.8%), 12 (48%) and 8 (40%) number of patients of acute pyogenic meningitis, viral meningoencephalitis and tubercular meningitis were admitted from hill region. Cases of cerebral malaria were 3 (42.9%) and 4 (57.1%) respectively from hill and plain region. Sepsis associated encephalopathy had 2 (40%) cases from hill and 3 (60%) cases from plain areas. Cases of dengue encephalopathy, enteric encephalopathy and cryptoccocal meningitis were equal in both hill as well as plain region. The number of acute pyogenic meningitis and viral meningoencephalitis were marginally more from plain area, (53.2% versus 46.8% and 52% versus 48%). Number of cases of tubercular meningitis was more from plain (60%) in comparison to hill (40%).

- **Geographical factors and mortality** (Table 3)

Table 3

Geographical landscape	No. of patients		Total
	Mortality	Survival	
Hilly region	17 (30.9%)	36 (69.1%)	55
Plain	8 (13.3%)	52 (86.7%)	60

p value=0.022 (significant)

Seventeen (30.9%) patients from hilly region died in present study. Mortality rate was only 13.35% in patients who were from plain. This high value of death rate from hill region was statistically significant. (p=.022)

Discussion

Herpes simplex virus is a common cause of sporadic encephalitis around the world. (9) Postmonsoon Japanese encephalitis (JE) has been reported from many parts of India. Among the other identifiable viruses, enterovirus, JE virus, and mumps are important agents. (10) In present study, no clean cut segregation of cases in any specific weather was found. There was slight inclination of cases in month of June to September which is rainy season. The maximum contribution in rainy season was given by cerebral malaria and encephalitis. In a study conducted on "encephalitis cases surge in Uttar Pradesh" by Tomasulo (11), there was high incidence of cases of encephalitis in each monsoon in Gorakhpur and the author contributed this fact to the ideal conditions for flooding and mosquito breeding created by high rains paired with low lying areas. In another study by Modi et al similar surge in JE and cerebral malaria cases were seen in post monsoon season (12). In another study on outbreak of JE cases in Nepal during the year 2011 a similar post monsoon surge in cases of JE was seen in the rainy season. (13) Region wise distribution (hilly vs plain) revealed 17 (68%) mortality in the hilly region as compared to 8 deaths (32%) in plain areas. This data was also found to be statistically significant with a p value of 0.22. Possible explanation of this finding is that patients from hilly region admitted in advanced stage of disease, deprived of primary treatment. This is a well known fact that in hill area of Uttarakhand lacking medical practitioners, medications, and transportation to the hospital due to poor road facility and adverse environmental factors such as heavy rainfall, landslides.

Conclusion

In our previous studies, we evaluated the distribution of patients on the basis of their age and gender, distribution of patients on the basis of various etiologies and the survival rate of patients with various etiologies (7,8). In present study we found significantly higher mortality rate in those patients who came from hilly areas. Poor roads, lack of transport facility, inadequate medical facility and adverse environmental factors could have been one of the possible reasons for this outcome. The high mortality rate was seen in diabetic patients but this observation was statistically insignificant. Early intervention and pharmacotherapy definitely had positive effect on the ultimate outcome. This observation was statistically significant.

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