



IMPACT OF JAPANESE ENCEPHALITIS AND ITS OUTCOME: A STUDY IN TERTIARY CARE HOSPITAL IN NORTH INDIA

Medicine

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ABSTRACT

BACKGROUND: Studies on Japanese Encephalitis, a leading cause of encephalitis and neurological infections in Asia, are very few. We aim to study the impact of Japanese encephalitis and its outcome in a tertiary care hospital in North India.

MATERIAL AND METHOD: A prospective observational study was conducted in patients suffering from viral encephalitis. Routine investigations, computed tomographic scan of head, magnetic resonance imaging brain and CSF analysis were done.

RESULTS: Most of the patients were in the age group of 21 to 30 year. Males were more affected than females. After a follow up at 1 month, neuro-sequelae were found to be present in 64.70% patients of JE, with maximum patients having altered behaviour. Proportion of patients who recovered was 15.68% while 19.60% patients expired.

CONCLUSION: Reporting and appropriate workup of the suspected acute viral encephalitis patients is very important to reduce the morbidity and mortality.

KEYWORDS

viral encephalitis, Japanese encephalitis, North India

INTRODUCTION:

Human encephalitis is a complex neurological syndrome constituting a challenging public health problem. Although definite epidemiological trends are evident, it is difficult to make generalizations as few population-based studies exist. Most cases are not reported to health authorities, and many possible pathogens are implicated but in most cases, a cause is never found [1].

Encephalitis with viral etiology is a common public health problem. It can be caused by a variety of viruses, the herpes viruses and some arboviruses being among the important ones.

Japanese Encephalitis (JE), a vector borne disease, is a leading cause of encephalitis and neurological infections in Asia [2]. Around 50,000 cases are recorded every year with 5-35% case fatal [3]. However, studies on its prevalence in North India are very few. Our study aimed to study the impact of Japanese encephalitis and its outcome in a tertiary care hospital in North India.

MATERIALS AND METHODS:

A prospective observational study was conducted in the Department of Medicine, King George's Medical University, Lucknow from August 2014 to July 2015 after the approval from the Institutional Ethical Committee. All patients of either sex, aged more than 13 years, admitted to the Department of Medicine, CSM Medical University, with the clinical features commensurate with viral encephalitis (fever, headache and altered sensorium) were assessed and included in the study. A written informed consent was taken from all the patients' guardians and thereafter patients were included in the study after explaining the procedure of the study. The exclusion criteria included patients diagnosed with pyogenic meningitis, tuberculous meningitis and septicemia associated encephalopathy, patients diagnosed with non infectious encephalopathy and those who refused to give consent.

STUDY DESIGN:

Detailed history was recorded and detailed clinical examination was done in all the patients who presented with febrile encephalopathy. Complete blood counts, renal function tests, liver function tests, serum electrolytes, chest skiagram, ultrasound whole abdomen, sputum for

acid fast bacilli, HIV- ELISA were done. Computed tomographic (CT) scan of head along with magnetic resonance imaging (MRI) of brain and electroencephalogram were also carried out for all the patients. Cerebrospinal fluid (CSF) was analysed for appearance, cytology, protein, glucose (CSF to plasma glucose ratio), gram staining, acid fast bacilli staining, India ink staining, detection of Cryptococcal antigen, adenosine deaminase activity, polymerase chain reaction, CSF culture for bacteria, CSF culture for mycobacterium tuberculosis, VDRL and Cytology for malignant cells. CSF picture characterized by lymphocytic pleocytosis with normal glucose along with high protein content were included in the study. These patients' CSF was then subjected for ELISA and PCR so as to establish the viral etiology.

Patients were assessed at 1 month of follow-up after discharge so as to study the outcome in form of recovery, expiry and persistent neurological sequelae in Japanese encephalitis. The patients were thus examined for improvement or deterioration in condition with special attention to neurological assessment.

STATISTICAL ANALYSIS:

Data was recorded in Microsoft excel 2003. The results were presented as mean±SD, median and percentages. Chi-square test was used to compare the categorical/dichotomous variables. A p-value of <0.05 was considered statistically significant. All the analysis was carried out using SPSS 16.0 software.

RESULTS:

All the patients presenting with febrile encephalopathy attending the Medicine outdoor patient department or the emergency of Medicine Department were enrolled in the study, of these a total of 192 patients fulfilling the inclusion criteria and not coming under the domain of exclusion criteria were included in the study.

The etiological diagnosis was done on the basis of Polymerase chain reaction and Ig-M ELISA. Most common diagnosis was Japanese encephalitis (53.13%) followed by Herpes Simplex Encephalitis (26.09%), Dengue encephalitis (10.7%), Unexplained encephalitis (7%) while least common diagnosis was HIV encephalitis (3%).

We came across 102 patients of JE out of the total 192 patients of AVE. Out of the patients diagnosed with JE, the viral markers were positive only for 60.0% (n=61) cases and negative for 40.0% (n=41) cases.

Though proportional difference in age of patients with Japanese encephalitis was found but this difference was not found to be statistically significant. No statistically significant association of age and JE was found ($\chi^2=11.081$ ($df=16$; $p=0.804$)) [Figure 1].

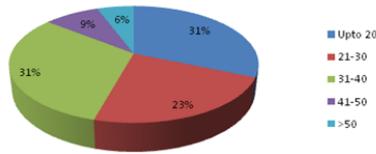


Figure 1: Association of age with Japanese Encephalitis (in %) Prevalence was higher in males as compared to females. After a follow up at 1 month, neuro-sequelae were found to be present in 64.70% (n=66) subjects of JE, with maximum patients having altered behaviour, followed by ataxia, dystonia, persistent fits and memory loss. Proportion of patients who recovered was 15.68 % (n=16) while 19.60% (n=20) patients expired. The difference was found to be statistically significant ($\chi^2=38.117$ ($df=8$); $p<0.001$) (Figure 2,3).

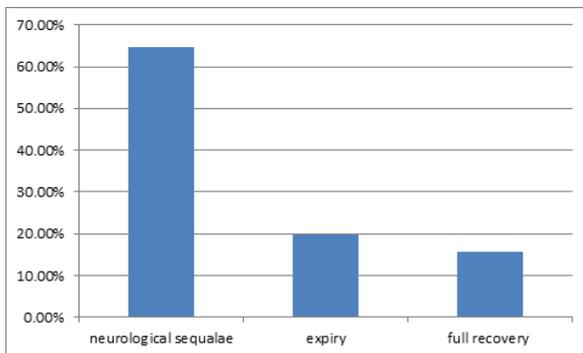


Figure 2: Outcome after 1 month

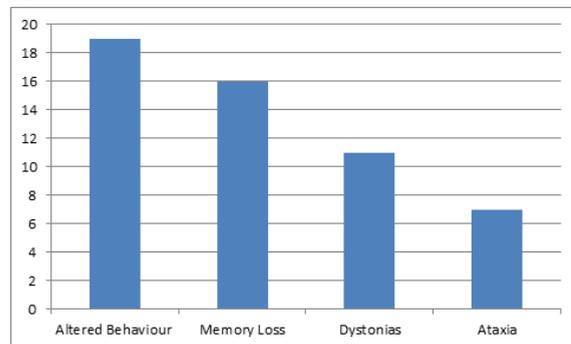


Figure 3: Neurological sequelae after 1 month

DISCUSSION:

Epidemic outbreaks of Japanese encephalitis pose a significant public health problem in the densely populated regions of tropical and subtropical Asia. Based on the endemicity, epidemicity the virus has been shown to be widely prevalent in most parts of south central, northern and northeast states of India. In Uttar Pradesh, the first major JE epidemic occurred in Gorakhpur in 1978, with 1,002 cases and 297 deaths reported. In 2005, Uttar Pradesh faced a devastating outbreak of JE, mostly confined to Gorakhpur, with another outbreak in 2006 and 2007. Hence, all previous evidences show the high prevalence of JE in UP [4].

In our study, most of the patients were in the age group of 21 to 30 years and only a few cases were aged more than 51 years. Analysis of JE cases by Kumari R et al. from Uttar Pradesh districts indicated that maximum cases (58%) were reported in the age group of 4 to 6 years,

while 18% of cases were reported in the age group 15 years and above. After JE vaccination in children up to 15 years, the proportion of cases in adults slightly increased in 2009 (24.87%) [5]. In 2004, of the total 115 cases analysed from Gorakhpur, 105 (91.3%) were among children below 15 years of age [6]. Jain P et al. (2014) however reported that JEV most commonly affected children aged between 5 and 15 years [7]. A gradual decrease of herd immunity in older persons has been taking place, creating a potential for future disease outbreaks [8].

In the study conducted by Kumari R et al., though both the sexes were affected, the males outnumbered females, with female to male ratio being 1:1.3. which indicate that the prevalence of Japanese encephalitis was higher in males as compared to females [5]. Higher prevalence in males was also seen in the outbreak of JE in 2005 and 1988 with a female:male ratio of 1:1.28 [5] and 1:1.7 respectively [9]. Our results are in conformity with that of Jain P et al. (2014) who reported AES in 544 (34.5%) female patients, while the remaining (65.5%) were males [7]. Slightly higher preponderance in males may be due to more environmental exposure and more outdoor activity by the male population during the peak biting time of exophilic vectors and more exposed body parts, while women tend to be relatively more covered by their attire.

Tripathi P et al. (2015) carried out a study on 1586 patients with AES. 1070 patients were tested for JEV IgM and 238 (22.2%) were positive [10]. JE positivity was found almost exclusively in monsoon and post-monsoon season and patients came from 22 surrounding districts. However, their study was confined to the age group between 6 months and 14 years and their study eventually showed that AES including JE continue to be an important cause of hospitalization in children in Lucknow, which highlights the need for further vaccination drives in this region. No statistically significant association of Age and different diagnosis of encephalitis was found ($p=0.804$). Jain P et al. (2014) reported that after a follow up at 1 month, neuro-sequelae were found to be present in 34.29% subjects of JE while 42.86% cases expired after a follow up of 1 month [7]. Proportion of patients who recovered was 22.86%. The diagnosis of JE in our study was confirmed by the identification of virus by means of PCR and ELISA, this was further supported by MRI brain. Neurological sequelae in the form of altered behaviour, ataxia, dystonia and persistent fits were very high in the patients suffering from Japanese encephalitis. Such sequelae can be prevented by vigilant diagnosis, early stabilisation and institution of nonspecific supportive measures.

Reporting and appropriate workup of the suspected acute viral encephalitis patients is important so as to reduce the morbidity and mortality.

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