

**ORIGINAL RESEARCH ARTICLE****MENINGOENCEPHALITIS IN INTENSIVE CARE UNIT: DO JAPANESE ENCEPHALITIS CASES GO UNSUSPECTED?**Ashish Ghimire^{1*}, Balkrishna Bhattarai¹, Basudha Khanal², Suchana Marahatta³, Gopendra Prasad Deo⁴¹ Department of Anaesthesiology and Critical Care, BPKIHS, Dharan, Nepal² Department of Microbiology, BPKIHS, Dharan, Nepal³ Department of Dermatology, Venereology and Leprology, BPKIHS, Dharan, Nepal⁴ Department of Anaesthesiology & Critical care, Chitwan Medical College, Bharatpur, Nepal

***Correspondence to:** Dr. Ashish Ghimire, Department of Anaesthesiology and Critical Care, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.
Email: ashishghimi@hotmail.com

ABSTRACT

Background: Meningoencephalitis (ME) is a medical emergency. Acute infective encephalitis is usually viral. Nepal has the second highest prevalence of JE in South East Asia. About one third of the JE cases results in death. The records of the JE in the laboratory of B.P. Koirala Institute of Health Sciences (BPKIHS) showed 760 samples to have the evidence of JE infection out of 3352 tested during the period of 2001-2011 AD. The present study aimed to conduct an audit on meningoencephalitis cases admitted in the ICU of our hospital in an attempt to find its burden. Methods: Medical records of all the adult patients with the provisional diagnosis of Meningoencephalitis at BPKIHS over the period of 2009-2011 AD were examined. Laboratory findings of all the patients diagnosed with ME who were admitted to the eight bedded general intensive care unit (ICU) were also reviewed. The diagnosis was made based on the findings of medical history, clinical examination and cerebrospinal fluid analysis for biochemistry and cytology, results of anti JE IgM test performed on CSF and/or serum. Results: Altogether 127 samples of CSF were obtained from adult patients admitted in different inpatient department of BPKIHS with the clinical diagnosis of meningo encephalitis between 2009-2011 AD. Out of them, 25 (19.68%) were tested positive of JE. A total of 684 patients were admitted over the same period with different diagnoses in 8 bedded ICU of hospital. Fifteen (2.19%) were transferred to the ICU with the ME. In the ICU, 9(60%) were treated as viral encephalitis. Among them CSF of only 4 patients' were sent for testing for JE and found positive in 2 cases. Seven (46.6%) patients expired while 4(26.6%) were taken home by the relatives against medical advice in critically ill conditions and remaining 4 (26.6%) improved and transferred to ward. Among the expired patients 5 (71.4%) had viral encephalitis. Conclusion: JE is a real problem but many cases are likely to have been gone undetected. Adoption of a more intensive approach with much liberal serology testing policy seems to be appropriate for better detecting JE cases in the setting.

Key words: Intensive care unit, Japanese encephalitis, Meningoencephalitis.

INTRODUCTION

Meningoencephalitis (ME) is a medical emergency. Acute ME is usually of viral origin. Japanese encephalitis (JE) is one of the most important causes of viral encephalitis world-wide, with an estimated 50,000 cases and 15,000 deaths annually.^{1,2} Nepal has the second highest prevalence of JE in South East Asia.³ About one third of the JE cases results in death and those who survive frequently suffer from

residual neuropsychiatric sequelae.⁴ JE in Nepal is seasonally endemic in the Terai region and in villages along the river banks between hills.³ Correct immediate diagnosis and initiation of symptomatic and specific therapy has a dramatic influence on survival and reduces the extent of permanent brain injury.

The records of the JE laboratory of B.P. Koirala

Institute of Health Sciences (BPKIHS) showed 760 samples to have the evidence of JE infection, out of 3352 tested during the period of 2001-2011AD. The samples tested were obtained from different areas of Eastern Nepal as well as from some parts of neighbouring India. JE is significant cause of morbidity and mortality in Nepal, particularly in the Terai region. It is suspected that the real burden of the disease could be far more than what the data shows. The present study aimed to conduct an audit on meningoencephalitis cases admitted in the ICU of our hospital in an attempt to find the burden it is creating.

METHODS

Medical records of all the adult patients with the provisional diagnosis of ME at BPKIHS over the period of 2009-2011 AD were examined. Laboratory findings of all the patients diagnosed with ME who were admitted to the eight bedded general intensive care unit (ICU) were also reviewed. The diagnosis was made based on the findings of medical history, clinical examination and cerebrospinal fluid analysis for biochemistry and cytology, results of anti JE IgM test performed on CSF and/or serum.

RESULTS

During the study period, a total of 127 CSF samples were obtained from adult patients admitted in different inpatient department of BPKIHS with acute encephalitis syndrome. After microbiological, biochemical and cytological analysis, twenty five (19.68%) were diagnosed as JE. Over same duration, a total of 684 patients were admitted in the eight bedded intensive care unit of the hospital. Among them 15 (2.19%) patients had suspected ME (Figure 1). There were 8 male and 7 female patients. The minimum duration of ICU stay was 1 day while maximum was 73 days.

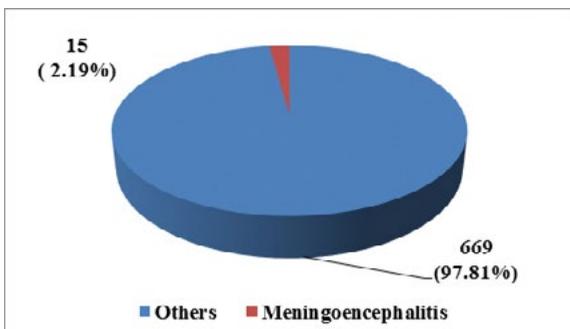


Figure 1: Burden of ME in BPKIHS

On the basis of CSF analysis findings, 9 (9/15, 60.0%) patients were diagnosed to have viral ME, while rest i.e. 6 (6/15, 40.0%) as non-viral ME (Figure 2).

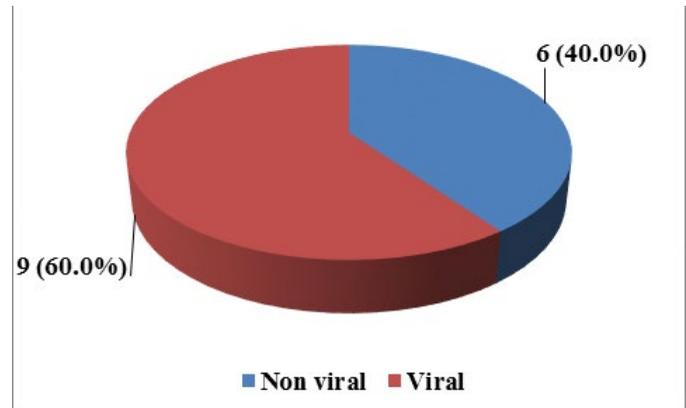


Figure 2: Cause of ME in patients admitted in ICU

Although nine ME patients were suspected to have viral etiology, CSF of only four patients were sent for testing for JE; it was positive in two cases. (Figure 3)

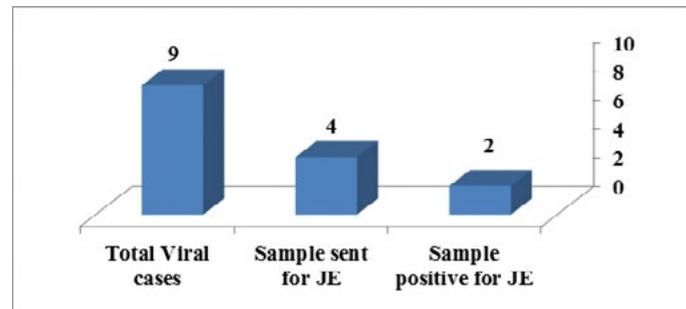


Figure 3: JE positivity in viral ME patients

Seven patients expired in the ICU while four were taken home in critically ill conditions by their relatives against the medical advice and remaining four improved clinically and were discharged from the ICU. Two patients who were taken home against the medical advice in critically ill conditions had viral ME and 2 had non-viral. Similarly, two patients who improved and discharged had viral encephalitis while the other two had non-viral ME (Figure 4). Among the expired patients five (71.4%) had viral encephalitis. One patient who died of viral encephalitis had JE.

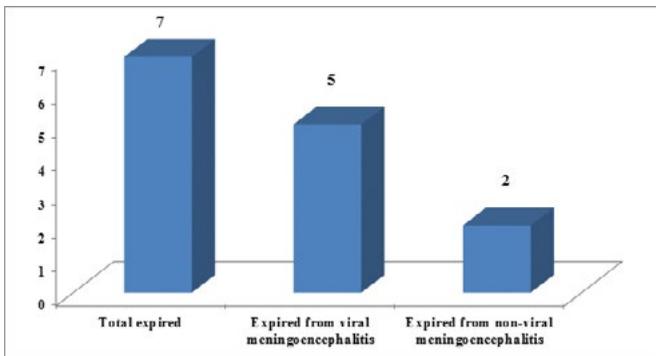


Figure 4: Mortality of ME patients

DISCUSSION

ME, commonly known as acute encephalitis, which may present with a broad spectrum of presentations like confusion, seizures, coma, respiratory depression, cranial nerve palsies and paralysis etc.⁴ JE is one of the major causes of encephalitis in Nepal. It is more prevalent among poor, malnourished and uneducated group of people. It has proved as a major burden for our patients in the last three decades. It has second highest prevalence in Nepal in South-East Asia.³ Since 2005, 1,802 cases and 283 deaths have been reported, yielding a case fatality rate of 16%.³ Among those who survive, about 30% develop some form of permanent neurological disability. Among them, only about 10% will recover to their pre-infective health status.⁵

Though, the disease seems to have declined in countries like Japan, South Korea and Thailand, its incidence seems to have been increasing in Nepal and neighboring India. Its diagnosis is mainly based on clinical signs and symptoms, and treatment remains supportive. No effective drug treatment for JE exists and only few are aware of the JE vaccine.⁶ JE vaccination is practiced among paediatric population and not mandatory for adults in Nepal. JE constitutes a major cause of morbidity and mortality in our country despite many efforts from the government and several non-governmental organizations; and it remains a priority for public health intervention. Hence, we need to have high degree of suspicion and thorough possible workup in all patients with ME; which will help us to know its clinicoepidemiological profiles in depth. This in turn will help for the better as well as focused prevention strategies of the disease.

Mosquito being the vector for JE transmission, JE is seasonally endemic in the Terai region and in villages along the river banks between hills. Since BPKIHS is one of the largest referral hospital of Eastern Terai districts, which also borders India, all patients presenting with ME in the hospital need to be evaluated suspecting JE unless proved otherwise. Patients with severe viral infections are often hospitalized in the ICU. Further, recent studies have underlined the frequency of virus detection in ICU patients.⁷ This audit of three year data retrospectively, therefore, attempted to find the scenario of JE in ICU of BPKIHS.

In our ICU prevalence of ME was 2.19% with slight male preponderance of the disease (Male=8, Female=7). In a study from India also, males were more affected than females (Males: 59.67%, Female: 40.33%).⁸

In our study, among 15 ME cases, 9 (60%) were provisionally diagnosed as viral and 40% were diagnosed as non-viral ME on the basis of CSF analysis, for the management point of view.

In a study from tertiary referral hospital of Kathmandu, viral etiology was found in 23.3%, bacterial etiology in 10.5% and dual infection in 9.5% adult patients with central nervous system (CNS) infection. They found JE as a cause of viral CNS infection in 9.5% patients.⁹ Likewise, in a five year study done by Indian Council of Medical Research in India, JE was found in 27.0% patients with suspected viral encephalitis.¹⁰

Unlike the findings of other studies our audit has shown that serology of JE was done only in very limited patients of ICU; only four out of 15 patients clinically diagnosed as ME with positivity in two cases. Two out of four is a high occurrence. Though ordering biochemical tests (investigations) are mostly carried out based on clinical judgement with the consideration of incurring costs, a more liberal policy of undertaking investigation of viral markers seems to be more appropriate in the setting. Based on the findings of the present audit one can predict that more of JE cases would have been detected if serology tests were done more frequently. In other words we would like to draw attention that we need to suspect and investigate for JE in all patients with CNS infection. Its prevalence in our part may be

even more than that is reported in the literatures.

This may be considered a very small audit with multiple limitations but certainly it indicates that there are problems that need to be looked at more intensively and cautiously.

CONCLUSION

The present study shows that JE is a real problem but many cases are likely to have been gone undetected. Adoption of a more intensive approach with much liberal serology testing policy seems to be appropriate for better detecting JE cases in the setting.

Acknowledgement: We are very much thankful to our patients, ICU and Microbiology team. Also, authors are grateful to everyone involved directly and indirectly in the study.

REFERENCES

1. Tsai TF. Factors in the changing epidemiology of Japanese encephalitis and West Nile fever. In: Saluzzo JF, Dodet B, eds. Factors in the emergence of arbovirus diseases. Paris: Elsevier,1997:179-89.
2. Solomon T. Viral encephalitis in South East Asia. *Neurological Infections and Epidemiology* 1997;2:191-9.
3. WHO. Immunization and Vaccine Development: Japanese encephalitis. World Health Organization. 3 December 2010. <http://www.searo.who.int/EN/Section1226/Section2073.asp>
4. Polhill S, Soni N. Encephalitis in the ICU setting. *Current Anaesthesia & Critical Care* 2007;18:107–116.
5. WHO. Epidemiology of Japanese Encephalitis in Nepal. World Health Organization. 3 December 2010. <http://www.nepjol.info/index.php/JNPS/article/download/1600/1533>
6. Balasegaram M, Chandramohan D. Japanese Encephalitis: Epidemiology and Current Perspectives in Vaccines. *The Open Vaccine Journal* 2008;1:1-12.
7. Kelesidis T, Mastoris I, Metsini A, Tsiodras S. How to approach and treat viral infections in ICU patients. *BMC Infectious Diseases* 2014;14:321.
8. Chakraborty D, Banerjee S, Maji D, Dey TK, Mondal P, Basu M. A Descriptive Study of Japanese Encephalitis in West Bengal, India, Based on Surveillance Data: Changing Pattern Observed in Recent Years. *Sch J App Med Sci* 2015;3:320-8.
9. Giri A, Arjyal A, Koirala S, Dongol S, Thapa SD et al. Aetiologies of Central Nervous System infections in adults in Kathmandu, Nepal: A prospective hospital-based study. *Sci Rep* 2013;3:2382.
10. Sarkar A, Taraphdar D, Mukhopadhyay BB, Kumar M, Mukhopadhyay SK, Chatterjee S. Influence of socio-economic status and environmental factors on serologically diagnosed Japanese encephalitis cases in the state of West Bengal, India during 2005-2010. *Health* 2012;4:6-12.