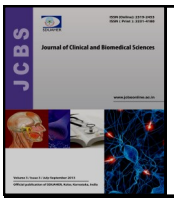

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**Editorial**

# Acute Encephalitis Syndrome in India – Japanese Encephalitis, Polluted Water and Malnutrition

Acute encephalitis syndrome (AES) has grabbed much attention as a public health problem in the recent years. The earlier major outbreaks of acute encephalitis in the country from 1973 to 2007 were mainly attributed to Japanese encephalitis (JE) virus and case fatality rate of over 33% were reported. The earlier efforts undertaken to control mortality due to JE outbreaks were in developing effective clinical case management strategy, vaccination attempts using mouse brain derived inactivated JE vaccine in the endemic areas, sentinel surveillance at referral hospitals and isolation of amplifier host. The more recent efforts undertaken by the Government of India (GoI) to prevent JE in the identified endemic districts of the country has been JE vaccination coverage under the universal immunization programme (UIP) using a single dose live attenuated JE vaccine containing SA-14-14-2 strain.

From the year 2008 onwards there has been an increase in the reporting of AES cases in the country (44097 cases and 5728 deaths) whereas the case fatality rates (CFR) has reduced to less than 13%. Now JE is no longer the major cause of AES as only around 15.5% of these cases are testing positive for JE. The state of Uttar Pradesh accounts to over half of the cases and deaths followed by the states of Assam and West Bengal. There is variation in the causation of AES in the country according to place. Various enteroviruses such as EV-76, EV-89 and Coxsackie virus B5 have been found to be associated with AES in Uttar Pradesh (UP) and have been attributed to consumption of contaminated drinking water. Chandipura virus is being increasingly attributed to AES in Gujarat and West Nile virus in Kerala. Temporal variations in AES distributions are being documented. In North India AES earlier was mainly reported in September and October whereas recently are being reported in June and July.

The epidemiology of recent outbreaks of AES has been unusual. None of the cases tested positive for JE in the AES outbreaks in 2012 and 2014 at Muzaffarpur in Bihar which had a mortality of around 35%. The affected have been predominantly the poor and malnourished children who have incidentally eaten unripe litchi fruit, hypothesized to have caused hypoglycaemic syndrome due to a toxin present in it. Some investigators have also attributed heat stroke as the cause of AES in children in Muzaffarpur. Better clinical case management strategies to assess and correct hypoglycaemia in these situations are attributed to have reduced the mortality rates following AES in Bihar.

Currently the vector-borne JE disease is being countered in the 60 high-priority districts of states of Assam, Bihar, Uttar Pradesh, West Bengal and Tamil Nadu. Vaccination campaigns for children of one to fifteen year age have been completed in most of these JE endemic districts of the country. Further prevention of JE in these districts should focus on children of 16 to 24 months through the universal immunization programme. The Government of India is taking support from the Center for Disease Control (CDC), Atlanta, USA to identify several strains of viruses of AES and JE if any which may be responsible for the mortality and disability each year in the endemic districts of the country. Investigations are in progress to identify the various causes of AES namely toxins, viruses and other factors.

The repeated outbreaks of AES among children have become a public health concern of National importance in India. Epidemiological investigations are further necessary to identify the various factors associated with AES in the country mainly in UP and Bihar. Varied approaches to identify the causes for these outbreaks have lead to further challenges. Biological, nutritional, toxicological and physical factors have been implicated as causes for AES and are further being investigated. Thorough investigations of each of the cases including autopsies of mortality cases followed by histopathological and toxicological examinations are needed for breakthrough in all of the 60 JE affected districts of the country.

Use of the relatively safe live attenuated JE vaccine under the routine immunization programme in the endemic areas is a cost effective strategy to prevent AES. Introduction and strengthening the systems to supply safe drinking water and preventing malnutrition in children are necessary

to approach the various factors causing AES in the country. More importantly to meet the immediate need of the affected better tertiary health care facilities at referral centres, hospitals with paediatric intensive care units and medical college hospitals are necessary to manage the cases and prevent mortality and disability. Practitioners of medicine both in the private and government sectors are to be trained in proper case management of AES in the identified endemic districts.

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