International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 24-10-2018; Accepted: 29-11-2018
www.medicalsciencejournal.com
Volume 4; Issue 12; December 2018; Page No. 173-176

Assessment of prevalence and clinical outcome of the acute encephalitis syndrome in children's at DMCH

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Abstract
The purpose of AES surveillance is to estimate disease burden, to understand disease pattern, and its influence on mortality and morbidity. Surveillance helps in documenting the burden of the disease and also helps in proper utilization of scarce resources. Hence based on the literature findings about the Acute Encephalitis Syndrome the present study was planned to evaluate the occurrence, clinical signs and outcome of the AES.
The 25 patients suffered from the AES syndrome in the Department of the Paediatrics in Darbhanga Medical College and Hospital, Laheriasaria from Jan 2017 to Dec 2017 were selected from the present study. All the patients were undergone CSF analysis, Fundus examination, Monteux test, Chest X - ray, CT Brain, MRI Brain, EEG, Virological studies.
The present study concludes that the reporting and surveillance mechanism needs to be strengthened in all the districts of the state. Private practitioners who participate less in surveillance activities need to be encouraged to do so especially for cases of AES. Reporting and appropriate workup of all cases would strengthen the AES surveillance and go a long way in reducing the morbidity and mortality due to this disorder. Better personal hygiene and nutrition along with proper immunization will decrease the incidence of bacterial meningitis. In order to prevent JE in children, continued vaccination will have to be undertaken.

Keywords: AES, Acute Encephalitis Syndrome, children's, clinical outcome

Introduction
Acute Encephalitis Syndrome (AES) including Japanese Encephalitis (JE) is a group of clinically similar neurologic manifestation caused by several different viruses, bacteria, fungus, parasites, spirochetes, chemical/ toxins etc. The outbreak of JE usually coincides with the monsoon and post monsoon period when the density of mosquitoes increases while encephalitis due to other viruses speciallyentero-viruses occurs throughout the year as it is a water borne disease [1].
Japanese Encephalitis (JE) is a mosquito borne zoonotic viral disease is one of the causes under AES. The virus is maintained in animals and birds. Pigs and birds, particularly the birds belonging to Family Ardeidae (e.g. cattle egrets, pond herons, etc.) are the natural hosts. Pigs and wild birds are reservoir of infection and are often called as ìamplifierhostsî in the transmission cycle, while man and horse are ëdeadendí hosts. Similarly other virus, fungus, parasite, spirochetes, toxin etc may cause similar illness. The disease affects the central nervous system and can cause severe complications, seizures and even death. The case fatality rate of this disease is very high and those who survive may suffer with various degrees of neurological sequelae. Children suffer the highest attack rates because of lack of cumulative immunity due to natural infection. Meningitis, caused by bacteria, can be treated as soon as possible with antibiotics. Encephalitis, usually caused by a virus, cannot be treated with antibiotics. However, good clinical management is important to reduce the risk of disability or death from the disease.
Clinical involvement of the Central Nervous System (CNS) is an unusual manifestation of human viral infection. The spectrum of brain involvement and the outcome of the disease are dependent on the specific pathogen, the immunological state of the host and a range of environmental factors. Although specific therapy is limited to only several viral agents, correct diagnosis, and supportive and symptomatic treatment (when no specific therapy is available) are mandatory to ensure the best prognosis.
Following an incubation period, in case of viral encephalitis including JE a prodrome of fever, headache, nausea, diarrhoea, vomiting, and myalgia occurs lasting for few days (1-5 days) followed by irritability, altered behaviour, convulsions and coma. The progression of disease is rapid. Signs of raised intra cranial tension are commonly present in acute stage of illness. The patient may develop difficulty of speech and other neurological deficits like ocular palsies, hemiplegia, quadriplegia and extrapyramidal signs in the form of dystonia, choreoathetosis and coarse tremors. All the cases of Acute CNS involvement are reported in the syndrome of acute encephalitis i.e. all cases of Acute Encephalitis Syndrome (AES) should be reported as they have similar clinical manifestations. Their case management usually follows a common protocol along with situation specific treatment. Diagnosis of JE will depend on laboratory investigations. The case definitions and case classification in the programme are given in the following paragraphs.
Treatment at the health facility, it is important to exclude other causes of CNS affliction like meningitis or cerebral malaria which require specific treatment. Treatment will depend on

the condition in which patient is received in the health facility. Since patients are likely to arrive with high grade fever and change in mental status or convulsions proceed with the assessment of patency of airway. The treatment at PHC/ CHC District level or at tertiary care hospitals remains the same. Depending upon the needs of care and availability of facilities available at the centre/ hospital the patients to be transferred to the nearest higher centre for further management. It should be ensured before transferring the case, all the available treatment is provided to the patient. Only needy patients where such facilities are not available, to be transported. The time consumed in transportation itself is a major cause of high mortality rate. In all endemic areas, all the facilities including training can be arranged beforehand except Ventilatory Support. All Centres should be equipped with ambu beg and oxygen in addition to other medicines and I/V cannula.

JE primarily involves the gray matter of many parts of the Central Nervous System. Differentiation of Encephalitis and Encephalopathy and making a probable etiological diagnosis of Japanese Encephalitis and Epidemic Brain Attack in rural areas, (where facilities are minimum but expectations are maximum), on clinical grounds is extremely important to manage the encephalitis case not only as an individual but also for the community since the management of JE and EBA call for immediate reporting to the Health Authorities for a wider coordinated intervention by many different departments to contain the epidemic. Epidemics of Viral Encephalitis demand a clinical diagnosis about the causative Virus for controlling the epidemic at the earliest and for asking for the specific test. Simple clinical observations help in assessing the depth of coma, planning emergency measures necessary to save the child, limit disability, prognosticate and to initiate epidemic control measures. This must be followed by neurological examination for any localizing signs and to plan for the urgent investigations for a final diagnosis. Exclusion of treatable conditions like Cerebral malaria, Epidemic Brain Attack, Meningoencephalitis, Herpes simplex virus encephalitis, Varicella / Zoster encephalitis, Metabolic causes of encephalopathy, Tuberculous Meningitis is extremely important since they require prompt additional specific treatment. The therapy for JE / Epidemic Brain Attack is primarily conservative and supportive since there is no specific treatment for both Japanese Encephalitis and Epidemic Brain Attack, and both have a high case fatality rate, if prompt medical and nursing care is not provided [2].

In India, AES outbreaks in north and eastern India have been linked to children eating unripe litchi fruit on empty stomachs. Unripe fruit contain the toxins hypoglycin A and methylenecyclopropylglycine (MCPG), which cause vomiting if ingested in large quantities. Hypoglycin A is a naturally occurring amino acid found in the unripened litchi that causes severe vomiting (Jamaican vomiting sickness), while MCPG is a poisonous compound found in litchi seeds that causes a sudden drop in blood sugar, vomiting, altered mental states leading to lethargy, unconsciousness, coma and death. These toxins cause sudden high fever and seizures serious enough to require hospitalisation in young, severely malnourished children [1].

Hence based on the literature findings about the Acute Encephalitis Syndrome the present study was planned to Evaluate the occurrence, clinical signs and outcome of the AES.

Methodology

The 25 patients suffered from the AES syndrome in the Department of the Paediatrics in Darbhanga Medical College and Hospital, Laheriasaria from Jan 2017 to Dec 2017 were selected from the present study.

The approval of the institutional ethic committee had been taken before the study. All the patients were informed about nature of study and consent taken verbally. The aim and the objective of the study are conveyed to all patients.

Following was the inclusion and exclusion criteria for the present study:

Inclusion Criteria

- Patients with clinical features of fever, seizures, altered sensorium

Exclusion Criteria

- Patients which turned out to be positive for Bacterial / TB meningoencephalitis, febrile seizures were excluded from study

All the patients were undergone CSF analysis, Fundus examination, Monteux test, Chest X - ray, CT Brain, MRI Brain, EEG, Virological studies.

Results & Discussion

The data from the 25 children's below 10 years were collected and presented as below. The children's showed the clinical features of fever, seizures, altered sensorium.

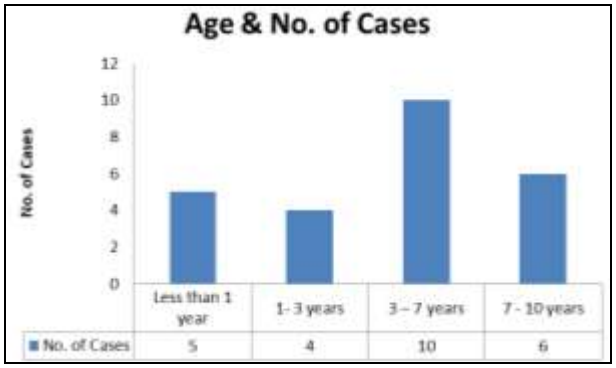

Fig 1: Age, Sex & Geography

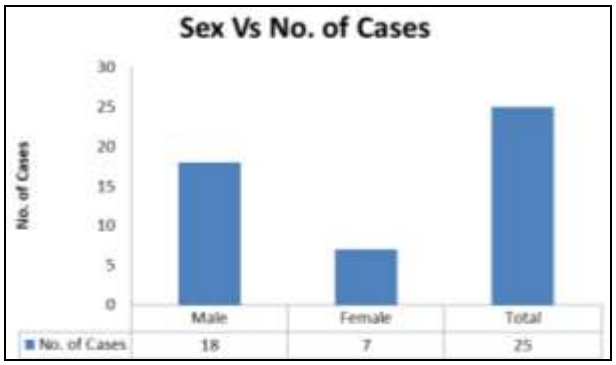

Fig 2

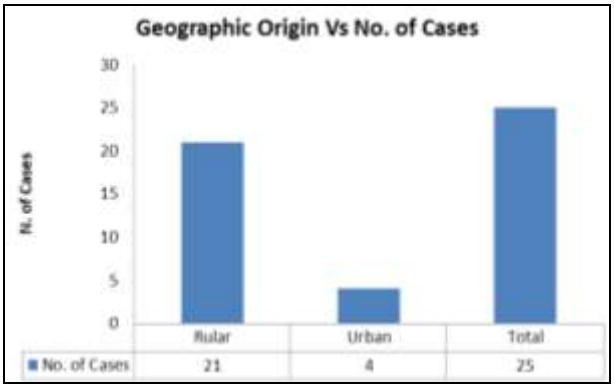

Fig 3

Table 2: Clinical signs

Clinical Sign	No. of Cases
Speech disturbance	10
Cranial nerve involvement	18
Motor deficit	35
Cerebellar signs	4
Involuntary movements	9
Meningeal signs	79
Papilledema	12

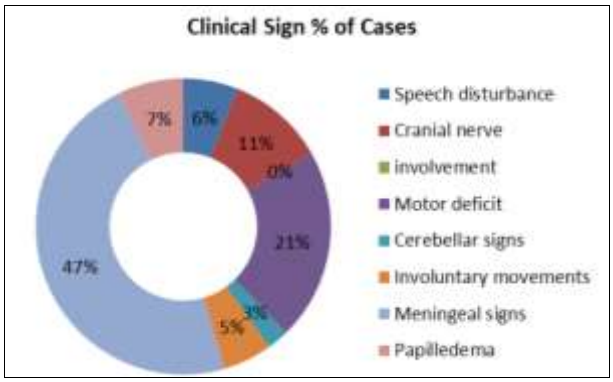

Fig 4

Table 3: Death occurrence

In Days	No. of Death
Within 1 week	3
Within 2 weeks	2
Within 3 weeks	1
Total	6

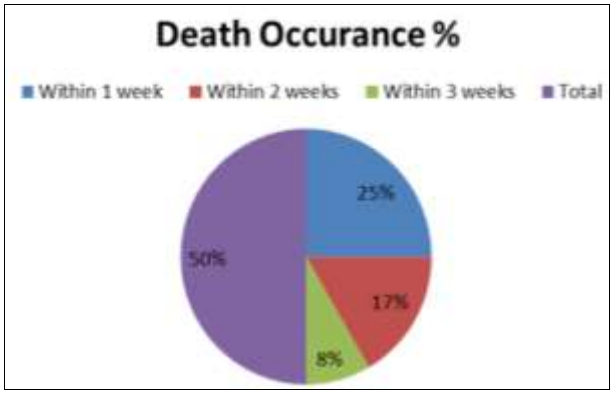

Fig 5

The purpose of AES surveillance is to estimate disease burden, to understand disease pattern, and its influence on mortality and morbidity. Surveillance helps in documenting the burden of the disease and also helps in proper utilization of scarce resources. The first and foremost requirement is establishing a proper "case definition", which can be applied in the field. The same has been provided here and also by the WHO [2]. Strengthening of surveillance is urgently needed throughout the country, more so in endemic states where frequent outbreaks are reported. Sentinel site hospitals should be identified for disease surveillance and case management, both in endemic and non-endemic areas.

The World Health Organization (WHO) recommends that Asian countries should strive for a nationwide surveillance to gather aggregate syndromic data through passive reporting from all health facilities, and conjoin this with sentinel case based surveillance in a selected number of health facilities which have laboratory capacity to confirm the etiological pathogens [4]. If the sentinel sites are carefully chosen to ensure representativeness of the general population and if they provide complete and reliable data, then the information on the proportion of syndromic cases that are laboratory confirmed for any particular pathogen can be extrapolated to aggregate data gathered from nationwide syndromic surveillance, and a national incidence estimate on pathogen-specific acute encephalitis can be approximated and monitored over time [5].

Although there were no studies that specifically addressed the incidence of AES, there were studies that mentioned the incidence of encephalitis in different settings. The AES cases had a seasonal distribution—beginning in the months of April and May and peaking in June. The cases started to decline from October. A similar pattern was seen in confirmed cases of JE. Most previous studies too reported epidemics between May and October, and mostly from the northern and eastern parts of India [6]. In UP, the reported JE cases between 1998 and 2007 were sporadic in June and peaked in September before declining. Seasonal peaks of cases of JE have occurred during July to October, coinciding with the rainy and post-rainy seasons. The onset of winter brings a decline in the cases of JE [7]. In Nepal, cases of AES and JE started a little earlier, in April–May, and reached a peak during late August to early September, and then declined [8]. Saxena *et al.* studied the trend of AES cases and suggested that JE was increasing in northern India, which may result in larger epidemics in the future [9]. In India, Karnataka has been reported to have two epidemics each year, a severe form from April to July and a milder one from September to December along with the rest of India [10]. In Tamil Nadu, of 561 AES cases reported during a study, JE was confirmed in 4.9% with an increasing trend from 4.1% in 2007 to 5.3% in 2009 [11]. The minimum reported incidence in a tropical setting for all ages was 6.34 per 100 000 population [12]. Districts of Patna, Nalanda, Jehenabad, Nawada, Gaya, Aurangabad, Vaishali, Muzaffarpur, Sheohar and East Champaran had the maximum number of cases of AES cases with an annual incidence ranging from 4.7 to 24.8 per 100 000 population. Dinesh *et al.* [13] and Mishra *et al.* [14] have also reported a similar distribution of cases.

In recent years, a diagnosis of 'acute encephalitis syndrome' (AES) has crept into medical literature in India, with a definition at variance from that of acute encephalitis in paediatric textbooks. For example, AES was defined in one study as 'clinical neurologic manifestations caused by wide range of viruses, bacteria, fungus, parasites, spirochetes, chemicals and toxins' [3]. Obviously, the clinical pictures of such various diseases cannot fit into one clinical diagnosis of acute encephalitis, either as a disease or as a syndrome.

Conclusion

The present study concludes that the reporting and surveillance mechanism needs to be strengthened in all the districts of the state. Private practitioners who participate less in surveillance activities need to be encouraged to do so especially for cases of AES. Reporting and appropriate workup of all cases would strengthen the AES surveillance and go a long way in reducing the morbidity and mortality due to this disorder. Better personal hygiene and nutrition along with proper immunization will decrease the incidence of bacterial meningitis. In order to prevent JE in children, continued vaccination will have to be undertaken.

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