Clinical Presentation and Hospital Outcome of Acute Meningoencephalitis Syndrome in Children

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Acute meningitis and acute encephalitis constitute significant public health problems worldwide. It is not an uncommon illness in paediatric age group. Though the incidence is low comparative to other common illness but it is an important health issue due to its high mortality and morbidity. This study aimed to find out the clinical presentation and hospital outcome of acute meningoencephalitis syndrome (AMES) cases. This prospective observational study was conducted at Rangpur Medical College Hospital, Rangpur, from November 2013 to April 2014 for duration of six months. This study included 37 patients. AMES was more common in older children than young age group. 23 (62%) cases were diagnosed as meningitis and 14 (38%) encephalitis. Among the 23 meningitis cases, 06 (26%) patients had no convulsion and 17 (74%) had convulsion. On the other hand out of 14 encephalitis patients 10 (71%) developed convulsion and 04 (29%) had no convulsion. Total 09 (24%) patients were expired. In meningitis patients, only 03 (13 %) died out of 23 and 06 (43%) patients out of 14 encephalitis group. Total 07 (19%) patients developed sequelae out of 37. This study concluded that magnitude of AMES cases in this tertiary care hospital was 1.21%. The death rate was three times higher in encephalitis patients. Death was also high in patients who were comatose at the time of admission.

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Introduction

Acute meningitis and acute encephalitis constitute significant public health problems worldwide.[1] Although bacteria are predominantly responsible for meningitis, viruses can cause both meningitis and encephalitis with equal frequency.[2] It is often difficult to reliably differentiate meningitis and encephalitis clinically.[3] Therefore, the term acute meningoencephalitis (AME) is used to denote both conditions.[4] Acute meningoencephalitis syndrome (AMES) is defined as an acute febrile illness with at least one of the following: altered mental status, new-onset seizures, or signs of meningeal irritation in a person of any age at any time of year.[5] It is not an uncommon illness in paediatric age group. Though the incidence is low comperative to other common illness (e.g. Acute watery diarrhoea, Pneumonia) but it is an important health issue due to its high mortality and morbidity. Most children completely recover from viral illness of central nervous system (CNS). Although, the prognosis depends on the severity of clinical illness, the specific cause and the age of the child. Motor incoordination, convulsive disorder, total or partial

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deafness, visual disturbance and behavioral problem may follow viral CNS infection.[6] This study will mainly focus on identifying clinical features and hospital outcome of AMES in children in a Medical College Hospital setting with an idea to put the result of the study for further research. This study will try to find out the relationship between different clinical features with immediate outcome during discharge.

Methods

It was a cross sectional study. This study was conducted from November 2013 to April 2014 for duration of 6 months in the department of Paediatrics in Rangpur Medical College Hospital, Rangpur.

After admission in the ward if AMES cases fulfilled the inclusion criteria and if there is no exclusion criteria, the cases were enrolled in the study. A preformed questionnaire was filled up for every case.

After doing thorough physical examination, relevant important investigations were done whenever required. Diagnosis of bacterial and viral meningitis was confirmed on basis of CSF analysis. Important treatment modalities were noted (all treatment were given by specialist Paediatrician). Finally the outcome was noted in respect to survival or death. At the time of discharge patient was examined to detect sequelae (auditory, visual, cognitive and motor function). Data was analyzed by computer with the help of SPSS software (Statistical package for social science) Version16.0. Statistical analyses were performed by unpaired students 't' test. P value <0.05 was considered as significant.

Results

During the study period a total 3047 patients were admitted, 37 cases were AMES and magnitude was 1.21% (Table I), majority patient's (54%) age was above 5 years and mean was 63 months (Table II), male 21 (57%) outnumbered female 16 (43%) (Table III), all 37 (100%) patient had fever, majority were altered consciousness (86%) and 73% had convulsion, (Table IV). Out of 21 male 06 (29%) were comatose and among the 16 female 03 (19%) were comatose (table-V). In 21 male cases 14(67%) were meningitis and 07(33%) were en cephalitis. In 16 female cases 09(56%) were meningitis and 7(44%) were encephalitis (Table VI). Only 3 (13%) patients were died in meningitis and 6 (43%) from encephalitis, death rate was three times higher in encephalitis patients (p value= 0.04, Table VII). Comatose 66.67% and lethargic 20% patients were died. There was no death among the patients who were confused and who had normal state of consciousness on admission (p = 0.004, Table VIII). Total 7 (19%) patients, 3 from meningitis and 4 from encephalitis developed sequelae. Motor disability was the most common (Table IX).

Table I: Magnitude of AMES cases in general Paediatric ward

Total Patients admitted	AMES Cases	Magnitude of AMES cases
3047	37	1.21

Table II: Age distribution of the AMES cases (n = 37)

Age in months	Number (%)
1-12	8(22)
13-60	9(24)
61-144	20(54)

Table III: Sex distribution of the AMES cases (n = 37)

Sex	Number (%)
Male	21(57)
Female	16(43)
Total	37

Table IV: Clinical features of cases on admission (n = 37)

Clinical features	Number (%)
Fever	37(100%)
Headache	12 (32%)
Vomiting	17 (46%)
Neck stiffness	07 (19%)
Convulsion	27 (73%)
Coma/altered consciousness	32 (86%)

Table V: Level of consciousness in relation to gender (n = 37)

Sex	Normal (%)	Confused (%)	Lethergic (%)	Coma (%)	Total (%)
Female	3(19)	3(19)	7(43)	3(19)	16(100)
Male	2(10)	5(24)	8(38)	6(29)	21(100)
Total	5(12)	8(22)	15(40)	9(24)	37(100)

Table VI: Diagnosis of cases and gender distribution (n = 37)

Sex	Meningitis Number (%)	Encephalitis Number (%)	Total
Male	14(67)	7(33)	21
Female	9(56)	7(44)	16
Toatal	23(62)	14 (38)	37

Table VII: Outcome of cases in relation to diagnosis (n = 37)

Diagnosis	Cure Number (%)	Death Number (%)	Total
Menisngitis	20(87)	3(13)	23
Encephalitis	8(57)	6(43)	14
Toatal	28(76)	9(24)	37

Table VIII: Outcome of patients in relation to consciousness (n = 37)

Conciousness	Cure Number (%)	Death Number (%)	Total
Normal	5(100)	0	5
Confused	8(100)	0	8
Lethergic	12(80)	3(20)	15
Coma	3(33.33)	6(66.6)	9
Total	28(76.68)	9(24.32)	37

Table IX: Disability of cases in relation to diagnosis (n = 37)

Disability	Meningitis Number (%)	Encephalitis Number (%)	Total
Normal	17(85)	4(50)	21 (75)
Auditory	0	0	0
Visual	0	0	0
Cognitive	0	1(12.5)	1(3.57)
Motor	3(15)	3(37.5)	6(21.43)
Total	20	8	28

Discussion

Magnitude of AMES cases in this tertiary care hospital was 1.21. The age distribution of study population showed that AMES was more common in older children than younger age group. Majority of the patients (54%) age range was above 5 years. The mean age of the study group was 63 months. In a hospital based prospective study of 136 children with meningitis, aged 3 month to 12 years, accounts for 79 (58%) of cases.[10] In another study of 54 children with acute bacterial meningitis 78% were below one year and 52% were under the age of six months.[11] In a preponderance of the Nipah virus encephalitis patients 2008 in Bangladesh, majority were young boys.[16] In this study older children were more affected, this may be due to that the sign-symptoms of meningo-encephalitis may be overlap with that of septicemia. There was another possibility that, in low

socioeconomic group most of the younger children are malnourished, so they were severely affected due to immune compromised status and they died before hospitalization.

Symptoms and signs of bacterial meningitis are often non specific. The symptoms may include high temperature, poor feeding, vomiting, lethargy, irritability, convulsion etc.[3] Out of 37 patients 27 (73%) developed convulsion and 10 (27%) had no convulsion and convulsion was very common among the cases of meningoencephalitis.

Male patients had more coma than female. Out of 21 male 06(29%) were comatose and out of 16 female 03 (19%) were comatose. Out of 23 meningitis patients 17(74%) had convulsion and 06 (26%) had no convulsion.

Among the all 37 cases of acute meningoencephalitis syndrome (AMES) 23 (62%) cases were diagnosed as meningitis and 14 (38%) cases were found encephalitis. Meningitis were more common than encephalitis. This study revealed that AMES were more common in male and among the male patients meningitis (67%) was twice common as encephalitis (33.3%). On the other hand female patients had about equal number of meningitis and encephalitis .The cause might be that as the symptoms and signs of meningitis are less severe than encephalitis and less care is given to female children, so there might be the possibilities that girls with meningitis were not brought to the hospital and died at home.

Among the all 37 cases Gram stain of CSF revealed two positive cases for streptococcus Pneumoniae and 35 cases were Gram stain negative. As most patients were admitted after receiving antibiotics from primary healthcare centers there might be CSF sterilization. CSF sterilization following antibiotic use occurs rapidly. Sterilization of meningococci may occur within two hours, whereas for pneumococci four hours of antibiotic therapy.[12]

Total 09 (24%) patients expired out of 37. Five (24%) male patients died out of 21 and 04 (25%) female patient died out of 16. The death rate was three times higher in encephalitis patients. In a study of acute bacterial meningitis in early childhood mortality rate was 31%.[22] In another study mortality rate in untreated Herpes simplex encephalitis was around 70%,[7] 40% to 76% in Nipah Virus Encephalitis.[8]

Total 7 patients developed sequelae out of 37 AMES cases that is 19% patients. Motor disability was the most common (21%). In a study 9% of meningitis patients had major deficits (IQ <70, seizure, hydrocephalus, spasticity, blindness, or hearing loss).[13] In another study of acute bacterial meningitis after a long term follow up (1 to 3 years) 45% had no sequelae and the remaining had significant neurodevelopmental handicaps ranging from isolated hearing loss to severe mental retardation with multiple disabilities.[11] Long term follow up of meningo-encephalitis is needed to detect sequelae. So, further study is required.

Conclusion

It can be concluded from this study that Magnitude of AMES cases in this tertiary care hospital was 1.21%. The death rate was three times higher in encephalitis patients than meningitis. Death was also high in patients who were comatose at the time of admission.

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