Acute Encephalitis in Children at Port Moresby General Hospital:

The role of Japanese encephalitis virus and assessing the quality of care

DR K KIROMAT
MMED 2017
INTRODUCTION

• Japanese encephalitis (JE) is a mosquito-borne viral disease that is endemic in Asia, Western Pacific countries (including PNG) and Northern Australia.

• The largest burden of the disease is in children, but it can affect all age groups

• Globally, ~67,900 cases reported annually

• First reported case in PNG in 1989,

• First serological confirmed JE case in 2004 in Port Moresby
JEV is transmitted from the bite of an infected mosquito from the Culex species, *Culex tritaeniorhynchus*.
INTRODUCTION

• Japanese Encephalitis Virus (JEV) causes a viraemia and if not cleared out by the immune system then cause a neurological infection.

• Most of the human infection are asymptomatic or result in only mild symptoms.

• Small percentage can cause severe infections

• Fatality rate of 20-30% and 30-50% of survivors have neurological sequelae
INTRODUCTION

• Encephalitis is the most commonly recognized presentation of JE

• Clinically indistinguishable from other causes of an acute encephalitis syndrome (AES)

  • Viruses – Dengue, Yellow, Herpes Simplex, CMV, EBV, arboviruses
  • Bacterial meningitis
  • Tuberculous meningitis
INTRODUCTION

• Management
  • No specific anti-viral treatment for JEV
  • Preventive measures mainstay treatment (Personal Protection, vector control)
  • Vaccination (WHO Recommended)
  • Supportive hospital care of severe infections

• In 2011, WHO and National Department of Health decided to do surveillance for JE in PNG across 5 provincial hospitals including PMGH
AIM

• To define the disease burden in children from Japanese Encephalitis at the Port Moresby General Hospital and provide data to enable planning for disease control measures.

• To determine the quality of care of children with Acute Encephalitis Syndrome at the Port Moresby General Hospital
METHOD

• Hospital based surveillance study conducted at the Port Moresby General Hospital.

• The project was part of a multicentre Hospital Surveillance which involved the four other Hospitals (Daru, Vanimo, Alotau, and Goroka).

• The study took place from January 2013 to December 2015

• Consent was obtained from the parents

• Ethical Clearance from Research Committee SMHS, PMGH
METHOD – Selection Criteria

• Children 1 month to 12 years old who met the case definition of acute encephalitis syndrome

• Case Definition: acute onset of fever and either:
  
  ✓ a change in mental state or
  ✓ new onset of seizures were recruited into the study
METHOD – Exclusion Criteria

- Children outside of the age groups
- Simple febrile seizure
Methods: Case Management

• Standard case management: Paediatric Standard Treatment Book for PNG

• AES patients were initially treated for bacterial meningitis

• Patients also received treatment as per guidelines or when appropriate
  • anti-malarial treatment,
  • Anticonvulsants
  • antipyretics
  • Tuberculosis: historical, clinical or laboratory evidence of tuberculosis
Outcome Measures

• The **primary outcome** was to determine the disease burden of JE in children with AES at the Port Moresby General Hospital.

• The **secondary outcome**
  • Identify other causes of Acute Encephalitis Syndrome
  • Assess quality of care provided to these children with AES.

• The data was analysed using Excel 2013
METHOD

Recruitment

Demographic Data
Baseline bloods – FBE, UEC, BC, RDT Malaria/BS
Blood and or CSF for JE IgM testing

Admission

Quality of Care assessment

Follow Up

Day 7 F/ UP
Serum JE IgM
Outcome
Neurological Sequalae

Neurological Sequelae
METHOD

Serum or CSF for JE

JE – IgM-capture ELISA test

JEV positive

JEV negative
METHODS – Assessment Quality of Care

Quality of Care Assessment

- WEIGHT
- HR, RR, T, BP
- NUTRITION
- POSITION CHANGE
- HEAD ELEVATION TO REDUCE ICP & ASPIRATION
- AIRWAY SUPPORT
- BLOOD GLUCOSE
- NEURO ASSESSMENT
- URINARY CATHETER
- 02 SUPPORT

- METHODS – Assessment Quality of Care
RESULTS

97 CASES ENROLLED

JE CONFIRMED
5

AES OTHER CAUSE
51

AES UNKNOWN
41

5 DENGUE
6 MALARIA
5 STREP PNA
1 Hib MENINGITIS
14 MENINGITIS - NO CAUSE IDENTIFIED
19 TBM
RESULTS – Baseline Characteristics

• Age at presentation mean 38.9 months.
• Length of admission = 30 days
• Male: Female 55:42.
• Residence:
  • 74% resided in National Capital District
  • 24% from villages in Central Province
  • 2% patients came from villages outside of Central Province.
• Time from onset of illness to presentation PMGH: Mean 8 days
RESULTS – Quality of Care
<table>
<thead>
<tr>
<th>QUALITY OF CARE VARIABLE (n = 70)</th>
<th>NUMBER (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen saturation recorded and oxygen applied as appropriate</td>
<td>60 (85)</td>
</tr>
<tr>
<td>Weight monitored</td>
<td>56 (80)</td>
</tr>
<tr>
<td>Enteral nutrition provided</td>
<td>56 (80)</td>
</tr>
<tr>
<td>Glasgow Coma Scale assessed and recorded</td>
<td>43 (61)</td>
</tr>
<tr>
<td>Basic observations recorded</td>
<td>41 (58)</td>
</tr>
<tr>
<td>Head elevation within 15-30°C</td>
<td>25 (36)</td>
</tr>
<tr>
<td>Pupillary assessment recorded</td>
<td>24 (34)</td>
</tr>
<tr>
<td>anticonvulsants given as appropriate</td>
<td>22 (31)</td>
</tr>
<tr>
<td>Blood glucose measured and recorded and hypoglycaemia prevented</td>
<td>13 (18)</td>
</tr>
<tr>
<td>Physiotherapy provided as appropriate</td>
<td>10 (14)</td>
</tr>
<tr>
<td>Blood pressure measured and recoded and kept within the normal range for age</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>
RESULTS - Outcome

• 5 cases of JE
  • Initially admitted as Malaria, Clinical Typhoid, Clinical Malaria and Bacterial Meningitis (2)
  • All recovered on treatment and discharged
  • Median length of hospital stay was 8days

• Overall, 13 patients developed neurological sequelae.
  • 5 had hydrocephalus from head CT scan.
  • Neurological complications that developed included 7 spastic quadriplegia, 2 spastic hemiparesis and 4 hypotonic
RESULTS - Outcome

- There were a total of 13 deaths (13%)
  - AES unknown 5
  - Streptococcal pneumoniae meningitis
  - Dengue
  - Meningitis – no cause identified 2
  - Malaria 2
  - Probable tuberculous meningitis 2
DISCUSSION

• This study shows that Japanese Encephalitis caused 5/97 children with AES

• 43% patients had identifiable cause of their AES and 57% patients had no identifiable cause.

• 26 patients (27%) had an adverse outcome compared to 71 (73%) patients who recovered well

• These findings are comparable to the study by G. Anga et al in 2010 on aetiology, clinical presentation and outcome of febrile encephalopathy in children in PNG
DISCUSSION

• The quality of care provided to these patients was variable, not all the patients received the same standard of care.

• Weight, oxygen sats, nutrition, were done relatively well, the most basic observations and GCS were done in 50% patients

• Parameters not done well were measuring blood glucose, BP, head elevation, assessment of pupils and providing adequate anticonvulsants and physiotherapy as required
CONCLUSION

• Japanese Encephalitis is a cause of Acute Encephalitis Syndrome in Children at PMGH

• Other more common identifiable causes of AES include Meningitis, TB Meningitis

• Many children with acute encephalitis have no identifiable cause given the limited laboratory services available at the hospital

• The quality of care provided to these patients was inconsistent – some better than others
RECOMMENDATIONS

• Management protocol for patients with Acute Encephalitis Syndrome

• Standardised investigations
  Malaria, Dengue, BC, Gene Xpert for TB
  CSF for Binax, JE, TB,

• Standardised care of AES patients
  Basic observations
  Neurological Assessment and care
  Adequate Management of complications and sequelae

• Medical Staff Education on care of critically ill patients
  Identifying the red flags and responding accordingly
ACKNOWLEDGEMENTS

• The almighty father, Our Lord and Saviour
• My family for their encouragement and support
• Dr Gwenda Anga
• Professor Trevor Duke
• CPHL PMGH Hospital staff
• PMGH – COPD staff and service registrars
• PMGH training paediatric registrars
• PMGH for allowing me to conduct this study
REFERENCES

1. WHO recommended standards for the surveillance of selected vaccine preventable disease WHO_V&B_03.01
4. Japanese encephalitis Reported cases by WHO Region: Global Health Data Repository
9. www.cdc.gov/japaneseenchelphalitis/
11. Immunogenicity of a Live Attenuated Chimeric Japanese Encephalitis Vaccine as a Booster Dose After PrimaryVaccination With Live Attenuated SA14-14-2 Vaccine A Phase IV Study in Thai Children. Sirintip Sricharoenchai, MD,* Keswadee Lapphra