Acute Encephalitis in Children at Port Moresby General Hospital:

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

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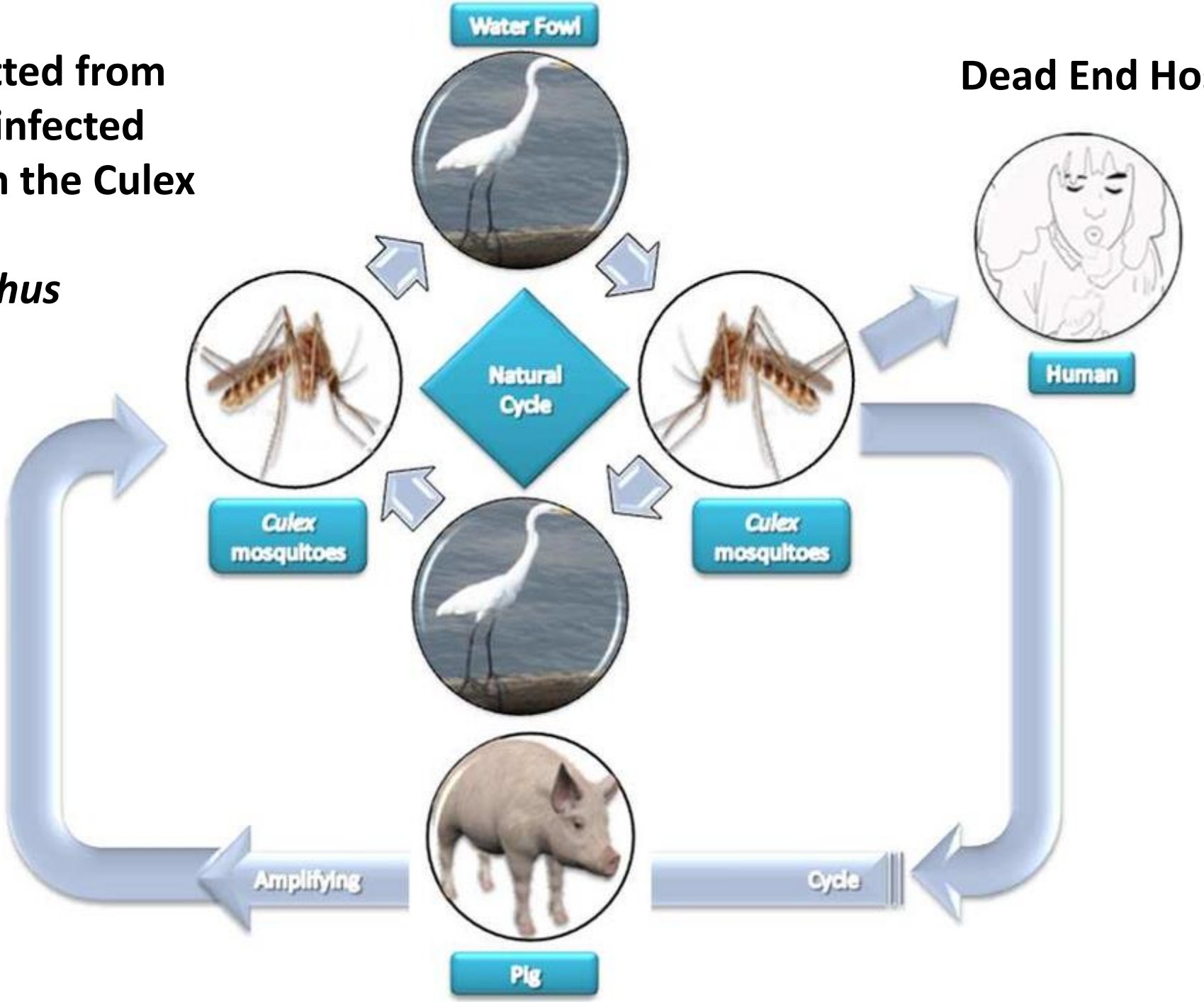
INTRODUCTION

- 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*

Dead End Host



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

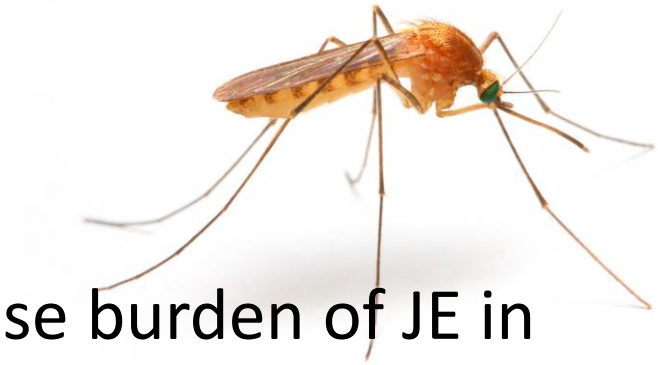
METHOD – Exclusion Criteria

- 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

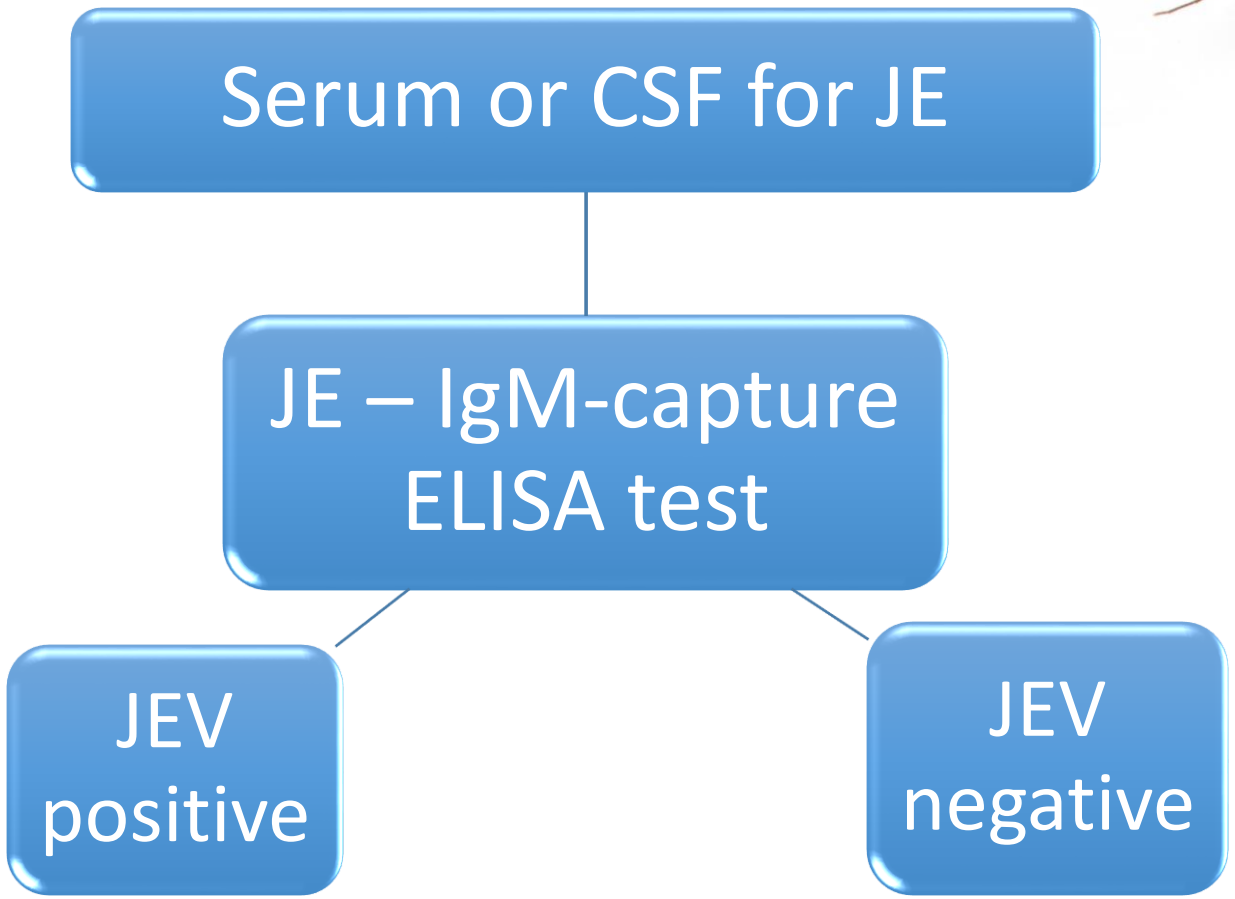
Day 7 F/ UP

Serum JE IgM

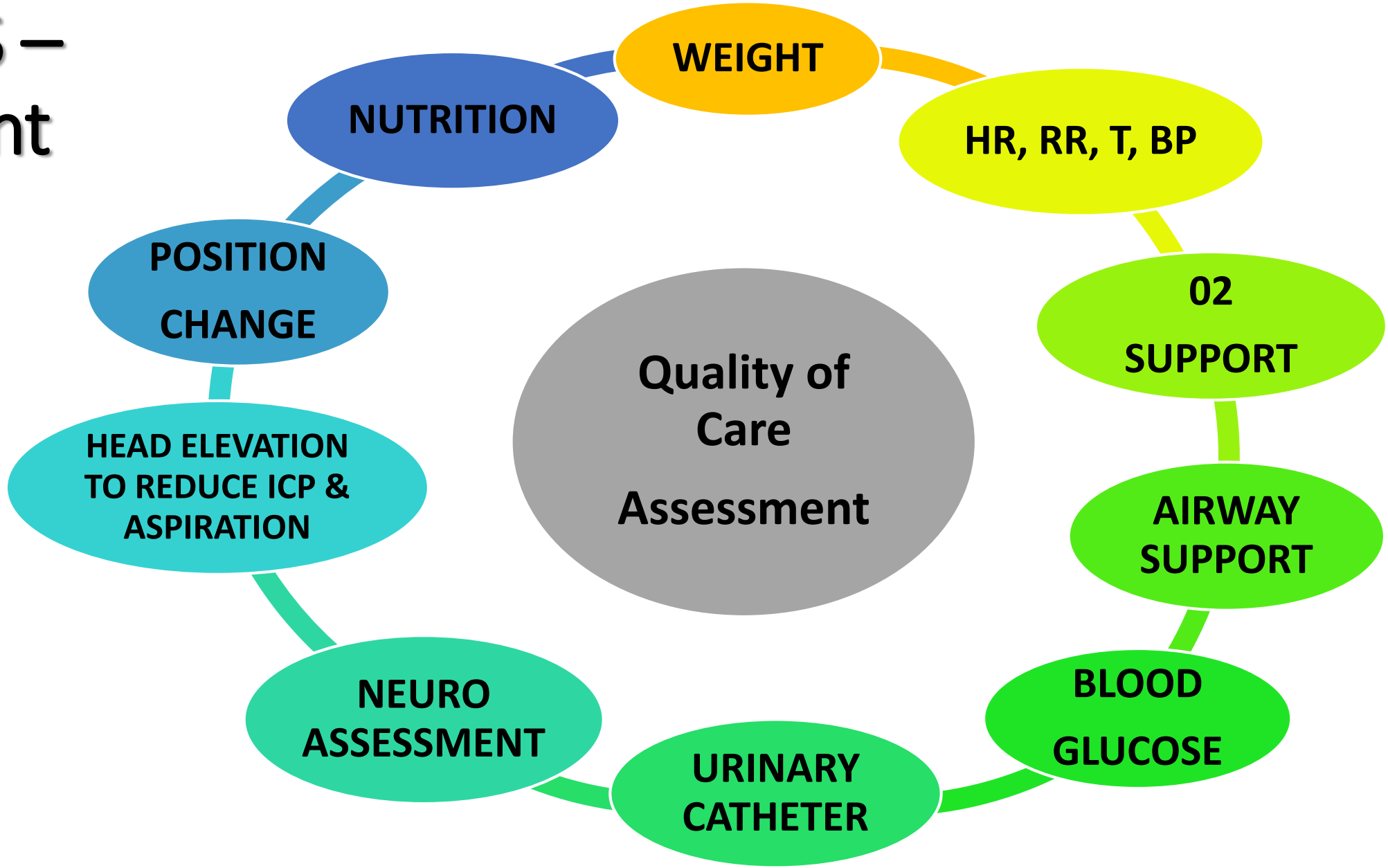
Outcome

Neurological Sequalae

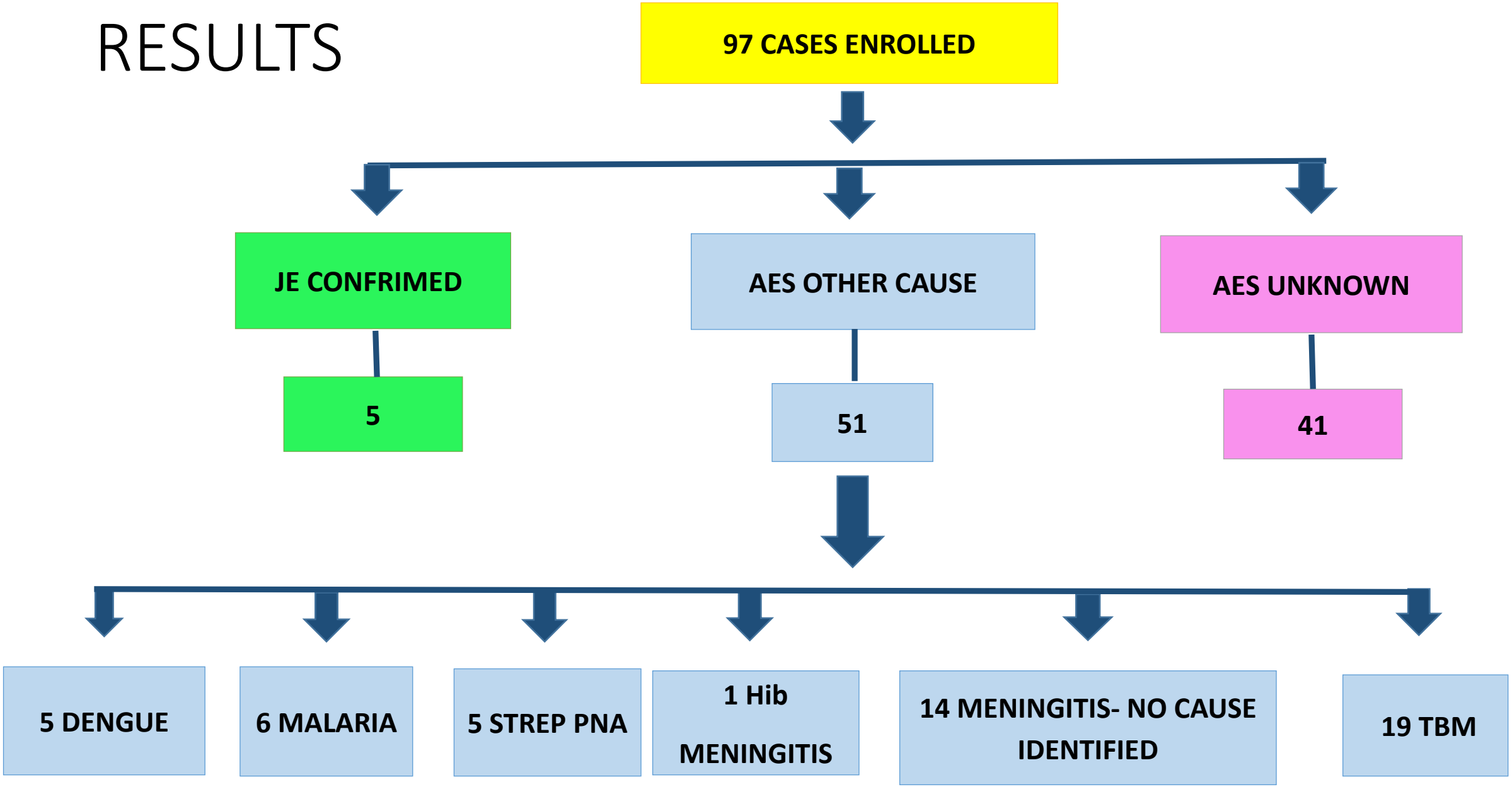
METHOD


Serum or CSF for JE
JE – IgM-capture ELISA test
JEV positive
JEV negative

METHODS – Assessment Quality of Care



RESULTS


97 CASES ENROLLED
JE CONFRIMED
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

QUALITY OF CARE VARIABLE (n = 70)	NUMBER (%)
Oxygen saturation recorded and oxygen applied as appropriate	**60 (85)**
Weight monitored	**56 (80)**
Enteral nutrition provided	**56 (80)**
Glascow Coma Scale assessed and recorded	**43 (61)**
Basic observations recorded	**41 (58)**
Head elevation within 15-30˚C	**25 (36)**
Pupillary assessment recorded	**24 (34)**
anticonvulsants given as appropriate	**22 (31)**
Blood glucose measured and recorded and hypoglycaemia prevented	**13 (18)**
Physiotherapy provided as appropriate	**10 (14)**
Blood pressure measured and recoded and kept within the normal range for age	**1 (1)**

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 then 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 obervations
  - Neurological Assessment and care
  - Adequate Management of complications and sequalae

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

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REFERENCES

1. *WHO recommended standards for the surveillance of selected vaccine preventable disease* WHO_V&B_03.01
2. *Bulletin of the World Health Organization* 2011; 89:766-774E. doi: 10.2471/BLT.10.085233
3. *Epidemiology of Japanese encephalitis: past, present, and future prospects.* H Wang, G Liang et al. Therapeutics and Clinical Risk Management. pp 435-448.19 March 2015.
4. *Japanese encephalitis Reported cases by WHO Region: Global Health Data Repository*
5. *The aetiology, clinical presentations and outcome of febrile encephalopathy in children in Papua New Guinea.* G. Anga, R. Barnabas et al. Annals of Tropical Paediatrics 2010 30, 109-118.
6. Japanese Encephalitis: Practice Essentials, Aetiology, Pathophysiology. http://emedicine.medscape.com/article/233802- overview
7. Tsai TF. *New initiatives for the control of Japanese Encephalitis by vaccination: minutes of a WHO/CVI meeting, Bangkok, Thailand, 13-15 October 1998. Vaccine. 2000 May 26*; 18 Suppl 2:1-25.
8. *Clinical Sequalae after Japanese Encephalitis. A one year follow-up study in Thailand.* Schneider RJ, Firestone MH, Edelman R, Chieowanich P, Pornpibul R. The Southeast Asian Journal of Tropical Medicine and Public Health.1974; 5(4):560-8.
9. www.cdc.gov/japaneseenchelphalitis/
10. *IgM antibody capture ELISA in the diagnosis of encephalitis, West Nile and dengue virus infections*. Gadkari DA, Shaikh BH. The Indian journal of Medical Research. 1984; 80:613-9.
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