LASSA VIRUS HAEMORRAGIC FEVER IN BENIN
Diagnostic- bioSecurity-perspectives

Dr Yadouléton Anges, PhD
Dr Accrombessi Manfred, MD, PhD
Dr Attinsounon Angelo, MD, PhD
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- 83 samples were received from different parts of Benin in 2016 and sent in the 4 external laboratories (Lagos, IRRUA, Hamburg, Lyon)
- 16 confirmed cases of Lassa fever.
Outbreak of Lassa in Benin
2014; 2016; 2017; 2018

9 deaths
15 suspected cases

28 deaths
84 suspected cases

2 deaths
8 suspected cases

8 deaths,
7 suspected cases
Situation very sad..., ...

Response of the International community
Implementation of laboratory of haemorragic fever in Benin
German-Benin collaboration (BNITM-MoH)
350 blood samples were brought from Benin to BNITM for Lassa diagnostic.

150 from the suspected area Tanguïta

80 from the outbreak area Tchaorou

120 Blood bank service
All samples were negative on Lassa fever from the suspected area.

Some were positive on dengue fever, Dengue II.

<table>
<thead>
<tr>
<th>Collection areas</th>
<th>GPC_PCM</th>
<th>Panarena_PCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbreak area (80)</td>
<td>Neg</td>
<td>Neg</td>
</tr>
<tr>
<td>Suspected areas (150)</td>
<td>Neg</td>
<td>Neg</td>
</tr>
</tbody>
</table>
Surveillance of haemorrhagic fever in Benin (1)

- SMIR (Integreated Disease Surveillance and Response)
  - Diseases with epidemic potential or early warning system
  - Lassa fever disease ++

**National level**
- Head of health sub-district center
- Community health workers & CV (in **each village** of sub-district)
- Reporting of common diseases with epidemic potential
- Notification of any non malaria fever case non repond to ATB

**Departmental level**
- Head of district center
- Summarize of data from **district centers**

**Regional level**
- Head of regional centers
- Summarize of data from **regional centers**

**District level**
- Departmental director of health
- Summarize of data from **department**

**Sub-district level**
- MoH (Epidemiology and health department)
- Summarize of data from **department**
Surveillance of haemorrhagic fever in Benin (3)

- SMIR (Global view)
Surveillance of haemorrhagic fever in Benin (2)

- SMIR (Periodicity of reporting)
  - Non-outbreak period (Per month)
  - Outbreak period (Per day)

- SMIR/Communication canal
  - Telephone (whatsapp)
  - Paper report +++
  - Internet (only at departmental level to MoH)

- Based-hospital surveillance (monthly collection from hospital)
  - Persistent fever > 38°C non respond to malaria drug and antibiotic
  - Sample addressed to the MoH laboratory
  - Diagnostic: Lassa (GPC-S Gene RT-PCR); Lassa-L; Altona Diagnostic kit-Lassa; Nikkison
Surveillance of haemorrhagic fever in Benin (4)

– SMIR strength
  • Peripheral level:
    – Good involving of community health workers (CHW)
    – Good participation of local authorities and leaders
  • Central level
    – Quick alert during the outbreaks
    – Rapidity of funding mobilization

– SMIR Weakness
  • Delay of report transmission (> 3-4 month of delay)
  • Delay of sample transmission to the central laboratory-Cotonou
  • High fee of communication (SMS, internet)
  • Lake of health staff and CHW training (< 1 training/year)
  • Lake of sensitization out of outbreak periods
  • No compensation of community health workers
Implementation of laboratory of Haemorrhagic Fever in Benin (Lazare site)

Room receiving-samples

Inactivation-room

Room-extraction de l’ARN, Master Mix

Salle de revelation
Laboratory-Diagnostic-qPCR
## Diagnostic of Lassa Fever

<table>
<thead>
<tr>
<th>Protocole</th>
<th>1KB_PCR</th>
<th>S-gene</th>
<th>Panarena_PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lassa virus : RT- PCR.</td>
<td></td>
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</tbody>
</table>

Same protocole with BNITM from German: comparaison of results
Ongoing research: cartography of mastomys rodents

- **Main Hypothesis**
  - The Lassa fever virus reservoirs are native or imported?
  - If native in Benin, where?
  - No data currently available

- **High probability of future outbreaks in Benin**
  - Poor surveillance system
  - High migration flow between Benin and Nigeria
  - Low reactivity of health system
  - Need to be ready for the next outbreak
  - Develop and assess preventive strategy
Mastomys -- Distribution

Mastomys ➔ Ecology, Distribution and habitatation of rodents

- Field, Home
- All locality from Benin

Natural predators ➔
- *Python regius*
- *Bitis arietans*
- Other locations

Frequently used as traditional medication
Research reservoirs
P3 Laboratory on the field
Results

- Some positive cases results of Lassa fever found among the sample from people and rodents in Benin.
  - Need of further investigations in the all country
- The sequency results found that Benin has its own viral strain different to Nigeria
- Benin has his own viral reservoir?
- Result is currently ongoing (Yadouleton et al., 2018)
CTE of CHUD BA

- Under construction: a small arranged space
- Sanitation, water
- 1 Ambulance + 1 Pick-up
- Team: 2 MD, 2 Nurses, 2 midwives, 3 hygienists, 2 biotechnologists, 2 drivers
- Average 2 confirmed / 10 suspected cases per outbreak
MANY THANKS FOR YOUR ATTENTION