Case Study - History

• You are a pediatrician working in the Emergency Department (ED) of a hospital in Mombasa.

• A fourteen year-old Tanzanian boy is brought to the ED. He is having intermittent generalized tonic-clonic seizures.

• He is on vacation with his family on Funzi Island.
Case Study - History

• What else do you want to know?
Case Study - History

• History – 24 hour history of progressive neurologic symptoms including weakness, altered sensorium, and now, seizures

• Is there a family history of seizures? No

• Is there a history of a fever? No

• Vital signs: Temp – 37 C, Pulse – 120, Resp rate – 18, Blood Pressure – 100/80

• Physical exam – fine rash on his torso, no focal neurological findings
Case Study – Possible Causes?
Case Study – Potential Causes

- Central nervous system disorders
- CNS infections – encephalitis or meningitis (malaria, typhoid (rarely))
  - No fever, so this is inconsistent with the symptoms.
- Brain tumor
  - No focal findings, inconsistent with the symptoms.
- Head trauma
  - Not known; possibly consistent with symptoms, although might have focal seizures.
- Idiopathic epilepsy
  - Consistent with symptoms.
- Toxic exposures
- Drugs of abuse – cocaine; alcohol
  - Consistent with symptoms – labs are pending.
- Ciguatera fish poisoning
  - Unknown; are others ill with similar symptoms after eating fish?
- Organophosphates
  - Consistent with symptoms
- Lead
- Metabolic disorders
- Hypoglycemia
  - Not known – labs are pending
- Electrolyte abnormalities
  - Not known; labs are pending
Case Study - History

• Patient required intubation and mechanical ventilation.
• Treated with benzodiazepines, phenobarbital, propofol, and rocuronium.
• Underwent two runs of hemodialysis.
Case Study - History

• Anything you want to know about his environment?
• Exposure history has three components
  • Exposure Survey
  • Work History
  • Environmental History
• What questions will you ask the patient (or what will you ask his parents?)
Exposures?
- No known exposures
- **Family of four**: parents and two teenage boys stayed in a banda on Funzi Island two days prior to arrival in the Emergency Dept.
- **Anyone else ill?** Yes, 16 year-old brother now in the Emergency Dept with altered sensorium; parents are also experiencing weakness.
- **Other three family members’ symptoms progressed**; they also were treated with benzodiazepines, phenobarbital, and propofol.
- **The other boy was treated with the neuromuscular blocking agent, rocuronium. The two adults received pralidoxime.**
- The boy and father also required intubation and mechanical ventilation.
- Is there an exposure that is not recognized?
- Exposed to infectious agents? – malaria?

Work History
- Patient is 8th grader.
- No employment

Environmental History
- Are symptoms related to stay in the banda?
- Recent renovations to the banda?
- Cleaning supplies used?
- Heating / Ventilating / Air Conditioning system?
- Pesticide exposure?
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Further Background
• The banda was fumigated with methyl bromide two days prior to the boys’ presentation at the hospital.
• Neurologic symptoms consistent with methyl bromide toxicity.

Methyl Bromide
• A restricted-use pesticide; phased out because it results in depletion of the ozone layer.
• Pesticide banned for use in residences in the United States; on Funzi Island was illegally used to treat powder post beetles in furniture and residences.
• Current use is for soil fumigation and in greenhouses, ships and warehouses.
• Exposure is by fumigation.
Case Study - History

- **Ministry of Health Investigation/Actions**
  - Methyl bromide used on Funzi Island came from licensed distributors in Kenya.
  - Methyl bromide used improperly at other businesses on Funzi Island and in other parts of Kenya
  - Environmental Investigation – Methyl bromide (MeBr) found in many bandas; safely secured containers of MeBr found on Funzi Island; numerous rounds of ventilation and testing.
  - Required all applicators with MeBr in stock to notify Ministry of Agriculture – quarantine and disposal.
  - Use warning to all pesticide regulators in Kenya
  - Methyl Bromide Workgroup formed at Ministry of Health – to prevent similar incidents.
Case Study - History

• Clinical Course
  • Serum bromide levels done; ranged from < 10 mg/dl to 13.6 mg/dl – normal value < 1.5 mg/dl; serum levels do not correlate well with symptoms.
  • Patient had hemodialysis; medically-induced coma for weeks.
  • Two and a half months after the incident, all four family members were discharged from acute care hospitals.
  • The boys and father were then admitted to a rehabilitation facility for severe neurological sequelae. The father was discharged from that facility and has continued to have severe tremors.
The End