MMC: 12 and 6 year old brothers dead of unknown poisoning

Note: This case is part of the regular mortality reviews that Nyaya Health conducts. The rationale behind these reviews is that death is the ultimate arbiter of epidemiological truth and that every death in the catchment area, even if apparently not related to care provided at the clinic, should be reviewed by the staff team. The reports of death will be compiled by staff members and by CHWs. Deaths are analyzed by their proximate causes, as well as their biological, structural, and societal precursors.

MMC: 12 and 6 year old brothers dead of unknown poisoning

Patient Number 1:

*6 year old boy presenting after losing consciousness 1-2 hours earlier

- He and his family ate fish and ghee (a butter-like product made from cow milk) last night, after which he complained of feeling belly pain
- No other reported symptoms before going to bed last night
- On awaking this morning, he complained of feeling weak and was noted to be lethargic by his parents.
- No urine or stool passed since last night, no emesis
- Did not go to school, continued to decline at home, stopped responding sometime around 9am
- Carried in on stretcher to BHemergency departmentat 1115am

§ The patient lives at least 1-2 hours walk from the hospital. After being carried on stretcher by his parents and family members most of the way, the patient (and family) was picked up by a tractor for the last segment of the journey.

*On presentation:

- Completely unresponsive, cold, with no detectable pulse or respiration

§ Oxygen saturation: None detectable

- Pupils fixed and dilated

*Management course:

- CPR was begun immediately with chest compressions / AMBU ventilation
- Ringer's Lactate 500 milliliter bolus given immediately.
- Atropine and adrenaline given intravenously
- CPR was performed for ~15 minutes, with no change in status.
- The child was pronounced dead at 1130am

Patient Number 2:

*12 year old boy presenting with complaints of lethargy and weakness in school this morning

- Patient had eaten fish and ghee last night just like his younger brother
- Had frothy bloody discharge from the ears last night before going to bed
- Was feeling well enough to go to school this morning, but started feeling weak after 1hr in school. Was carried (in a man's arms) home from school around 9am
- Carried in on stretcher by family at 1115am (along with younger brother above).

*On presentation:

- Weakly responsive, lethargic, irritable
- Vitals: Pulse 94, Respiratory Rate 35, Blood Pressure not recorded; oxygen saturation 94% at presentation
- Pupils weakly reactive to light, partially dilated

*Management course:

- (Cardiopulmonary resuscitation was being performed on younger brother, thus delay in initiation of treatment for this patient)
- Patient was lavaged with activated charcoal and 1 liter Ringer's Lactate, until clear fluid was withdrawn
- Patient was given intravenous Normal Saline 500 milliliters, and D5 500 milliliters
- During lavage, oxygen saturation began to drop (into the 30s) very rapidly
- Spontaneous respirations dropped to 3-4 per minute
- Bag-mask ventilation was begun, with auscultated confirmation of bilateral ventilation
- Oxygenation temporarily improved into 60% range
- Pulse began to drop, atropine and adrenaline administered intravenously
- No cardiac response to the atropine / adrenaline, pulse thready and <15
- Cardiopulmonary resuscitation was begun
- Patient began producing frothy blood from his mouth; suctioning was done
- No response to Cardiopulmonary resuscitation; patient pronounced dead at 1205pm

1. Clinical Assessment:

*Overview of the clinical details of the case

- See case description above

*Most likely causes of morbidity/mortality

- Botulism
- Mushroom poisoning
- Other, unknown toxin

*Any follow up that may have occurred since death/discharge

- No follow up available

2. Seven domains of MMC causal analysis

*Clinic operations

- Nursing staff initially identified the lack of a pulse in the 6 year old, and immediately triaged attention to his care, starting CPR promptly
- Unfortunately, this led to insufficient attention paid to the 12 year old at initial presentation, and it was later noted that some clinical staff had not even realized there was a second critical patient until after the 6 year old was pronounced dead, due their focus on the 6 year old.
- Communication was focused on step-by-step clinical management, but lacked description of the overall picture and did not ensure that all involved staff were aware of the entire situation.
- There is no emergency trolley with critical care medicines and equipment easily accessible and well organized. This led to confusion about finding certain equipment (even common things like stethoscopes or the pulse oximeter) and caused unnecessary delays in care provision.
- There is no protocol for emergency care, and roles were not pre-established before care provision was initiated. This led to disorganized and chaotic clinical management.
- No one is designated to deal with the family / patient party in cases like this, which leads to crowds forming in the emergency department , and random (disorganized) clinical staff yelling at them to disperse, but in no systematic manner. This also results in the patient party being alienated from the care provision and not understanding what is happening to their loved one, which can be especially alarming and confusing, especially in situations like this where two young boys had multiple clinical staff, including a volunteer foreigner, performing invasive procedures and CPR on them.
- Cases like this become even more difficult when they present at night, which involves the extended delays of summoning the health assistant or Physician from their staff quarters.

- If there was a system in which Health Posts would contact the emergency department staff in advance, to notify them of the incoming cases, care provision could be better prepared and streamlined.

*Supply Chain

- With regards to medicines and equipment that we have decided to stock, everything was available and in stock as needed.
- Many other equipment, such as intubation and ventilator support, are not available here, but this is not due to supply chain problems.
- We do not have a mechanism in place for emergency orders from any of the local, independently-run, medicals that might often be able to supply us with a small supply of a medicine if we stock out (for example, antibiotics).

*Equipment/Machinery

- There was no multi-plug readily accessible near theemergency departmentpatient beds. This caused delays in accessing suction. There are sufficient stock of multi-plugs, but they were not located in the appropriate place for patient care.

*Personnel

- There is a difficult balance for ANMs in deciding to call physicians immediately (without waiting 15-20mins for the health assistant to review and then call the physician themselves) because physicians often yell at the ANMs or refuse to come. In cases such as this though, immediate notification of physicians is imperative to intervene effectively.
- ANMs are not adequately educated about the usage of some emergency medicines and equipments. Some examples include:
- Nursing staff used the mechanical blood pressure machine to check BP, but were unaware that, in critical patients, this may not be the most accurate or efficient way to measure blood pressure
- Nursing staff used the pulse oximeter on the patients' toes, unaware that in a critical patient this may not accurately reflect cardiac activity
- An ANM brought a stylet instead of a Foley catheter
- Many of the clinical staff (HAs and ANMs) do not feel personally comfortable with their knowledge of CPR or other emergency procedures

*Outreach

- We have two CHWs in the area, but they were not contacted or utilized for this case.

*Societal / Structural

- Health education will continue to be a problem for many villagers. In this case, lack of knowledge about mushroom poisoning, or lack of sanitary food conditions may have contributed to these poisonings, and would likely have been preventable with better health education.

3. Review and Summary

*Identify/review lessons learned

- Reviewed the clinical presentation of mushroom poisoning and botulism (and neurotoxins in general) poisoning
- Reviewed relevant history questions that should be included to differentiate between mushroom poisoning and botulism
- Reviewed clinical management of mushroom poisoning
- Discussed difficulties involved in caring for actual botulism poisoning in resource-limited settings and reviewed comments from Toxicologists at Harvard about mortality rates and end-of-life management in emergency settings

*Identify/review any still to be answered questions

- None

*Identify/review recommendations for implementation

- ANMs, HAs, and Physicians all counseled regarding the importance of midnight calls, and cautioned against being angry when ANMs are "too quick" to call for a Physician.
- Balance of Physician sleep (often on call every night of the week) vs. having a low threshold for ensuring that any questionably critical case is seen as quickly as possible
- An emergency response drill will be organized, specifically reviewing CPR protocols and the delegation of roles in emergency cases
- Improved communication with local pharmacists so as to know what medicines are regularly available in the community in the (rare and very non-ideal) case of stock-outs