

Mortality Review: Collapse and Demise in a Village 24 Hours from the Hospital

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.

Brief Assessment

A 60 year old man with arrest in the field five days after presenting to the hospital status post possible snake bite and being ruled out by our clinical team for major hematological, cardiac, pulmonary, or neurological conditions. He had presented to the hospital with a snake bite on his leg a day prior but otherwise doing well, and had walked 24 hours to reach the hospital. At the time, there had been a shortage of snake anti-venom from the central government supply, and the clinical suspicion for snake envenomation was low given his well and stable appearance. It was noted at the time that he had a serious problem with alcohol abuse. He was discharged from the hospital, walked home, and resumed work as an ironsmith. He subsequently arrested in the field five day after his hospital admission and was brought dead on arrival to the hospital. The main question: what are the likely causes of death, and were there modifiable risk factors that we could have intervened upon to have prevented this outcome?

Top possible causes of death

In this case, in the absence of an autopsy which is impossible in this case, the ultimate cause of death is impossible to determine. However, we should consider the following possibilities, and reflect upon systems-level issues that could have helped to prevent the death:

- 1) pulmonary embolism,
- 2) myocardial infarction,
- 3) massive cerebral vascular accident,
- 4) delirium tremens,
- 5) cardiac arrhythmia (with or without electrolyte abnormalities from dehydration after extensive travel by foot plus alcohol misuse),
- 6) delayed snake neurotoxicity

A snake bite, although his presenting chief complaint to the hospital originally, is unlikely because Kraits, the typical venomous snakes in Achham, cause death within hours. His clinical picture is does not rule out the possibility of a Viper envenomation, although this is less likely.

Systems-level Analysis

Nyaya Health assesses the root causes of mortality within the following levels of analysis.

1) Clinic operations

Staff felt that he was triaged effectively and seen by the physician in a timely manner and with sufficient resources and time to evaluate the patient.

Getting a basic metabolic panel via the istat may have revealed an underlying electrolyte derangement given his alcoholism that may have lead to his death. In our scenario, however, it is difficult to make an assessment to get labs on a person who otherwise looks clinically healthy.

Additionally, our staff has minimal training in the detection, management, and counseling of alcoholism and delerium tremens. This is a nation-wide problem in the training of healthcare workers.

This may have caused us to miss possible features of the diagnosis as well as missed us to take an opportunity to counsel the patient on the dangers of DT.

2) Supply chain

Although given his clinical presentation delayed reaction to a snake bite is unlikely, it is important to note that we suffered significant supplies chain issues in providing snake anti-venom. We had completely run

out of anti-snake venom and were still in the process of trying to procure additional vials. The 35 vials that were in stock were completely exhausted less than ~3 days prior to this incident on a woman from sanfe who was brought to the emergency after being bitten by a krait. We had already begun contacting and inquiring the DHO and Doti Hospital for additional vials. Unfortunately, the District Hospital only had snake anti-venom that had expired in April. Finally, after a recommendation from the government, our health assistant Lal Bahadur who happened to be in Dhangadi at the time was able to pick up 50 vials of ASV from the regional medical store and bring with him to the hospital on Sunday morning by when this patient had already been discharged. As such, currently we have in our pharmacy 50 vials of snake anti-venom.

3) Equipment/machinery

In this particular case, there were no equipment malfunctions nor machines that we lacked for appropriate diagnosis.

4) Personnel and Communication

There do not seem to have been any gaps in communication between the different providers involved in his care. The presence of specialist physicians would not have aided in management in this case (e.g., a cardiology or psychiatry consultation were not indicated routinely). All staff members were aware of his snake bite and his alcoholism. He was effectively triaged to the physician for assessment.

5) Outreach

We have not yet reached with CHWs where he lives. While it is unclear what happened both prior to arrival and on his subsequent collapse back home, having a CHW in communication with our hospital staff could have led to improved care.

6) Societal

Poverty played a role in this patient's access to health care and overall health status. Like nearly all of our patients, he was living in severe poverty with nearly no primary care.

7) Structural

The patient lived 24 hours away by foot. An ongoing struggle in the district is to construct a transportation network that reaches the remote areas by reliable and passable roads.

Final Evaluation and Response

It is possible that this sad and devastating death could have been prevented by a more effective pre-hospital system that is not yet available in the district. There were no obvious gaps in the care delivered at the hospital other than possibly a lack of capacity in addressing alcohol misuse and the dangers of delirium tremens. A key logistics problem emerged in the supply chain of non-expired snake anti-venom from the government, although this is likely incidental to the case since it is highly unlikely that snake envenomation was the cause of this man's demise.