

## Grand Rounds

# A 39-year-old man with blindness following the application of raw cassava extract to the eyes

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## History

A 39-year-old male Nigerian farmer presented in the eye clinic at the University Teaching Hospital, Ado Ekiti, Nigeria on April 21, 2008 because of bilateral vision loss, copious discharge from the eyes and severe ocular pain of one week duration. The eye complaints started with initial ocular discomfort and redness when the wind blew particulate matter into his right eye while riding a motorcycle. He started having ocular discomfort in the left eye on the following day. He consulted a local chemist who prescribed an unknown eye drop, which the patient applied to both eyes. He later applied cassava extract to his eyes that he prepared by soaking slices of raw cassava (Figure 1) in water in a clean container for about 45 minutes. The patient applied the extract to both eyes four times on the first day. However, he discontinued using it the following day due to increasing ocular discomfort. He also visited a church where the presiding priest gave him a “special oil” to rub on his head and “holy water” to drink as treatment for the ocular ailment. The ocular condition worsened as he started having copious ocular discharge, severe ocular pain, photophobia, and noticed failing vision that worsened over the following 2 days.

## Examination

The patient was in obvious discomfort. Visual acuity was hand motions in both eyes. External examination showed bilaterally edematous eyelids and copious ocular discharge. Anterior segment examination revealed bilaterally eroded conjunctivae, melted corneas, descemetocelles and collapsed anterior chambers (Figure 2). The eyes were extremely tender and highly sensitive to light. There were blepharospasms on attempted opening of the lids.



**Figure 1.** Cassava tubers.

## Ancillary Testing

The ocular discharge was plated on blood and chocolate agar. Culture yielded no growth after two weeks. There was no facility available for further studies such as fungal culture when patient presented.

## Treatment

The patient was treated with daily ocular irrigation in the eye clinic, intensive topical application of benzyl penicillin drops, hourly topical ciprofloxacin drops, topical atropine 1% drops, oral ciprofloxacin (ciprotab) and oral ibuprofen. Antifungal eye drops (flucamed) were pre-

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**Figure 2.** Photograph of the patient's eyes following the application of cassava extract. Note the lid edema, copious eye discharge, conjunctival erosions, corneas melting, and descemetocoeles.

scribed but unavailable. On the third day after presentation, the discharge had subsided, the ocular pain was diminished and visual acuities were 1/60. The eyelid edema had decreased and the bases of eroded conjunctivae were more hyperemic. The corneal epithelium was sloughing and residual intact corneas were apparent. The descemetocoeles were intact. Treatment was continued until the fourth day after which the patient was lost to follow up.

## Differential Diagnosis

1. Chemical eye injury was suspected in this patient as there was a history of eye exposure to cassava extract (a weak acid, pH 6.5). Moreover, the ocular symptoms rapidly worsened shortly after the administration of cassava extract.
2. Bacterial conjunctivitis/keratitis was also suspected in this patient especially by virulent pathogenic organisms such as *Neisseria*, *Haemophilus*, *Klebsiella*, and *Pseudomonas*. The onset of ocular symptoms was short, and the progression was rapid. However, the negative culture, although not absolute, lowered this suspicion.
3. Adult chlamydial conjunctivitis should not be ruled-out totally in this patient especially since the patient is from agrarian community where he may have been exposed to poor hygiene and inadequate sanitation. Still, lack of history of sexually transmitted disease in this patient, and the copious nature of the eye discharge weakened this differential.
4. Fungal conjunctivitis/keratitis was also a possible diagnosis in this patient. However, the history was unusual for fungal eye infection. One

would expect ocular trauma involving vegetative material as well as slower onset.

5. Viral conjunctivitis could be entertained in view of the short duration and bilaterality of the eye presentation. However, the patient was not exposed to contagious adenoviral conditions including epidemic keratoconjunctivitis and acute hemorrhagic conjunctivitis. Moreover, the discharge was not serous.
6. Orbital cellulitis could also be entertained in this patient. There was, however, no history of sinusitis, subperiosteal abscess, facial injury, or penetrating orbital injury that could lead to orbital cellulitis in this patient.

## Diagnosis

Various substances are used as traditional eye medications across the globe, including organic and inorganic substances.<sup>1</sup> Unfortunately, harmful substances including raw cassava extract (as illustrated by this case and anecdotal reports), which are potentially toxic to ocular tissue, form the bulk of these substances.<sup>2,3</sup>

The deleterious effects of harmful traditional eye medications on vision have been widely reported.<sup>4,5,6</sup> The process leading to visual loss by traditional eye medications could be either by chemical burns to the ocular tissues, inoculation of harmful pathogenic organisms, or both.<sup>7</sup>

The patient in this report had failed self-medication using eye drops bought from a local chemist. The drug could have been steroid-based, worsening possible particulate foreign-body-induced corneal erosion especially in the right eye.

Both the patient and the priest were ignorant to the ocular condition, as their actions at least raised false hope and at most only provided psychological support. Most likely, the low level of education and low socio-economic class of the patient also contributed to his penchant for unorthodox treatment options. Perhaps, it could be argued that the lack of a readily accessible standard eye health care in the community was another compelling factor to the patient's decision to seek unorthodox treatment.

In this patient, the treatment objective was to remove or dilute toxic cassava extract and purulent ocular discharge, to relieve pain, and to cover for pathogenic agents (bacteria and fungi). Other treatment plans were to provide psychological support, education of the

patient and his relatives (who accompanied him to the hospital) on the danger of self medication and, of course, to rehabilitate the patient. Further management as well as ocular assessment could not be carried out as the patient was lost to follow-up after the fourth day.

The patient history, ocular examination findings, and negative culture results suggest chemical ocular injury. Raw cassava is not only acidic (pH 6.5) but also contains cyanide, among other constituents, that are potentially toxic to ocular tissue.<sup>2,3</sup> However, the speed of progression might have been accentuated by other insults, including particulate foreign bodies (which could have breached the corneal epithelium), pathogenic organisms, and unknown eye drops. The eye drops applied by the patient might have contained steroids, which would inevitably worsen the progression of any existing corneal erosion and infection. However, this could not explain the absence of an isolate in culture. On the other hand, an eye drop containing antibiotics is unlikely to worsen the progression of any existing corneal erosion and infection but could explain the absence of isolate on culture.

Raw cassava extract, based on its constituents, can cause chemical burns to the eyes with rapid destruction of ocular tissue leading to blindness. However, other added

ocular insults may have served as catalysts to the cassava extract-induced ocular damage. Eye health education targeted toward agrarian communities on the danger of self eye medication including the use of traditional eye medications, especially raw cassava extract, will reduce avoidable blindness in the community.

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