

Pantoea ananatis as a Cause of Corneal Infiltrate after Rice Husk Injury

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We report a case of an agricultural worker presenting with corneal infiltrate following ocular injury with a rice husk. On examination, a superficial corneal foreign body was removed and sent for culture, which grew *Pantoea ananatis*. This is, to our knowledge, the first clinical case report of *Pantoea ananatis* causing corneal infiltrate.

CASE REPORT

A 35-year-old male patient complaining of pain and redness in his left eye for 4 days presented to Aravind Eye Hospital, Madurai, a tertiary eye hospital in South India. He gave a history of ocular trauma with a rice husk while working in the agricultural field. On examination, his visual activity was 6/9. The eyelids were normal. Slit-lamp examination revealed a superficial corneal foreign body with minimal infiltrate at the 4 o'clock position. Examination of the anterior chamber showed occasional cells. The foreign body was removed and plated on blood agar medium for microbiological investigation. The patient was treated empirically with topical gatifloxacin (0.3%) and econazole eye drops (0.2%, wt/vol) every 2 h in the affected eye.

After 24 h of incubation at 37°C with 5% CO₂, yellow, pigmented, mucoid colonies grew around the foreign body on the blood agar. The organism was identified as a *Pantoea* species by using the API Rapid ID 32E (BioMérieux) system database and was further identified to the species level by sequencing the 16S RNA region. Molecular identification of the BLASTn identities resulted in the patient's sample being classified as *Pantoea ananatis* strain E5 with a 98% sequence coverage.

This strain was susceptible to amikacin, gentamicin, tobramycin, chloramphenicol, cefotaxime, cefazolin, ceftazidime, ciprofloxacin, ofloxacin, gatifloxacin, moxifloxacin, and levofloxacin by the Kirby-Bauer disk diffusion method (2, 3). The patient was reevaluated after 1 week, and the ulcer showed signs of healing. Gatifloxacin (0.3%) eye drops were continued for another week.

Corneal ulceration is a major cause of visual morbidity and is most commonly caused by various fungal and bacterial species. Trauma with or without an associated foreign body is the leading risk factor in developing countries such as India. A foreign body can carry microorganisms on its surface or in its substance, and approximately 50% of the removed foreign bodies carry bacterial contamination. Bacterial keratitis following corneal trauma is more likely to occur in agricultural or mining settings than in industrial factories. Bacterial keratitis usually begins in the corneal tissue immediately surrounding the foreign body (9, 10, 12). In corneal ulcers, the most commonly isolated organisms from the family *Enterobacteriaceae* are *Enterobacter*, *Klebsiella*, and *Proteus* species and *Escherichia coli* (1).

The genus *Pantoea* belongs to the family *Enterobacteriaceae*, which are Gram-negative aerobic bacilli. *Pantoea* species are com-

monly found in soil, water, and food, and when associated with plants, they can function as either pathogens or commensals. Only a limited number of cases of human disease associated with these bacteria have been described. Among the species of this genus, *Pantoea agglomerans* is most commonly isolated in hospitals (5). Two cases of endophthalmitis caused by *P. agglomerans* were reported earlier by Lee et al. (8) and Seok et al. (11). A single case of bacteremic infection with *Pantoea ananatis* after colonoscopy was previously reported by De Baere et al. (6).

Pantoea ananatis can be associated with plants as an epiphyte, endophyte, or pathogen. It can cause disease symptoms such as leaf blotches and spots, die-back, and stalk, fruit, and bulb rot in a wide range of economically important agricultural crops and forest tree species worldwide (4). *P. ananatis* has been detected frequently inside rice seedlings and mature rice plants, and it is known that rice husks are often thrown into the air during harvesting (7). These facts are consistent with our patient's report of ocular rice husk injury and provide a mechanism to explain entry of the organism into the cornea.

Pantoea sp. is an uncommon cause of corneal infiltrate. To our knowledge, this is the first reported case of a corneal infiltrate associated with a vegetative foreign body and caused by *Pantoea ananatis*. Corneal trauma is the leading cause of microbial keratitis, and the keratitis usually begins in the corneal tissue surrounding the foreign body. In our case, the organism was found to be susceptible to all tested antibiotics, which is consistent with the antibiotic susceptibility profile of *P. ananatis* reported by De Baere et al. (6) following isolation of the species from a case of bacteremic infection. In both profiles, the organisms were not found to be resistant to any antibiotics used regularly in ophthalmic treatment.

This case demonstrates the importance of culturing foreign bodies in order to enable identification of the causative organism and institute appropriate antimicrobial therapy. Furthermore, *Pantoea ananatis* as a cause of corneal infiltrate must be considered and suspected when there is a history of vegetative injury.

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