Panophthalmitis Caused by *Vibrio parahaemolyticus*

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We report a case of *Vibrio parahaemolyticus* panophthalmitis which resulted from contamination of a wound with water from a pond in inland Georgia. The pond was on the property of an oil refinery which receives crude oil from southern Mississippi. Cultures of the pond water 5 years later did not yield *V. parahaemolyticus*, but did yield non-O1 *V. cholerae* and had 0.28% sodium chloride content. *V. parahaemolyticus* may have been introduced into the pond along with oil transported from the Gulf of Mexico, and growth of this halophilic species may have been supported by salt from spilled crude oil.

Several *Vibrio* species other than *V. cholerae* O1 can cause disease in humans. These include non-O1 *V. cholerae*, which does not agglutinate in cholera O1 antiserum, and three halophilic vibrios, *V. parahaemolyticus*, *V. alginolyticus*, and *V. vulnificus* (4). All are normally found in estuarine and sea water. *V. parahaemolyticus* is responsible for 75% of the gastroenteritis reported in Japan (14) and has reportedly been isolated from several extraintestinal sources including blood (15), ear (12), synovial fluid (13), wounds (8, 11, 12), and eye (14a). It has been found in coastal (1, 2, 5) and inland (10) salt water environments and in fresh water ponds in Calcutta, India (6). We report a case of panophthalmitis caused by *V. parahaemolyticus* from in inland Georgia pond.

**Case report.** On 28 May 1976, a previously healthy 48-year-old man was struck in the left eye by a foreign body while hammering on a metal dredge which had just been pulled from a pond at an oil refinery near Atlanta, Georgia. He immediately sought medical attention. Ophthalmologic examination disclosed an uncorrected visual acuity of 20/30 minus one in the right eye; he could count fingers with the left eye. There was a corneal laceration located centrally about 4 or 5 mm in length. There was no obvious rupture of the lens, but some lens material was present in the anterior chamber. The fundus could not be visualized. A retained foreign body was suspected. He underwent repair of the corneal laceration and removal of a metallic foreign body. Gentamicin eye drops were begun. In the next 24 h, he developed a hypopyon with marked discharge, pain, and swelling of the lid. Taps of the anterior chamber and vitreous were performed, and a Gram stain of the vitreous fluid showed numerous gram-negative rods and polymorphonuclear leukocytes. Colistin drops were added to the gentamicin regimen. He continued to have marked swelling and discharge from the eye. Ten days after his accident, the left eye was enucleated. His recovery was uneventful.

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Culture of the vitreous fluid yielded a *Vibrio* species identified at the Centers for Disease Control as *V. parahaemolyticus*. The isolate was Kanagawa negative.

**Discussion.** Five years after this accident, in August 1981, we returned to the site, interviewed a plant official, and obtained water specimens from the oil-refinery pond for culture and salinity measurements. There was a series of five ponds designed as sequential reservoirs for spilled oil. The first in the series of ponds was partially covered with oil slick. A water sample from the common effluent of all five ponds was obtained and incubated for 18 h at 37°C in alkaline peptone broth (pH 9.6) containing 1% NaCl. A loopful was streaked on thiosulfate-citrate-bile salts-sucrose agar, and colonies were identified. Salinity and coliform counts were determined.

Culture of water from the common effluent grew non-O1 *V. cholerae*. *V. parahaemolyticus* was not isolated. The salinity was 0.28%. The pond water produced a heavy growth of fecal coliform bacteria.

An interview with a plant official revealed that crude oil is brought to this refinery by railroad from a field in Mississippi, about 60 miles north of the Gulf of Mexico. The oil contains sodium chloride and sodium sulfate and undergoes a desalting process before further refining. Periodic inspections of the site by the Environmental Protection Agency had not revealed contamination of the environment by salt above that allowable by Environmental Protection Agency regulation. Often, oil is spilled into the pond when it is unloaded before desalting.

Wound infections with *V. parahaemolyticus* have invariably involved exposure to seawater (7, 11, 12). Isolation of this marine *Vibrio* from a wound in a patient who lived over 300 miles from the sea led to our investigation, and the failure to find any exposure to seawater or raw
seafood was unexpected. Clearly, the pond system is the most likely source of infection.

*V. parahaemolyticus* grows best in 3% NaCl. It requires at least 0.5% NaCl (3). Non-O1 *V. cholerae* can grow in the absence of salt and can tolerate up to 6% NaCl (9). Our finding of 0.28% NaCl in pond water would probably not support the growth of *V. parahaemolyticus*. It is possible that the salinity in 1976 was higher because of less rainfall or more contamination of the pond with salt.

Non-O1 *V. cholerae* causes nonepidemic gastroenteritis frequently related to seafood ingestion (9). These organisms are widely distributed in brackish water and salt water in the United States and are sometimes associated with sewage contamination (4).

Although spillage of crude oil during unloading would explain the saline environment favorable for growth of *V. parahaemolyticus*, it is not clear how the organism was introduced. One may speculate that it was brought in with a load of crude oil contaminated with Mississippi Gulf water containing *V. parahaemolyticus*. Whether *V. parahaemolyticus* multiplied and persisted in the ponds or was merely a transient contaminant is uncertain. Our attempt to recover *V. parahaemolyticus* from the ponds occurred so long after the infection that only a positive result would have helped answer this question. Because similar circumstances may exist elsewhere, and air travel permits persons with marine *Vibrio* infections to be far inland before they seek medical attention, it is important to recognize this wound pathogen even in areas that are remote from the coast.

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LITERATURE CITED


