Endophthalmitis Caused by *Rhodococcus equi* Prescott Serotype 4
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*Rhodococcus equi*, an aerobic actinomycete primarily known as a livestock pathogen, was repeatedly isolated from the severely infected right eye of a 9-year-old boy.

*Rhodococcus* (Corynebacterium) *equi*, a well-established animal pathogen (2, 4, 5), has been used extensively as a cause of human infection, primarily involving immunocompromised hosts (1, 3, 7; D. C. Sane and D. T. Durack, Letter, N. Engl. J. Med. 314:56–57, 1986). We report here the first case, to the best of our knowledge, of *R. equi* as a cause of endophthalmitis in an immunocompetent individual.

**Case report.** A 9-year-old male presented to the Holy Spirit Hospital Emergency Care Unit on 31 July 1985 with a corneal laceration produced by the point of an umbrella. On examination, a 5-mm perforating, irregular, multiedged laceration of the right cornea with a large subconjunctival hemorrhage was observed. Optical testing found vision in the left eye to be 20/20 but the right eye to be capable only of detecting hand motions at 1 ft (30.48 cm). Radiologic examination found no foreign bodies, and the remainder of the admission physical and laboratory data was normal. The patient was taken to the operating room for repair of the laceration and was released on 2 August 1985 following an unremarkable postoperative course. The patient subsequently developed a traumatic cataract, which was removed on 15 August 1985.

On the morning of 28 August 1985, the patient, who was progressing as expected, was seen by his ophthalmologist for a routine follow-up examination. That evening the child began complaining of severe right eye pain, had several episodes of vomiting, and was “feverish.” The next morning he returned to the Emergency Care Unit, where he was seen by a staff ophthalmologist who found a severely involved right eye infection. Pertinent admission findings were a leukocyte count of 25,000/μl and a fever of 101°F (38.3°C). The patient was admitted with a diagnosis of endophthalmitis of the right eye. At 2:00 p.m., the patient was taken to the operating room for a vitrectomy, at which time 0.5 ml of vitreous fluid was aspirated and delivered to the Microbiology Department for Gram stain and culture. The ophthalmologist noted at this time that the eye was “exceedingly involved with infection.” A Gram stain of this material revealed 2+ neutrophils, but no organisms were observed. On the basis of the Gram stain findings, the patient was returned to the operating room at 3:00 p.m. for a repeat vitrectomy and washout. At this time, 140 ml of aseptically collected saline washout from the vitreous cavity was recovered and delivered to the Microbiology Department for processing.

On the basis of the bacteriologic findings, the patient was placed on intravenous gentamicin and gentamicin eye drops (Garamycin). The infection responded well to this regimen, and the patient was released from the hospital on 6 September 1985. A 2-month follow-up examination found no recurrence of infection.

**Bacteriology.** The 0.5 ml of fluid collected during the first vitrectomy was used to inoculate a 5% sheep blood agar plate, a chocolate agar plate, and cooked meat broth (CM). The CM was subcultured aerobically and anaerobically (in a glove box) after 24 h of incubation. The 140 ml of saline washout collected during the second vitrectomy was carefully divided into three aliquots, and each was placed in a sterile 50-ml conical tube and centrifuged at 1,821 × g for 15 min. The supernatant from each aliquot was aseptically removed and stored. Each of the sediments was cultured as follows: (i) aerobically with 5% sheep blood agar, chocolate agar, and CM; (ii) anaerobically by subculturing the CM in a glove box to Centers for Disease Control blood and Kanamycin-Vancomycin agar plates; (iii) for acid-fast bacilli on one Lowenstein-Jensen slant; and (iv) for fungi on one Sabouraud glucose agar slant. Additionally, for each aliquot sediment smears were prepared for Gram stain and acid-fast staining by Kinyoun's modified acid-fast staining procedure. All the aerobic plates, the CMs, and the Lowenstein-Jensen slants were incubated at 36°C in 8% CO₂. Anaerobic subcultures of the CMs were incubated at 36°C in the glove box incubator. The Sabouraud glucose agar slants were incubated at 36°C in a non- CO₂ atmosphere.

No acid-fast bacilli were seen on the Kinyoun's stained preparations, but the Gram stains of each of the aliquot sediments revealed 4+ neutrophils and rare small, gram-positive to gram-variable rods. The next day, all the plates (those from the 0.5 ml of vitreous fluid, as well as those from each of the aliquot sediments from the vitreous washout) showed small, pinpoint, almost clear colonies. A Gram stain of these colonies showed gram-positive rods identical to those seen on the original Gram stains of the sediment material but also an abundance of gram-positive coccoid forms. These same morphologic types were found on smears from each of the CMs. By 48 h, these colonies were approximately 1 mm in size, entire, and quite mucoid, and they were distinctively salmon pink. All the anaerobic plates, as well as the Lowenstein-Jensen and Sabouraud glucose agar slants, remained negative.

The organism was found to be catalase positive and produced the following biochemical reactions on a specially prepared Minitex panel: it was nitrate and urease positive (urease positive in less than 24 h); and bile esculin, glucose, malto, sucrose, mannotol, and xylose negative. A tentative identification of *R. equi* was entertained at this time. To help substantiate this identification, an equi factor plate, as described by Prescott et al. (6), was prepared, and the result was found to be consistent with *R. equi*. The identification of the isolate was subsequently confirmed as *R. equi* by the...
Pennsylvania State Laboratory; the Special Bacteriology Branch, Centers for Disease Control; and J. F. Prescott, Ontario Veterinary College, who also reported the isolate to be Prescott serotype 4 (personal communication).

A susceptibility profile was obtained by using a MicroScan gram-positive panel (American Scientific Products). Although actual susceptibility-resistance determinations could not be made, the following MICs were recorded: erythromycin, ≤0.25 µg/ml; penicillin, 2.0 µg/ml; ampicillin, 2.0 µg/ml; cephalexin, 8.0 µg/ml; chloramphenicol, 4.0 µg/ml; gentamicin, ≤1.0 µg/ml; vancomycin, ≤1.0 µg/ml; trimethoprim-sulfamethoxazole, ≤10 µg/ml; clindamycin, 4.0 µg/ml; and nafcillin, >8.0 µg/ml.

Golub et al. (3) reported the first human case from which Corynebacterium (now Rhodococcus) equi was isolated. This was from the lung of a patient with plasma cell hepatitis. Since that time, other cases have occasionally appeared in the literature. In reviewing the literature on R. equi, Van Etta et al. (7) found only 12 documented cases, 11 of which occurred in immunocompromised patients. Most of the isolates were from lung and respiratory secretions and associated bacteremias. The single immunocompetent patient had a localized neck mass with a lymph node serving as the source of R. equi. Most recently, Sane and Durack (Letter, N. Engl. J. Med., 1986) reported on a case of acquired immunodeficiency syndrome from which R. equi was isolated from a cutaneous lesion.

Similar to those in other reported cases (1, 3, 7; Sane and Durack, Letter, N. Engl. J. Med., 1986), our isolate was susceptible to erythromycin, vancomycin, and gentamicin. But, unlike in many of the other reported cases (1, 3, 7), we found no history of exposure to animals. It is tempting to associate the infection with the umbrella, but the delay between the accident and the manifestation of infection makes this seem unlikely.

The unusual serotype involved in this case, Prescott serotype 4 (5), may be a particularly virulent form of R. equi. In other documented cases, serotype was not reported; therefore, it is difficult to say whether this serotype has a predilection for humans or is just one of many serotypes capable of causing human infection. In its natural habitats, animals and associated soil, R. equi Prescott serotype 4 is a rare serotype, having been isolated by J. F. Prescott from a few pigs and by the Japanese rarely from horse manure (Prescott, personal communication).

In conclusion, we report here the first known case, to the best of our knowledge, of endophthalmitis caused by R. equi Prescott serotype 4.

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LITERATURE CITED