

Isolation of *Kingella kingae* from a Corneal Ulcer

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***Kingella kingae* was isolated from a corneal ulcer in an 11-month-old male. This organism has been previously reported from normally sterile sites, including sites of endophthalmitis, but this is the first time isolation from the cornea has been reported.**

The taxonomic characteristics of *Kingella kingae* were first listed by Elizabeth O. King, who designated it *Moraxella* sp. nov. 1. In 1976, *K. kingae* was reclassified as the type strain of the genus *Kingella* (4). Two further species, *K. indologenes* and *K. denitrificans*, have since been included (11).

K. kingae has been reported as a cause of arthritis (9, 13), osteomyelitis (2), endocarditis (7), meningitis (14), and septicemia (10). *K. indologenes* has been isolated from eye infections. Pickett et al. (8) reported that of six *K. indologenes* eye infections, one occurred in a corneal abscess (12).

A search of the literature indicates that this is the first time that *K. kingae* has been reported as isolated from a corneal infection, although Henriksen (3) reported isolation of the organism from an abscess on the upper eyelid and Carden et al. (1) reported it as the causative organism of a case of metastatic endophthalmitis. Graham et al. (2) reported that 70 patients with *K. kingae* infections were received by the Centers for Disease Control from 1953 through 1980. None was reported as having been isolated from the eye.

Our patient was an 11-month-old male child who presented in April 1991 with a red discharging left eye, the condition being of 4 days' duration. He was initially treated in the Children's Casualty Department with chloramphenicol eye ointment. The eye failed to improve, and the patient was referred to the Eye Outpatient Clinic.

Upon fluorescein staining and slit-lamp examination, a corneal ulcer was seen. The patient was admitted for an examination under anesthesia. There was no history of prior trauma to the eye.

Corneal scrapings were collected. Gram staining showed numerous leukocytes and moderate numbers of a blunt-ended gram-negative bacillus. Some of the bacilli were intracellular.

After 2 days of incubation at 37°C, a sparse growth of a gram-negative bacillus was obtained on 5% sheep blood agar (BBL, Cockeysville, Md.). The colonies were raised, smooth, and slightly opaque and were surrounded by a zone of hemolysis. No pitting of the agar was evident. The organisms were nonmotile, cytochrome oxidase positive, catalase negative, and indole negative. By using the Vitek NHI card (Vitek AMS; Vitek Systems, Inc., Hazelwood, Mo.), an identification of *K. kingae* (93% confidence level) was made. This was confirmed by using manual biochemical tests (8) (Table 1) as follows. Acid was produced from glucose and maltose but not from xylose, mannitol, sucrose,

or lactose. Esculin and gelatin hydrolysis were negative, as were urease, nitrate reduction, and Simmons citrate utilization.

The presence of hemolysis, the absence of indole production, and an inability to produce acid from sucrose distinguished the isolate from an isolate of *K. indologenes*.

The organism was susceptible to penicillin, erythromycin, chloramphenicol, ampicillin, cephalothin, and gentamicin by using the National Committee for Clinical Laboratory Standards disk diffusion method (5) with Mueller-Hinton agar supplemented with 5% sheep blood incubated for 18 h at 37°C. The patient was commenced on subconjunctival gentamicin and cephalothin. He remained in the hospital for 4 days. By the follow-up visit, 5 days after the patient was discharged, the ulcer had healed.

TABLE 1. Biochemical characteristics of the *K. kingae* isolate

Test or characteristic	Result ^a for:		
	Isolate	<i>K. kingae</i>	<i>K. indologenes</i>
Hemolysis (clear zone)	+	V ^b	-
Motility	-	-	-
Acid from:			
Glucose	+	+	+
Xylose	-	-	-
Mannitol	-	-	-
Lactose	-	-	-
Sucrose	-	-	+
Maltose	+	+	+
Catalase	-	-	-
Oxidase	+	+	+
Growth on MacConkey agar	-	-	-
Simmons citrate	-	-	-
Urease	-	-	-
Nitrate reduction	-	-	-
Indole	-	-	+
Gelatin hydrolysis	-	-	-
Esculin hydrolysis	-	-	-

^a +, positive; -, negative.

^b V, variable (84% positive).

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K. kingae is a rare cause of clinical disease in humans and is possibly a normal member of the upper respiratory tract flora (6). Henriksen (3) isolated this organism from 5 of 437 consecutive nasopharyngeal cultures (1.1%). To date, the organism has been reported chiefly as causing infections in normally sterile sites. Since *K. kingae* is a commensal of the mouth, there is speculation that the infection of normally sterile sites may be associated with disruption of the normal mucosal barrier. Because there are difficulties in isolating the organism from mixed cultures and in identifying it, the number of actual cases may be higher than that reported.

The fact that only a sparse growth was obtained despite moderate numbers of organisms being seen upon Gram staining may indicate the fastidious nature of *K. kingellae*, and one can speculate that this organism might well be involved in a greater number of culture-negative infections. As with our patient, most infections have been reported to be in children. Graham et al. (2) found a striking association of *K. kingae* with children less than 6 years of age in that three-quarters of the invasive infections in their study were in this age group and were *K. kingae*, compared with *Moraxella* spp.

Although *K. kingae* is gram negative, it is generally susceptible to penicillin and ampicillin. Penicillin is considered the treatment of choice for systemic infection.

In the present case, *K. kingae* was isolated as the single agent from a corneal ulcer. To our knowledge, this is the first documented case of such an infection in humans.

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