JOURNAL OF CLINICAL MICROBIOLOGY, Aug. 1988, p. 1580–1581
0095-1137/88/081580-02$02.00/0

Vol. 26, No. 8

NOTES

Alcaligenes piechaudii from Chronic Ear Discharge

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Received 7 March 1988/Accepted 25 April 1988

A recently described bacterium, *Alcaligenes piechaudii*, was isolated repeatedly from the ear discharge of a diabetic man. This appears to be the first report of human infection in which there is clinical evidence of a pathogenic role for this species.

In 1986, a new species, *Alcaligenes piechaudii*, was described from human clinical specimens and the environment (2). However, although strains of the species had been recovered mainly from human clinical material, little information was available for any of the isolates and their clinical importance could not be determined. In this paper, we describe a diabetic patient with a chronic ear discharge from which *A. piechaudii* was cultured repeatedly.

A 58-year-old man presented with a 3-month history of a bloody discharge from the right ear. He had been diagnosed as having diabetes mellitus 38 years previously. Examination of the ear showed a central perforation in the right tympanic membrane surrounded by granulation tissue. The left drum was normal. A swab of the discharge from the right ear was taken for culture, and treatment with amoxycillin (250 mg, three times a day) and Sofradex ear drops (Framycetin, gramicidin, and dexamethasone) was commenced.

The discharge persisted for almost a year, during which time the patient was seen on five more occasions. On each occasion, the discharge was cultured. The treatment was changed to cephalexin (500 mg, four times a day) and Sofradex ear drops with 0.5% acetic acid at the second visit and then to amoxycillin (250 mg, three times a day) and Neosporin ear drops (polymyxin B, neomycin, and bacitracin) with 0.5% acetic acid on the fifth presentation. However, it was not until after the patient was admitted to hospital for stabilization of his diabetes that a definite improvement occurred which led eventually to cessation of the discharge.

At each presentation, smears were prepared from the swabs of the discharge and stained by Gram stain. The specimens were cultured on 5% horse blood agar, MacConkey agar (CM7b; Oxoid Ltd., Basingstoke, England), Sabouraud dextrose agar (Oxoid) with gentamicin (10 μg/ml), and horse blood agar with nalidixic acid (15 μg/ml) and colistin sulfate (10 μg/ml). The cultures were incubated at 35°C in 3% carbon dioxide for 48 h.

Moderate numbers of pus cells with gram-negative rods and gram-positive cocci were seen in a Gram-stained smear of the swabs collected at the first visit. Oxidase-positive, gram-negative rods, subsequently identified as *A. piechaudii*, were cultured, along with coagulase-negative staphylococci. Pus cells were again seen in the smear of the discharge prepared at the second visit but not thereafter. The oxidase-positive, gram-negative rods were cultured from specimens taken at all six presentations, usually with coagulase-negative staphylococci but once as a profuse growth in pure culture.

The isolate grew as a strict aerobe on horse blood agar, MacConkey agar (CM7b), and nutrient agar (Oxoid) after incubation at 37°C for 24 h. Colonies were nonhemolytic. The bacilli were motile at 22 and 37°C. Flagellar arrangement was shown to be peritrichous by electron microscopy. Physiological tests were performed by conventional methods (1, 5) and included the ability to grow in a basal medium containing β-hydroxybutyrate as sole carbon source (9). Acid production from carbohydrates was tested in an ammonium salt basal medium (8). The results are listed in Table 1.

A comparative disk method (10) was used for testing antimicrobial susceptibility to Framycetin (100 μg), neomycin (30 μg), and polymyxin B (300 IU). Susceptibility to other antimicrobial agents was tested by using the Dynatech MIC 2000 System (Dynatech Laboratories, Inc., Alexandria, Va.) with a modified broth dilution technique (4). The isolate was susceptible to amoxycillin and polymyxin B, of inter-

TABLE 1. Biochemical characteristics of *A. piechaudii* isolated from ear discharge

Result	Test
Positive	Acid from ethanol[a]
	Alkali in Hugh and Leifson medium
	Catalase activity
	Growth in β-hydroxybutyrate
	Growth on cetrimide agar
	Nitrate reduction
	Oxidase reaction
	Simmons citrate utilization
	Tyrosine hydrolysis
Negative	Acid from carbohydrates[a]: glucose, lactose, maltose, mannitol, sucrose, and xylose
	Casein digestion
	DNA hydrolysis
	Esculin hydrolysis
	Gelatin hydrolysis
	Indole production
	Malonate utilization
	Nitrite reduction
	Tween 80 hydrolysis
	Urease production

[a] Tested in ammonium salt basal medium.

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mediate susceptibility to cephalexin, and resistant to chloramphenicol, Framycetin, neomycin, and tetracycline.

Four of the seven strains which were initially characterized as *A. piechaudii* were isolated from human clinical specimens, one was from soil, and two were of unknown origin (2). Few clinical details were available on the human isolates. The name *A. piechaudii* had been suggested earlier for one of the clinical isolates, the so-called *Alcaligenes faecalis* CIP-6075, which was shown to be phenotypically and genetically distinct from *A. faecalis* and other species of *Alcaligenes* (3). The specific epithet was chosen to honor the French bacteriologist Michel Piéchaud.

Our isolate of *A. piechaudii* was cultured repeatedly from chronic ear discharge in a diabetic man. None of the four original isolates of *A. piechaudii* of human origin was associated with otitis (2), but other species of the genus *Alcaligenes* were reported previously from ear discharges (7). The original description of *Alcaligenes xylosoxidans* subsp. *xylosoxidans* (2) (then *Achromobacter xylosoxidans*) was based on a study of seven strains, all of which were isolated from purulent ear discharges in patients with chronic otitis media (11). Indeed, it has been suggested on the basis of the isolation of this species in mixed cultures from five of nine patients with purulent ear discharge that some of the "*Pseudomonas* sp." reported in otitis externa may actually be *A. xylosoxidans* subsp. *xylosoxidans* (6). Species in the genus *Alcaligenes* are generally regarded as being opportunistic pathogens (7), and it is likely that the diabetic condition of the patient predisposed him to infection by *A. piechaudii*. This is supported by the association of a definite improvement with stabilization of the patient's diabetes.

The key characteristics of *A. piechaudii* are as follows. It is a gram-negative rod, motile by peritrichous flagella, aerobic, catalase positive, and oxidase positive. It has an alkaline reaction in Hugh and Leifson medium, is nonsaccharolytic, and reduces nitrate but not nitrite. *A. piechaudii* may not yet be familiar to many laboratory workers, but it has been encountered in clinical material and may play a pathogenic role, as this case illustrates.

We thank C. A. Dawson and B. Holmes of the Computer Identification Laboratory, Central Public Health Laboratory, London, England, for confirming the identification of *A. piechaudii*.

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