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Group VE-2 (*Chromobacterium typhiflavum*) Bacteremia

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Group VE-2 (*Chromobacterium typhiflavum*) bacteremia occurrred in a severely traumatized, post-neurosurgical patient. A discussion of the clinical occurrence of the organism, bacteriological characteristics, and antibiotic sensitivities is presented.

Bacterium typhiflavum was originally described by Dresel and Stickl (3) as a yellow-pigmented variant of the typhoid bacillus. Many of the fermentative strains have been recently classified as *Enterobacter agglomerans* (4). However, the designation *Chromobacterium typhiflavum* has been retained by Pickett and Pederson (8, 9) and Blazevic (2) to describe certain nonfermentative, yellow-pigmented, oxidase-negative bacilli. These strains are identical in biochemical characteristics to the Center for Disease Control (CDC) group VE-2 bacteria (5, 10). Recently, we observed a case of bacteremia with this organism.

Case report. A 29-year-old male became comatose in July 1976 after suffering a compound skull fracture with extradural cerebral hemorrhage. After surgical evacuation of the blood clot, the patient developed high spiking temperatures. Two sets of blood cultures were obtained. Within 48 h of incubation, yellow-pigmented gram-negative rods were present in all four blood culture bottles (Trypticase soy and Columbia broths) as well as on the 24-h chocolate agar subculture plates.

On the basis of yellow pigmentation on aerobic blood agar plates, negative oxidase test, and biochemical reactions in fluorescence-lactose-denitrification, motility-nitrate, and lysine decarboxylase media (California Laboratory Industries, North Hollywood, Calif.), these organisms were tentatively identified as *Chromobacterium typhiflavum* (CDC group VE-2). The identification of CDC group VE-2 was confirmed in conventional media by the Hawaii Department of Health Laboratory (Table 1) and also by the Special Bacteriology Laboratory, CDC, Atlanta, Ga. Three API-20E reagent strips (Analytab Products, Inc., Plainview, N.Y.) and three Oxi-Ferm tubes (Roche Diagnostics, Nutley, N.J.) were also inoculated. API-20E strips yielded three different profile numbers because of variable reactions in glucose, V-P, and gelatin, as well as uniformly positive reactions in citrate and arabinose. When the *API Analytical Profile Index* (1976 edition) was used, one of the codes (020400243) produced "excellent" CDC group VE-2 identification, whereas the other profile numbers were not listed in the *API Analytical Profile Index*. The more comprehensive API computer analysis of these unlisted numbers revealed the most likely probabilities as group VE-2 (profile 0205002) and *Pseudomonas maltophilia* (profile 0202002). Oxi-Ferm tube identification produced three different identification values (0140, 4150, and 0150), because of variable reactions in anaerobic dextrose and citrate, with uniformly positive reactions in xylose and aerobic dextrose. These identification values were coded as group VE-2 in two instances and *Acinetobacter calcoaceticus* var. *anitratus* in the remaining instance. Antibiotic susceptibility testing of the gram-negative isolate by the standardized disk method (1) demonstrated susceptibility to ampicillin, carbenicillin, chloramphenicol, tetracycline, gentamicin, kanamycin, tobramycin, and trimethoprim-sulfa, with resistance only to cephalothin.

Because of multiple possible sources of gram-negative sepsis, the patient was initially treated with carbenicillin, cephapirin, and tobramycin. When bacterial identification and antibiotic susceptibilities became available, intravenous antibiotic therapy was changed to ampicillin. The temperature of the patient gradually returned to normal, and he was discharged with moderate neurological deficit. Repeated blood cultures, as well as cultures of urine, sputum, and spinal fluid, were negative. The patient's intravenous catheters were not cultured, and the source of sepsis was not determined. This gram-negative rod has not been isolated in our hospital laboratory from other patients or environmental cultures.

The group of bacteria known as VE-2 or *Chromobacterium typhiflavum* is very infrequently isolated from clinical specimens. During a 24-year period, the Special Bacteriology Laboratory of the CDC received 35 cultures of this organism, mainly from wounds and abscesses (10). In a 2-

TABLE 1. *Bacteriological characteristics of gram-negative isolate*

Test	Reaction
Pigment	Yellow
Triple sugar iron	Alkaline-neutral: no H_2S
Oxidase	Negative
Flagellation (Leifson stain)	Single polar
Catalase	Positive
Esculin hydrolysis	Negative
Motility	Positive
Gelatin	Negative (7 days)
Nitrate reduction	Negative
Indole	Negative
Simmons citrate	Positive
Christensen urea	Negative
Lysine decarboxylase (Moeller)	Negative
Arginine dihydrolase (Moeller)	Negative
Ornithine decarboxylase (Moeller)	Negative
Growth at 25°C	Positive
Growth at 35°C	Positive
Growth at 42°C	Negative
Growth in 0% NaCl	Heavy
Growth in 6% NaCl	Negative
Carbohydrate oxidation (CDC basal medium)	
Glucose	Acid
Maltose	Acid
Lactose	Acid (72 h)
Mannitol	Acid
Xylose	Acid
Sucrose	Alkaline
Nonfermentative medium developed by Pickett[a]	
Lysine decarboxylase	Negative
Motility-nitrite	Positive-negative
Fluorescence-lactose-denitrification	Negative-negative-negative

[a] California Laboratory Industries, North Hollywood, Calif.

year period, group VE-2 bacteria were isolated 14 times at UCLA Hospital. Two of these isolates occurred in blood cultures; neither isolate was judged to be clinically significant (7). To my knowledge, no other cases of group VE-2 sepsis have been published.

The taxonomic status of the group VE-2 bacteria remains uncertain, although it has been suggested that these bacteria be included in the genus *Pseudomonas* or possibly *Xanthomonas* (10). The group VE bacteria are yellow pigmented and oxidase negative and produce an alkaline triple sugar iron slant. They are separated into two biotypes (VE-1 and VE-2) on the basis of biochemical reactions, flagellar morphology, and guanine-plus-cytosine (G+C) ratio studies (5, 10). Group VE-1 possesses polar multitrichous flagella, hydrolyze esculin, dihydrolyze arginine, often liquify gelatin and reduce nitrate, and possess a G+C ratio of approximately 57 mol%. Our isolate closely resembled group VE-2 bacteria, which have negative esculin, arginine, nitrate, and gelatin reactions, possess a single polar flagellum, and have a G+C ratio of 67 mol%.

Of interest was our ability to identify this isolate rapidly on the basis of morphology, oxidase reaction, and biochemical tests in nonfermentative media described by Pickett and his associates (6, 8). Two other test methods (API-20E reagent strips and Roche Oxi-Ferm tubes) yielded several different code numbers, which misidentified the organism in one-third of the code identifications. Large-scale direct comparisons are needed to determine the relative accuracy of nonfermentative identification among these different test media.

The antibiotic susceptibility pattern of our isolate was consistent with the results of Pederson et al. (7), whose organisms were uniformly susceptible to ampicillin, chloramphenicol, kanamycin, and tetracycline. This patient's bacteremia appeared to respond to intravenous ampicillin. However, more clinical data are needed to assess both the pathogenicity and clinical course of group VE-2 infections, especially in severely debilitated patients.

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