Group IVe-Like Gram-Negative Bacillemia in a Patient with Obstructive Uropathy

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A nonfermentative, gram-negative bacillus, resembling Center for Disease Control group IVe, was isolated from the blood of a patient with obstructive uropathy. Prior studies implicating this organism in septicemia could not be found in the literature. It is suggested that this is the first time that this bacillus has been reported to cause bacillemia in humans.

The importance of oxidase-positive, nonfermentative, gram-negative bacilli in a variety of pathological processes is becoming increasingly apparent (2-4, 8, 10). Over a 2-year period, Brown (1) indicated that approximately 0.3% of all bacteremia cases were attributed to bacteria of this category, excluding saccharolytic *Pseudomonas* sp. Seneca and Grant (9) reported 12% of their bacteremia cases in urology patients were due to oxidase-positive, nonfermentative, gram-negative bacilli, with 2% of the total being other than oxidative *Pseudomonas* sp.

This paper reports a bacillemia due to an oxidase-positive, nonfermentative, gram-negative bacillus in a patient with obstructive uropathy and bilateral hydronephrosis. The organism was biochemically very similar to Center for Disease Control group IVe. This is the first reported case of bacteremia due to group IVe or IVe-like bacteria.

A 55-year-old female was admitted with renal failure and obstructive nephropathy 4 years after surgery and radiation for uterine adenocarcinoma. Retrograde pyelography revealed complete obstruction of the right ureter and 95% obstruction of the left, both at the pelvic brim. Ultrasound examination revealed grossly dilated ureters and kidneys bilaterally, minimal renal parenchyma present on the right, and significant parenchyma on the left. Open left nephrostomy was performed on the hospital day 2 with significant urine output. Postoperatively, the patient became febrile and had five positive blood cultures, drawn over a 2-day period, containing an oxidase-positive, nonfermentative, gram-negative bacillus. She was begun on cefazolin and kanamycin at dosages appropriate for her renal function.

The patient continued to pursue a febrile post-operative course with gradual enlargement of her nonfunctioning right kidney which did not show pickup on a gallium scan. Subsequently a right nephrostomy was performed which revealed a large urinoma. The urine from nephrostomy grew the same gram-negative bacillus. Excision of the urinoma with nephrostomy drainage of the pyonephrosis was performed 3 days later. After this procedure, the patient became afebrile and her renal function stabilized with serum creatinine values of 12 mg/dl. Antibiotics were continued for 2 additional weeks.

Commercially prepared media (Cal Labs, North Hollywood, Calif.) were used for isolating and biochemical characterizing the group IVe-like bacterium. Standard inoculation techniques and interpretation were followed according to King (5). Catalase, oxidase, and nitrate reduction reactions were performed as described by MacFadden (7). Our reactions and identification were confirmed by the Center for Disease Control, Atlanta, Ga. Antibigrams were performed by the standard Kirby-Bauer method using Baltimore Biological Laboratory (Cockeysville, Md.) sensitivity disks.

All five positive blood culture isolates were detected in aerobic Bactec (Johnson Labs., Inc., Cockeysville, Md.) vials within 12 h after collection. The Bactec contents were subcultured to 5% sheep blood agar, MacConkey agar, and chocolate agar plates for isolation. A Gram stain of the Bactec vial contents revealed a somewhat elongated and narrow deep-staining, gram-negative bacillus. The bacterium produced colonies 0.5 to 1.0 mm in diameter in 24 h on sheep blood agar that were somewhat convex, circular, opaque, and butyrous in consistency. The colony size or appearance did not change appreciably after 48 h. Biochemically, the isolate resembled group IVe by being non-saccharolytic for glu-

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cose, xylose, mannitol, lactose, sucrose, and maltose after 5 days. It also grew on MacConkey agar, was weakly catalase positive, and formed gas from nitrate. In contrast to group IVe, the bacterium only partially hydrolyzed urea in 3 to 7 days. The group IVe bacteria rapidly hydrolyze urea (6). The organism grew best at 35°C and gave slight growth at 25 and 42°C. Our isolate was nonmotile as are 76% of the CDC group IVe organisms. A summary of the biochemical data is shown in Table 1 comparing our organism with group IVe.

The antimicrobial susceptibility pattern showed that the isolate was resistant to ampicillin, carbenicillin, chloramphenicol, colistin, and nitrofurantoin. It was sensitive to kanamycin,

gentamicin, cephalothin, nalidixic acid, trimethoprim-sulfamethoxazole, and tetracycline.

The group IVe organism is representative of a variety of gram-negative bacilli so far without a genus. This organism is closely aligned to *Alcaligenes* sp. because of its nonsaccharolytic nature and peritrichous flagellation. Of 26 isolates collected by the Center for Disease Control, all but 3 were from the urinary tract; the source of the others was unidentified (6). The patient reported here presented renal failure due to bilateral ureteral obstruction secondary to either radiation fibrosis or recurrent uterine tumor. Complete obstruction with hydronephrosis produced a nephric focus of infection which was not eradicated, despite adequate antibiotics, until the focus was surgically drained. This case illustrates that the group IVe-like organism may cause bacilemia from its usual urinary tract location if structural abnormalities exist.

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TABLE 1. Comparative reactions between group IVe (6) and our group IVe-like isolates

Test	Reaction by: ^a	
	Group IVe	Group IVe-like
Action on blood lysis	0 to indeterminate	0 to indeterminate
Color	0	0
CO ₂ requirement	0	0
Pigment	0	0
Flagellation	Polar & long lateral flagella	0
Enrichment of medium with 3% sterile rabbit serum	0	0
Triple sugar iron agar slant	K/N	K/N
Litmus milk	Not done	Alkaline
Oxidase	+	+
Catalase	+	+
Growth on MacConkey agar	+	+
H ₂ S (triple sugar iron agar)	-	-
Oxidation/fermentation	I	I
Urease (Christensen urea agar)	+	+
Indole	-	-
Citrate	d	-
Gelatin	-	-
Glucose, xylose, mannitol, lactose, sucrose, and maltose	-	-
Esculin	-	-
Nitrate to gas	+	+
Phenylalanine deaminase	Not done	+

^a Symbols: K, alkaline; N, neutral; O, none or not required; I, inactive; +, 90% or more positive; -, no reaction; d, different biochemical reactions.