Flavimonas oryzihabitans (Pseudomonas oryzihabitans; CDC Group Ve-2): an Emerging Pathogen in Peritonitis Related to Continuous Ambulatory Peritoneal Dialysis?

JUSTIN W. A. BENDIG,1,†* PHILIP J. MAYES,2 DAVID E. EYERS,1 BARRY HOLMES,3 AND TONY T. L. CHIN2

Department of Microbiology1 and Department of Renal Medicine,2 St. Helier Hospital, Carshalton, Surrey SM5 1AA, and Identification Services Laboratory, National Collection of Type Cultures, Central Public Health Laboratory, London NW9 5HT,3 England

Received 22 July 1988/ Accepted 11 October 1988

A case of peritonitis caused by Flavimonas oryzihabitans (Pseudomonas oryzihabitans; CDC group VE-2) in a patient on continuous ambulatory peritoneal dialysis is reported. This is the seventh case of infection caused by this organism reported in the English literature and the third reported case of continuous ambulatory peritoneal dialysis-related peritonitis caused by this organism; it is the first case of infection of any kind caused by this organism in England.

Flavimonas oryzihabitans is the newly proposed genus and combination for an unusual, and rarely pathogenic, gram-negative rod, known previously as Pseudomonas oryzihabitans (and before that as CDC group Ve-2). Only six cases of infection caused by this organism have been reported, most occurring in the United States. Two have been cases of peritonitis in patients on continuous ambulatory peritoneal dialysis (CAPD; 1, 12), and four have been cases of septicemia (2, 4, 9, 10). We wish to document a third case of peritonitis caused by this organism in a patient on CAPD, and the first reported case of infection of any kind caused by this organism in England.

A 66-year-old man on CAPD for end-stage renal failure caused by obstructive uropathy presented in December 1987 with increased cloudiness of his dialysis fluid and reduced ultrafiltration on his overnight bag (he had had only one previous episode of peritonitis, caused by Staphylococcus epidermidis, soon after starting CAPD in May 1986, which was treated with intraperitoneal cefuroxime). Gram stain of a centrifuged 20-ml sample of dialysate showed numerous pus cells but no organisms. Culture of the fluid on blood and MacConkey agar and in BACTEC blood culture bottles (Becton Dickinson UK, Cowley, Oxford, England) all revealed a pure growth of a yellow-pigmented, nonlactose-fermenting, oxidase-negative, gram-negative rod (aerobic culture only). This was tested in the API 20NE system (API Laboratory Products, Basingstoke, England), and our results yielded the profile number 0047651, which is listed in the API 20NE Analytical Profile Index (2nd ed., August 1984) with the comment: "excellent identification to CDC Group Ve-2."5 Subsequently, the isolate was sent to the National Collection of Type Cultures, Central Public Health Laboratory, Colindale, London, England. There it was examined (as culture number CL12/86) in 40 conventional tests, and when the results of these were processed through the appropriate probability matrix (5), the strain was identified to group Ve-2 with the maximum possible identification score. The isolate was susceptible by disk diffusion testing to ampicillin, erythromycin, tetracycline, gentamicin, neomycin, chloramphenicol, and cefotaxime, but it was resistant to cephradine and cefuroxime. The patient was treated initially with intraperitoneal gentamicin (5 μg/ml) and cefuroxime (500 mg per bag), which cleared the dialysate after 3 days. He made a complete recovery on completing 10 days of gentamicin therapy. Attempts to isolate the organism from the patient’s urine, feces, ears, nose, throat, and further peritoneal dialysis fluid were unsuccessful.

F. oryzihabitans is a strictly aerobic, gram-negative rod, which grows at room temperature and 37°C but not at 42 or 5°C. It is nonsporeforming and motile by means of a single polar flagellum. Colonies after 24 h of incubation on nutrient agar are circular, smooth, shiny, about 1 mm in diameter and vary in their degree of yellow pigmentation. Some strains produce wrinkled colonies similar to those of Pseudomonas stutzeri. F. oryzihabitans is oxidase negative. Hemolysis does not occur on 5% horse blood agar, and there is no fluorescence on King’s medium B. The organism is susceptible to several antibiotics—ampicillin, carbenicillin, cefotaxime, chloramphenicol, colistin, erythromycin, gentamicin, neomycin, and tetracycline (6)—but is resistant to the cephalosporins (1, 2, 11).

Group Ve organisms were first described by Tatum et al. (13), who divided them into two biogroups: Ve-1 and Ve-2. Strains of Ve-2 were isolated from a variety of human sources (3, 13), mainly wounds and abscesses, but were thought to be of no clinical importance. Similar organisms, also of doubtful significance, have been called "Chromobacterium typhiflavum" (8), although this is confusing, as the name has been more commonly applied to fermentative organisms now known as Erwinia herbicola or Enterobacter agglomerans. In 1985, Kodama et al. (7) proposed the name Pseudomonas oryzihabitans (L. fem. n. oryza, rice; L. fem. adj. habitans, inhabiting; M. L. fem. adj. oryzihabitans, rice inhabiting) for Ve-2 organisms that they isolated in large numbers from rice paddies. Holmes et al. (6) considered it inappropriate to make the genus Pseudomonas more heterogeneous by including group Ve-2 within it. Group Ve-2 strains do not produce oxidase and show no appreciable levels of DNA relatedness to strains representing the major Pseudomonas rRNA hybridization groups. A new genus, Flavimonas (L. adj. flavus, yellow; Gr. n. monas, a unit; N.L. fem. n. flavimonas, a yellow unit) was therefore

*Corresponding author.
†Present address: Department of Microbiology, St. George's Hospital, Blackshaw Road, London SW17 OQT, England.

217
proposed, but with a name reflecting the close phenotypic similarity of Ve-2 organisms to the pseudomonads. The resistance of this organism to cefuroxime and cephradine, but not to cefotaxime, holds true in our isolate. Prior use of cephalosporins is likely to select for colonization with *F. oryzaehabitans*. As in the other two recorded cases of peritonitis caused by this organism (1, 12), our patient had had a previous course of a cephalosporin, though the original source of the organism remains obscure. Our patient had never been in the vicinity of rice paddies. The isolation and identification of *F. oryzaehabitans* in a routine laboratory should not be difficult. It will be interesting if further cases are reported in CAPD patients.

**LITERATURE CITED**


