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Septicemia with *Ewingella americana*

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Ewingella americana **was isolated from two blood cultures from a 75-year-old male after cholecystectomy. The characteristics of this strain are compared with the reported biochemical characteristics of 44 American strains. Previously described infections and pseudoinfections with *E. americana* are reviewed.**

Ewingella americana was first described in 1983 by Grimont and coworkers as a new genus and species in the family *Enterobacteriaceae* (6). This group of organisms was previously known as enteric group 40. Formerly the organism may have been classified as the *Enterobacter agglomerans* complex. *E. americana* is the only species in the genus (3). The generic name honors the American bacteriologist, William Ewing, and the species name refers to the American source of the clinical isolates described (6). Originally, some doubt existed about the clinical significance of most isolates of *E. americana*. However, recent case studies have established the pathogenic potential of *E. americana* (10, 11). Little is known about the natural habitat of the organism.

A 75-year-old, previously healthy male with cholecystitis and cholelithiasis was admitted to the University Hospital of Ghent on 15 July 1991. Fever persisted despite 10 days of intravenous antibiotic therapy with piperacillin and netilmicin. On the 11th day after admission, a cholecystectomy was performed under treatment. Treatment was continued until 4 days postoperation. The patient remained febrile (39°C) 1 week after surgery. Six days after surgery, two blood cultures were positive for *Pseudomonas aeruginosa* and *Candida albicans*. Sputum yielded *P. aeruginosa* and *C. albicans*, and urine culture was positive for *Serratia marcescens*. The patient was treated with amphotericin B, temocillin, metronidazole, and cloxacillin until 13 August, and clinical signs subsided.

On 19 August, the patient's fever rose again, up to 39.4°C. Two sets of blood cultures (BACTEC System 660, media 6A and 7B; Becton Dickinson Diagnostic Instrument Systems, Towson, Md.), sampled on 19 and 21 August, were both found to be positive for *E. americana*. Three of the four bottles yielded a gram-negative bacterium which was identified as *E. americana*. The patient was treated with temocillin, and his fever disappeared after 3 days.

Biochemical testing with API 20 (API system, S.A., Vercien, France) yielded the numerical profile 1205101, which corresponds, according to the *API Analytical Profile Index* (1), with a very good identification of *E. americana*. Others using this commercial system reported the numerical profile 1005101, which yielded the presumptive, but very unlikely, identification of *Yersinia pestis* (1a). Identification was confirmed by a set of conventional biochemical reactions performed by the method of Farmer et al. (3). Table 1 lists the biochemical reactions of 44 *E. americana* strains (3) and compares them with the reactions of the strain in this report. In addition to the reactions described in Table 1,

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TABLE 1. Biochemical reactions of *E. americana*

Test or characteristic	% Pos[a]	Reaction[b]
Indole production	0	–
Methyl red	84	NT[c]
Voges-Proskauer	95	+
Citrate (Simmons)	95	+
Hydrogen sulfide (triple sugar iron)	0	–
Urea hydrolysis	0	–
D-Phenylalanine deaminase	0	–
Lysine decarboxylase	0	–
Arginine dihydrolase	0	–
Ornithine decarboxylase	0	–
Motility (36°C)	60	–
Gelatin hydrolysis (22°C)	0	–
Growth in KCN	5	NT
Malonate utilization	0	–
D-Glucose		
Acid	10	+
Gas	0	–
Lactose fermentation	70	+
Sucrose fermentation	0	–
D-Mannitol fermentation	10	+
Dulcitol fermentation	0	NT
Salicin fermentation	80	+
Adonitol fermentation	0	–
myo-Inositol fermentation	0	–
D-Sorbitol fermentation	0	–
L-Arabinose fermentation	0	–
Raffinose fermentation	0	–
L-Rhamnose fermentation	23	–
D-Xylose fermentation	13	+
Maltose fermentation	16	–
Trehalose fermentation	99	+
Cellobiose fermentation	10	NT
α-Methyl-D-glucose fermentation	0	NT
Erythritol fermentation	0	NT
Esculin hydrolysis	50	+
Melibiose fermentation	0	–
D-Arabitol fermentation	99	NT
Glycerol fermentation	24	NT
Mucate fermentation	0	NT
Tartrate, Jordan's	35	NT
Acetate utilization	10	–
Lipase (corn oil)	0	NT
DNase at 25°C	0	–
Nitrate-nitrite	97	+
Oxidase, Kovacs'	0	–
o-Nitrophenyl-β-D-galactopyranoside	85	+
Yellow pigment	0	–
D-Mannose fermentation	99	+

[a] Percentage of positive reactions after 2 days of incubation at 36°C for 44 strains tested (3).
[b] Reaction of *E. americana*.
[c] NT, not tested.

fermentation of amygdaline was positive and beta-glucuronidase was negative.

The strain was sent to the Centers for Disease Control reference laboratory (Atlanta, Ga.) and identified as a typical strain of *E. americana*.

The isolate was susceptible to the antibiotics tested routinely in our laboratory (ampicillin, carbenicillin, trimethoprim-sulfamethoxazole, cefuroxime, piperacillin, tobramycin, amikacin, netilmicin, cefotaxime, ceftazidime, imipenem, and aztreonam) when tested by the Kirby-Bauer disk diffusion method (9). The isolate was also susceptible to colistin and temocillin (4, 5, 12).

Originally, *E. americana* had been isolated from sputum, blood, toe and thumb wounds, urine, and stool (1a, 3, 6). Nevertheless, the clinical significance of these isolates was difficult to establish.

In 1983, a septicemia with *E. americana* in a mixed infection with an unusual *Pseudomonas* species in an immunocompromised patient suffering from diabetes mellitus, who had undergone a recent open heart surgery and who had multiple intravascular catheters, was described (11). The source of this gram-negative bacteremia remained undetermined. Three years later, an outbreak of *E. americana* bacteremia among patients who had undergone cardiovascular or peripheral vascular surgery occurred in an intensive care unit of the same hospital. After epidemiological investigation, the source was found to be a contamination of the ice bath where surgical equipment was cooled (10).

An outbreak of pseudobacteremia with *E. americana* associated with cross contamination from nonsterile citrated blood collection tubes was described. Twenty patients in a children's hospital were involved in this pseudoepidemic (7, 8). Review of blood-drawing procedures revealed that blood samples for coagulation studies and for culture were drawn with the same syringe and that coagulation tubes were filled before blood culture tubes. Collection tubes for coagulation studies were prepared in the hospital, and *E. americana* was isolated from the citrate of unused coagulation tubes (8). Plasmid profile typing confirmed the association between patients' isolates and isolates from citrate, since a unique four-plasmid profile was present in most of the isolates but absent in eight unrelated *E. americana* control isolates. The isolates described previously were susceptible to most antibiotics, with isolates resistant to aminoglycosides, ampicillin, and narrow- and expanded-spectrum cephalosporins (1a, 2, 10, 11).

We presented a study of an immunocompetent patient who developed a septicemia with an unusual gram-negative rod, *E. americana*, after surgery of the gallbladder. After therapy with temocillin, the patient recovered well. The source of the isolate could not be traced since the origin of the fever episode was attributed to an undocumentable abdominal source and no other bacteriological cultures were taken during this febrile episode. Careful analysis of case studies could help to further clarify the ecology and clinical potential of this organism.

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