Soft Tissue Infection and Bacteremia Caused by *Shewanella putrefaciens*

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*Shewanella putrefaciens* is as yet rarely responsible for clinical syndromes in humans. However, a case involving multiple organs in an elderly male under treatment with appropriate steroids confirms that attention should be devoted to unusual pathogens.

CASE REPORT

An 87-year-old Caucasian male who had come back a few days before from holidays on the Adriatic shore was admitted because of shivering, fever up to 39.8°C, and erysipelas of the left forearm. He complained of malaise, extreme weakness, and severe pain at the upper left extremity. No other relevant symptoms were present. There was a history of “rheumatic myalgia” (not well diagnosable) for which he was on long-term, low-dose methylprednisolone (4 mg once daily); he denied other previous illnesses of note and regular consumption of any drugs.

On exam, he presented as an obese man with a typical Cushing-like face and was febrile (39°C) but hemodynamically stable. A 1.5-cm-long cutaneous-subcutaneous wound was present on the skin near the left elbow, together with erysipelas affecting the whole left forearm. Small-bubbled rattling noises were heard at the level of the left pulmonary basis. In view of the fever, immediate blood (three sets each in aerobic and anaerobic bottles) (BD BACTEC, Benex Ltd., Shannon, Ireland), urine, and stool cultures were taken. Wound exudate was not cultured, nor was skin biopsy performed. Hematological investigations revealed a white cell count of 13.9 × 10^9/liter, a hemoglobin level of 14.0 g/dl, and a platelet count of 370,000/μl (normal range, 0 to 0.5 mg/dl), and the erythrocyte sedimentation rate was 37 mm (normal range, 0 to 10 mm). Chest X-ray film showed a segmental infiltrate in the left lower lobe very close to the diaphragm muscle and consistent with pneumonia. No sputum cultures were obtained, and the stable general conditions of the patient suggested delaying a bronchoscopy in order to recover lung aspirate. The patient was given empirical antimicrobial therapy with intravenous sulbactam-ampicillin and ceftriaxone, and which gave an excellent confidence level for the identification, and with the semiautomated Api ID 32 GN method (bioMérieux), which is based on 32 assimilation tests. This second assay offered a 96.5% probability for *S. putrefaciens*. Antimicrobial susceptibility determinations were automatically performed through the VITEK system, which yielded the MICs reported in Table 1; then, the Kirby-Bauer agar diffusion method was used as a confirmatory tool.

Both *S. putrefaciens* and *Shewanella alga* are uncommon as isolates from clinical syndromes, their natural habitats being all forms of water, fish, oily foodstuffs, and soils (2, 4, 11). Indeed, this is the first case, to our knowledge, of such isolates in Italy. Initially classified as *Pseudomonas* spp., their importance in human pathology has become evident in the last years as reports of different kinds of infection have increased (1, 5, 6, 9–12). Experimental works have allowed differentiation of these two pathogens on the basis of their genetics and metabolism, thus also allowing review of the previously published clinical experiences (7, 11). In light of these findings, and though a definitive taxonomy of the genus is still debated, microbiology diagnostic tools have become more refined and presently permit a distinction between the two species (6). In...
particular, based on the oxidation of various carbohydrates. Khashe and Janda distinguished two main biotypes of *S. putrefaciens*: biotype 1 produces acid from maltose, sucrose, and arabinose, whereas biotype 2 could be chiefly separated by the inability to oxidize maltose and sucrose (7). In contrast, *S. alga* strains do not oxidize these carbohydrates at all (7). Thus, this different utilization of carbohydrates, together with different growth at 42°C or in 6.5% NaCl and the production of a hemolytic substance, would make easier the separation of these species from one another (7). Moreover, it has been suggested that different tolerance to some antimicrobials seems to provide a reliable phenotypic characterization between them (11). However, it should be remarked that the chemosensitivity patterns of nonfermenting gram-negative rods in Italy are extremely variable with respect to carbapenems, and it is therefore not unusual to find isolates with great differences between each other in the MICs of imipenem and meropenem. In addition, the absolute rarity of such isolates makes the definition of a reference phenotype very difficult. *S. alga* appears to be more closely related to human illnesses than *S. putrefaciens* (7, 11). The reason for the difference in pathogenic potential, though still unclear, could lie in some hemolytic factors or exotoxins that are expressed by *S. alga* and not by *S. putrefaciens*; also, the different pattern of resistance to antimicrobials could explain, in part, such a difference (7). Nevertheless, *S. putrefaciens* also retains pathogenic potential, mainly under special environmental circumstances. Indeed, most of the reported infections pertained to contact with contaminated waters or injuries or occurrences in which integrity of the skin was compromised to some extent (3, 4, 9, 10, 12); this last issue encompasses also long-term catheters (1). In addition, isolation of *S. putrefaciens* occurred in polymicrobial infections (3).

In our opinion, this new case of infection and consequent bacteremia caused by *S. putrefaciens* strengthens the hypothesis that attention should always be extended also to unusual pathogens, especially under particular circumstances. Despite the relatively better sensitivity to antimicrobials of *S. putrefaciens* compared to *S. alga*, they both should probably be regarded as emerging opportunistic pathogens in taking care of immunosuppressed patients (8).

### REFERENCES