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CASE REPORTS

First Case of Fulminant Sepsis Due to *Wohlfahrtiimonas chitiniclastica*▽

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We report the first case of fulminant sepsis due to *Wohlfahrtiimonas chitiniclastica*. This case is also the first one reported in South America. We emphasize the importance of recognizing bacteria that live in the larvae of a parasitic fly as the causative agent of severe infections in homeless patients.

CASE REPORT

A 70-year-old homeless male patient was admitted to the emergency department of Eva Peron Hospital, Buenos Aires, Argentina, in June 2008 because of sensory impairment.

He had a history of alcohol abuse, severe smoking, and occlusive peripheral arteriopathy of the lower limbs (with a 30% obstruction of the external iliac artery) without medical control since 1997.

On admission, the patient was found to be disoriented, he did not answer simple commands, and he had isochoric pupils which showed hyporeactivity. His vital signs were as follows: nonrecordable blood pressure; pulse (heart) rate, 75 beats/min; respiratory rate, 40 breaths/min; body temperature, 35°C (95°F), and signs of peripheral hypoperfusion.

Physical examination revealed that the patient was in very poor sanitary condition.

In both inguinal regions, the presence of multiple erythematous plaques covered by "honey-colored" crusts was observed; these lesions could not be cultivated.

On respiratory auscultation, the patient showed coarse crackles in the right lower quadrant. Also, he presented weak peripheral pulses with no edema and jugular vein distention 2/3. The abdomen was soft and tender on palpation with preserved bowel sounds.

The clinical picture was interpreted as a probable septic shock.

Laboratory findings of the peripheral venous blood sample on admission were as follows: white blood cell count, 5,000/mm^3 (with 86% neutrophils); hematocrit, 18.4%; hemoglobin count, 6.1 g/dl; and platelet count, 135,000/mm^3. An arterial blood gas analysis showed a pH of 7.18, a partial CO_2 pressure of 35.0 mm Hg, a partial O_2 pressure of 136.0 mm Hg, HCO^{3-} concentration of 13.1 mmol/liter, 97.0% O_2 saturation, and a −14 meq/liter base excess.

His serum biochemistry results were as follows: [Na^+], 138 meq/liter; [K^+], 6.8 meq/liter; blood urea nitrogen level, 406 mg/dl; and creatinine level, 12.6 mg/dl. Treatment with intravascular fluids (500 ml of 5% dextrose, 1,500 ml of saline [0.9%], and 100 mg thiamine) was initiated. A urinary catheter and central line were placed, and two blood culture sets and a urine culture were performed. Empirical treatment with ciprofloxacin (400 mg given every 12 h intravenously [i.v.]) and ampicillin-sulbactam (1.5 g every 6 h) was started.

After admission to the intensive care unit (ICU), the patient presented sustained hypotension, hypoglycemia, respiratory failure, and oliguria, requiring the use of vasopressors (noradrenaline and dopamine), intravascular volume expansion, mechanical ventilation, and transfusion of 2 units of packed red blood cells.

Hemodialysis was attempted on the third day of his intensive care unit stay, but it was not tolerated by the patient.

The urine culture was negative and in the 2 blood culture sets (BacT/Alert; bioMérieux, Marcy l'Etoile, France) taken at the time of admission, at two different times, there was pure growth of Gram-negative rods. With the preliminary report of nonfermenting Gram-negative bacillus isolation in blood cultures, the antibiotic treatment was changed to ceftazidime plus amikacin.

Colonies on nutrient agar were entire, convex, smooth, and glistening with spreading after an incubation of 24 h at 35°C. The organism was identified using standard biochemical tests (9) as Gilardi rod group 1 and by API 20 NE (bioMérieux, Marcy L'Etoile, France) as *Brevundimonas diminuta* or *Oligella urethralis* (with 88.5% accuracy). Biochemical test results for the isolate and related microorganisms are shown in Table 1.

PCR amplification of the 16S rRNA was performed in order to identify the correct species. PCR product of the 16S rRNA gene, using the primers described by Weisburg et al. (13), was obtained with the *Taq* DNA polymerase based on the manu-

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TABLE 1. Biochemical identification of *Wohlfahrtiimonas chitiniclastica* isolate

Biochemical test	Result[a] for:				
	Our isolate	Gilardi rod group 1	*W. chitiniclastica*	*Schineria larvae*	*Neisseria weaveri*
Oxidase activity	+	+	+	V	+
Motility	−	−	−	−	−
Urease activity	−	−	−	++	−
Phenylalanine deaminase	++	++	+	+	V
Nitrate reduction	−	−	ND	−	−
Nitrite reduction	−	−	ND	ND	+
Esculine hydrolysis	−	−	−	−	−
Growth at pH 5	++	ND	++	−	ND
Oxidation of glucose	−	−	−	−	−

[a] Symbols: +, positive; ++, strong positive reaction; −, negative. Abbreviations: V, variable; ND, not done. Data for Gilardi rod group 1 and *N. weaveri* are from reference 9. Data for *Wohlfahrtiimonas chitiniclastica* are from references 1 and 12, and data for *Schineria larvae* are from references 1, 11, and 12.

TABLE 2. Antibiotic susceptibility (MIC) of *W. chitiniclastica* clinical isolate

Antimicrobial agent(s)	MIC (μg/ml)	Interpretation[a]
Penicillin	0.25	S
Amoxicillin	0.064	S
Piperacillin	0.25	S
Ceftazidime	0.032	S
Ceftriaxone	0.008	S
Imipenem	0.125	S
Meropenem	0.004	S
Trimethoprim-sulfamethoxazole	0.25	S
Gentamicin	1.0	S
Ciprofloxacin	0.032	S
Tetracycline	1.0	S
Minocycline	2.0	S

[a] S, sensitive.

facturer's specifications (Promega). Sequencing of the 1.4-kb PCR product was performed on both DNA strands using an ABI Prism 3100 BioAnalyzer instrument at the Utah State University sequencing facility. The sequences were analyzed with the BLAST V2.0 software available at the website (http://www.ncbi.nlm.nih.gov/BLAST/). Sequencing analysis revealed a 99% identity with the sequence corresponding to the 16S rRNA gene of *Wohlfahrtiimonas chitiniclastica* strain 5401129 (GenBank accession no. EU484335).

Susceptibility to 13 antimicrobial agents was determined by the Etest technique (bioMérieux) on Mueller-Hinton agar in accordance with the manufacturer's instructions. The MIC breakpoints used in this study were those established by the Clinical and Laboratory Standards Institute (CLSI) in 2008 (2) for other bacteria that do not belong to the *Enterobacteriaceae* family. The MICs for the *Wohlfahrtiimonas chitiniclastica* isolate are shown in Table 2.

The patient developed hypotension and signs of peripheral hypoperfusion and hypoglycemia refractory to treatment. He remained in septic shock with a profound metabolic acidosis and died 5 days after admission to the hospital.

The relationship between Gilardi rod group 1 and *Schineria* spp. has previously been observed by K. Bernard. Three strains studied with the use of 16S rRNA sequence analysis indicate a close relationship with a new taxon group with the proposed designation *Schineria* (1). *Wohlfahrtiimonas chitiniclastica* is phylogenetically close to *Ignatzschineria larvae* (formerly *Schineria larvae*) (10), which causes severe wound myiasis in cattle.

While *I. larvae* was isolated from a homogenate sample of first- and second-stage larvae of the obligate parasitic fly *Wohlfahrtia magnifica* in 1997 and described by E. Toth et al. in 2001 (11), *W. chitiniclastica*, described by the same authors in 2008, was isolated from the homogenate of third-stage larvae of the same fly (12).

Although no larvae or worms were found in the patient's groin injury, we could speculate that the skin lesions where the larvae developed were colonized or infected with the organism which then entered the bloodstream.

Two cases of bacteremia due to *Ignatzschineria larvae* (4, 8) and another one due to *Wohlfahrtiimonas chitiniclastica* (7) have been described in adults with myiasis. The first *I. larvae* case was in a 76-year-old farmer with diabetes and myiasis of the leg, scrotum, and anus that responded favorably to treatment with ofloxacin plus oxacillin (4). The second patient was a middle-aged homeless man, with alcoholic neuropathy and foot wound myiasis which responded to antimicrobial therapy with cefotaxime plus ofloxacin but was reinfected with a new strain of *I. larvae* 3 months later (8).

The only case of bacteremia due to *Wohlfahrtiimonas chitiniclastica* was recently described by S. Rebaudet et al. (7) in a 60-year-old homeless woman with a history of alcoholism. She was covered with thousands of body and hair lice, and dozens of insect larvae were in her hair. She had ulcers on her scalp but no maggots. She responded favorably to ceftriaxone therapy. All of these cases occurred in southeastern France.

Although these flies are present in southeastern France, several cases of myiasis have also been reported in the literature in Europe, Asia, Morocco, and Egypt (3). However, *Wohlfahrtia* does not exist in South America (5). In Argentina, there are three species of flies that are obligate parasites that cause myiasis in humans: *Cochliomyia hominivorax*, which is present almost throughout the entire country, and *Dermatobia hominis* and *Oestrus ovis*, which attack mainly ruminants (6). Since there are no published works related to the study of the microbial flora in native Argentine flies and no entomology teams engaged in this analysis, we cannot ensure that *W. chitiniclastica* forms part of the flora of these flies; however, we cannot exclude the possibility. More studies are needed to clarify this issue.

We would like to highlight the importance of recognizing bacteria that colonize the larvae of parasitic flies as the causative agent of severe infections in homeless patients or patients with poor hygiene.

Nucleotide sequence accession number. The sequence obtained for the *W. chitiniclastica* 16S rRNA gene has been submitted to GenBank under accession no. JF692205.

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