

Cutaneous infection and bacteraemia caused by *Erwinia billingiae*: a case report

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Abstract

Cellulitis and erysipelas are common skin infections usually caused by *Staphylococcus aureus* and streptococci. Gram-negative rods are rarely implicated. We report here a case of dermohypodermatitis and bacteraemia caused by *Erwinia billingiae*, a Gram-negative bacteria usually pathogenic and epiphytic to pome fruit tree.

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Introduction

Acute bacterial skin infections like cellulitis and erysipelas are common skin infections, with an incidence rate of 1/1000 per year [1]. They are usually caused by aerobic Gram-positive bacteria, such as *Staphylococcus aureus* and group A β -haemolytic streptococci, and only rarely by Gram-negative bacteria such as *Pseudomonas aeruginosa* and other enterobacteria (i.e. *Klebsiella* spp., *Proteus mirabilis*) [2–5]. Common risk factors include lymphoedema, disruption of the cutaneous barrier and toe–web intertrigo [6]. Blood cultures are positive in about 5 to 10% of cases [5,7].

Erwinia billingiae is a Gram-negative bacteria belonging to the *Enterobacteriaceae* family which is usually pathogenic to plants [8]. Human infections by *Erwinia*-like microorganisms are rarely described. The first case reported in the literature was that of an 88-year-old woman with a urinary tract infection related to *Erwinia persicinus* [9]. The second case concerned a 79-year-old woman with cervical lymphadenitis caused by an *Erwinia tasmaniensis*-like organism [10].

Case presentation

In July 2015, a 40-year-old man with known chronic hepatitis C sought care at our emergency department with a painful redness of his third right toe which was rapidly spreading to the back of his foot. It had appeared the previous day after a barefoot walk in the grass. He did not complain of shivering or fever. There was no history of clear trauma or insect bite.

Examination revealed a painful, diffuse oedema and redness of his third toe and the back of his foot (Fig. 1A), compatible with dermohypodermatitis and associated with lymphangitic streaking up to the medial calf (Fig. 1B), as well as painful and swollen popliteal and inguinal lymph nodes. The interdigital space showed lesions suggestive of intertrigo. He did not manifest other local or general symptoms.

Conventional X-rays of the foot did not reveal an underlying bone injury or the presence of foreign bodies. Blood culture samples and skin squames were collected.

According to local guidelines, an empiric antibiotic treatment with amoxicillin–clavulanic acid (first dose 2.2 g iv followed by 1 g twice a day orally) was started [1,10]. In addition, the patient's right leg and foot were immobilized in a posterior cast. We prescribed once-daily thromboprophylaxis with subcutaneous dalteparin sodium 5000 IU and a systemic nonsteroidal anti-inflammatory drug (ibuprofen) with no weight bearing permitted. One out of two pairs of blood cultures grew *Erwinia billingiae*. Antibiogram revealed resistance to all β -lactam antibiotics except carbapenems, intermediary resistance to gentamicin, and sensitivity to ciprofloxacin and cotrimoxazole. Furthermore, the local samples of his intertoe compartments revealed the presence of the dermatophyte *Trichophyton rubrum*.

Because of the results of the susceptibility testing, antibiotic treatment was changed to oral ciprofloxacin 500 mg twice daily and continued for 14 days. Further clinical evolution was favourable: the patient did not report any additional fever, and the local redness, oedema and pain rapidly resolved.

At follow-up 2 months later, the patient remained asymptomatic and without any sequelae.



FIG. 1. Initial clinical presentation. (A) Redness of third toe and over back of foot. (B) Lymphangitic redness up to medial calf (marked in blue).

Discussion

To our knowledge, this is the first case of human infection caused by *Erwinia billingiae* reported in the literature. *Erwinia billingiae* is a Gram-negative bacterial strain belonging to the *Enterobacteriaceae* family, first described in 1999 [11]. Species in this genus are similar to *Pantoea* and *Enterobacter* species, and many *Erwinia* species have been reclassified into these groups [8,12]. Usually *Erwinia* species are plant-associated bacteria, pathogenic or not [13–15]. Pathogenic species like *Erwinia amylovora* and *Erwinia pyrifoliae* are connected with so-called pome fruit diseases (i.e. the fire blight of apples), while species like *E. tasmaniensis* and *E. billingiae* are rather epiphytic, nonpathogenic bacteria [16]. Clinical isolates of *Erwinia* spp. are rare: *Erwinia persicina* was isolated from the urine of a woman with a urinary tract infection [9], and *E. tasmaniensis* was found in a biopsy tissue sample of cervical lymphadenitis [10]. Other case reports describe *Erwinia* spp. as a possible causative agent of urinary tract infections [17]. However, it is not clear if the organism actually caused the infection.

In the present case the patient exhibited dermohypodermatitis associated with bloodstream infection due to *Erwinia billingiae*. Our hypothesis is that the interdigital intertrigo and the bare-foot walk in a grassy field were the risk factors for this infection. Even if a skin biopsy demonstrating bacterial growth was not performed, the favourable clinical course after receipt of

directed antibiotic therapy suggests a possible implication of this *Erwinia* strain as an opportunistic agent in this infection.

Conflict of interest

None declared.

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