

Bergeyella zoohelcum Septicaemia of a Patient Suffering from Severe Skin Infection

Petri K. Kivinen, Marjo-Riitta Lahtinen, Eija Ruotsalainen, Ilkka T. Harvima and Marja-Leena Katila

Departments of Dermatology, Medicine and Clinical Microbiology, Kuopio University Hospital, P.O. Box 1777, FIN-70211 Kuopio, Finland. E-mail: Petri.Kivinen@kuh.fi

Accepted September 10, 2002.

Sir,

Bergeyella zoohelcum belongs to a complex of flavobacterium-like bacteria that rarely cause disease in man (1, 2). All opportunistic bacteria, including *B. zoohelcum*, may cause clinically relevant diseases that need appropriate and effective therapy. They may also be more virulent than is commonly believed, causing even life-threatening infections, especially in immunocompromised patients. In this letter, we describe a clinically and bacteriologically verified rare bacteraemic skin infection caused by *B. zoohelcum*. In ascertaining the specific microbiological diagnosis of the skin infection it was possible to prevent further serious complications.

CASE REPORT

A 77-year-old woman with mild Morbus Alzheimer was referred to a tertiary care hospital with symptoms and signs of erysipelas. She lives alone with her cat in the countryside and receives home nursing care. She had a previous history of diabetes type II with insulin therapy, pernicious anaemia, hypertension with heart failure and polymyalgia rheumatica. Owing to polymyalgia she used methyl prednisolone 4 mg once a day. She had had a fracture of the left tibia several years earlier. One year prior to the present episode she was seen by a dermatologist because of a leg ulcer and pain with slight eczema and venous insufficiency. Given proper instructions for home care, the ulcer healed, as confirmed later that year by the dermatologist.

A few days prior to hospitalization, a small non-excreting V-shaped excoriation appeared on the anterior-lateral surface of the left leg. Rapidly developing redness, severe pain and swelling around the excoriation were noticed, raising the suspicion of erysipelas or even deep venous thrombosis, and she was referred to the emergency department of the university hospital. Careful clinical examination revealed mild dehydration and mild confusion. Heart auscultation was normal. She had palpable chronic dermatitis with swollen and painful superficial veins in the left leg and an excoriation (4 mm × 5 mm) covered with crust and strong redness on the periphery. She also had several haematomas in the upper arms. No other symptoms of severe illness were found. Deep venous thrombosis was excluded by ultrasound examination. Axillary body temperature was 36.9°C. Laboratory investigations revealed a C-reactive protein (CRP) count of 144 mg/l, leukocyte count of 13.9×10^9 cells/l, haemoglobin 1.78 mmol/l, platelet count of 250×10^9 /l and creatinine 127 µmol/l. Serum electrolytes were found to be normal. A poor balance between diabetes and highly elevated plasma glucose, 21.4 mmol/l, was also diagnosed. No bacterial culture samples could be taken from the V-shaped excoriation because of dryness. Two sets of blood culture samples were taken (Bactec 9240 System, Becton Dickinson Microbiology System, Sparks, Mass.). Hence, the clinical diagnosis of the dermatologist was superficial thrombophlebitis with erysipelas.

The woman was admitted to department care at the dermatology unit. Wet saline compresses were set twice a day as local treatment on the swollen erysipelas area of the left leg. Dermatitis was treated locally with 17-hydrocortisone butyrate ointment twice a day. She was

given acetosalicylic acid 75 mg orally once a day, and the insulin dosage was adjusted. Owing to a history of penicillin allergy she was given cefuroxim 1.5 g/8 h intravenously. An obligate aerobic Gram-negative rod was recovered from the aerobic culture bottles (Bactec Plus Aerobic) of the two blood culture samples after 2 and 4 days' incubation, respectively. Initial identification of the isolates indicated *Myroides* sp., but supplementary identification tests verified the species as *B. zoohelcum*. Because the patient made a quick recovery, the first culture result was clinically interpreted as contamination, but recovery of the same rare species also from the other sample verified true bacteraemia. In addition, the diagnosis of erysipelas was changed to severe skin infection or cellulitis. The *B. zoohelcum* strain was sensitive to all β-lactam antibiotics, including penicillin and cefuroxim, as well as to aminoglycosides and quinolones, but resistant to cotrimoxazole. After therapy with cefuroxim 1.5 g/8 h intravenously she soon completely recovered, with a CRP level of 6 mg/l measured after 6 days. No fever was observed and no symptoms of severe septic infection were found during department care. At the end of department care, neither erysipelas nor ulcerative findings were detectable, but mild thrombophlebitis still persisted. As a home care patient she was prescribed peroral cephalixin 750 mg three times a day for 10 days and after that cephalixin 750 mg twice a day for 15 days — a total of 25 days. Acetosalicylic acid therapy for thrombophlebitis with other adjusted medication dosage was continued.

DISCUSSION

B. zoohelcum belongs to a complex of flavobacterium-like non-fermentative Gram-negative rods which rarely cause disease in man (1). The species was initially introduced as a CDC group IIj organism, but was soon placed taxonomically in the genus *Weeksella* as *Weeksella zoohelcum* (2) together with *W. virosa*, a known inducer of human infections (3). However, studies on genetic differences from *W. virosa* indicated a separate genus, and the genus *Bergeyella* was recently established (4). Typical of the species among flavobacterium-like Gram-negative rods is its susceptibility to penicillin. *B. zoohelcum* has been isolated from commercial microbial flora of many felines and dogs (5), as well as from a variety of food sources (6). The virulence of *B. zoohelcum* is variable, but it is known to cause opportunistic infections. It is rare in human clinical samples, but it has been isolated from wounds and abscesses caused by animal bites, mostly dog bites. Infections have also been associated with long exposure to cats or dogs without pre-existing trauma (7), especially in older people (8). Only two reports of the former *W. zoohelcum* (9) and *B. zoohelcum* septicaemia (10) and one of meningitis (11) have been published earlier.

Here, we describe a clinically and bacteriologically verified bacteraemic infection caused by *B. zoohelcum*

of a woman with impaired health and many mild illnesses with steroidal and diabetic medication. To find out how rare a case we had, we checked through the bacteriological register of Kuopio University Hospital and found only one report of *B. zoohelcum* infection — a dog bite wound in a 14-year-old girl — within the past 10 years. Unusual isolates in bacterial infections are commonly of zoonotic origin. Though dog and feline bites are usually polymicrobial (5), associated septicaemia is polymicrobial on only very rare occasions. In Finland, mammalian bites are caused mainly by cats and dogs, and *Pasteurella multocida*, *Moraxella* spp. and *Capnocytophaga* spp. are the most commonly isolated species. Among them, *C. canimorsus* has been associated with life-threatening septic infections, even in patients without immunocompromising conditions (own unpublished data). In the USA, mammalian bites are a considerable clinical problem and lead to 1% of all emergency room visits (12).

Our patient case did not initially indicate a zoonotic origin of her leg infection. The small and superficial V-shaped ulceration visible on arrival at the hospital could have been caused by her coming against the sharp edge of a piece of furniture. The methyl prednisolone that she had been using for polymyalgia rheumatica for years had caused the atrophy of the skin. Also, the skin haematomas detected indicated that she was at increased risk of bleeding after minor trauma. During department care, she said she had a cat that slept on top of her legs daily, but she could not remember whether the cat had scratched her leg. According to visiting relatives, the cat licked her skin. The ulceration was situated at the site of a former fracture, where easy tissue penetration could be expected via emaciated skin and subcutaneous tissue. Unbalanced diabetes and steroid therapy were additional risk factors for septicaemia.

This rare case points to how impaired health combined with a lack of reliable anamnesis, may hide uncommon sources of infection. The port of entry for the infection may also be almost imperceptible, but, once detected, usually very logical. According to European recommendations, erysipelas is considered exclusively to be a Streptococcal disease which made us change the diagnosis. Though other bacteria can cause similar locally restricted infections that clinically resemble erysipelas or cellulitis they should be classified as skin infections, not as erysipelas, despite similar treatment.

Opportunistic bacteria with low virulence, and only rarely recovered, may cause clinically relevant disease needing appropriate and effective therapy. These bacteria may also be more virulent than is commonly believed, causing even life-threatening infections in immunocompromised patients. Bacterial endocarditis has been associated with low virulence bacteria recovered from animal bite wounds and rarely causes bacteraemia, e.g. *Moraxella* spp. (13), *P. multocida* (14) and *Capnocytophaga* spp. (15). Reports are available on bacteraemia and meningitis, but none on endocarditis

caused by *B. zoohelcum*. Left untreated, the likely risk of endocarditis is similar to that of other bacteria of zoonotic origin. Whether the thrombophlebitis played a role in developing the severe skin infection remains unclear, but it possibly took part in the sequence of events leading to septicaemia.

REFERENCES

1. Botha WC, Jooste PJ, Britz TJ. The taxonomic relationship of certain environmental flavobacteria to the genus *Weeksella*. J Appl Bacteriol 1989; 67: 551–559.
2. Holmes B, Steigerwalt AG, Weaver RE, Brenner DJ. *Weeksella zoohelcum* sp. nov. (formerly group IIj) from human clinical specimens. Syst Appl Microbiol 1986; 8: 191–196.
3. Reina J, Gil J, Salva F, Gomez J, Alomar P. Microbiological characteristics of *Weeksella virosa* (formerly CDC group IIj) isolated from the human genitourinary tract. J Clin Microbiol 1990; 28: 2357–2359.
4. Vandamme P, Vancanneyt M, Monsieurs M, Cookson B, Wirsing von Konig CH, Kersten K, Blackall PJ. New perspectives in the classification of the flavobacteria: description of *Chryseobacterium* gen. nov., *Bergeyella* gen. nov., and *Empedobacter* nom. rev. Int J Syst Bacteriol. 1994; 44: 827–831.
5. Talan DA, Citron DM, Abrahamian FM, Moran GJ, Goldstein EJ. Bacteriologic analysis of infected dog and cat bites. Emergency Medicine Animal Bite Infection Study Group. N Engl J Med 1999; 340: 85–92.
6. Botha WC, Jooste PJ, Hugo CJ. The incidence of *Weeksella*- and *Bergeyella*-like bacteria in the food environment. J Appl Microbiol 1998; 84: 349–356.
7. Grimault E, Glerant JC, Aubry P, Laurans G, Poinso JP, Jounieaux V. [Uncommon site of *Bergeyella zoohelcum*. Apropos of a case]. Rev Pneumol Clin 1996; 52: 387–389.
8. Blain H, George MY, Jeandel C. Exposure to domestic cats or dogs: risk factor for *Pasteurella multocida* pneumonia in older people? J Am Geriatr Soc 1998; 46: 1329–1330.
9. Noell F, Gorce MF, Garde C, Bizet C. Isolation of *Weeksella zoohelcum* in septicaemia. Lancet 1989; 2: 332.
10. Montejo M, Aguirrebengoa K, Ugalde J, Lopez L, Saez Nieto JA, Hernandez JL. *Bergeyella zoohelcum* bacteraemia after a dog bite. Clin Infect Dis 2001; 33: 1608–1609.
11. Bracis R, Seibers K, Julien RM. Meningitis caused by group Iij following a dog bite. West J Med 1979; 131: 438–440.
12. Tan JS. Human zoonotic infections transmitted by dogs and cats. Arch Intern Med 1997; 157: 1933–1943.
13. Christensen CE, Emmanouilides GC. Bacterial endocarditis due to “*Moraxella* new species I”. N Engl J Med 1967; 277: 803–804.
14. Gump DW, Holden RA. Endocarditis caused by a new species of *Pasteurella*. Ann Intern Med 1972; 76: 275–278.
15. Montejo Baranda M, Acha Arrieta V, Hernandez Almaraz J, Perez Rodriguez M, Antonana Oraeta M, Aguirre Errasti C. Two cases of *Capnocytophaga* bacteraemia, one with endocarditis. Can Med Assoc J 1984; 130: 1420.