Necrotizing Fasciitis Caused by *Haemophilus influenzae* Type b in an Elderly Patient

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Published ahead of print on 30 December 2008.

CASE REPORT

An 81-year-old Japanese woman presented to the outpatient dermatology department at Kyoto University Hospital with painful swelling of the left leg. She had a history of type II diabetes mellitus and had not previously been vaccinated against *Haemophilus influenzae* type b. Physical examination revealed swelling, erythema, purpura of the left lower extremity, and hemorrhagic bullous lesions of the left dorsum (Fig. 1). Swelling and erythema spread rapidly to the left lower limb, and she became unconscious 1 h after presentation. The patient was therefore transferred to the intensive care unit.

Examination revealed the following: temperature, 36.4°C; heart rate, 132 beats/min; respiratory rate, 24 breaths/min; blood pressure, 107/88 mmHg. Laboratory examinations showed the following: white blood cell count, 3.5 × 10⁹ cells/liter with 3% segmented cells, 38% band cells, 22% metamyelocytes, 21% myelocytes, 15% lymphocytes, and 1% eosinophils; platelet count, 34,000/liter; prothrombin time, 18.0 s; activated partial thromboplastin time, 42.7 s; fibrinogen, 839 mg/dl; fibrin level, 28.1 mg/dl. Blood gas analysis under room air revealed pH, 7.188; pCO₂, 31.6 mmHg; pO₂, 70.7 mmHg; HCO₃⁻, 15.2 mmol/liter; base excess, −15.2 mmol/liter.

Two sets of blood cultures, with BacT/Alert aerobic (FA) and anaerobic (FN) bottles (bioMérieux, Marcy l’Etoile, France), were performed. Bedside biopsy material from the affected area of the left lower extremity yielded gram-negative rods on Gram staining. Combination antibiotic therapy including meropenem (1 g/day divided into two doses) and minocycline (400 mg/day divided into two doses) adjusted to renal dysfunction was empirically started. Extensive debridement was performed 7 h after presentation. The subcutis, fascia, and muscles were totally necrotic. As complications of acute renal failure were also present, continuous hemodialysis was initiated.

On hospitalization day 2, all blood cultures obtained on admission revealed gram-negative rods on Gram staining. On hospitalization day 3, *H. influenzae* was isolated with the RapID NH system (Remel, Lenexa, KS) from all blood cultures and surgical specimens of bedside biopsy material and debrided tissue. Antibiotic susceptibility tests performed by the microdilution method with an MIC2000 system (Nagase, Tokyo, Japan). A type b isolate was confirmed by using *H. influenzae* antisera a to f (Denka Seiken, Tokyo, Japan). A type b isolate was confirmed by using *H. influenzae* antisera a to f (Denka Seiken, Tokyo, Japan).

Necrotizing fasciitis was confirmed histopathologically with debrided tissue revealing necrosis from dermis to fascium, along with capillary thrombosis and polymorphonuclear leukocytic infiltration (Fig. 2). The patient was switched to cefotaxime (4 g/day divided into two doses) adjusted to renal dysfunction according to in vitro results of antibiotic susceptibility testing. The patient had received intravenous cefotaxime for a total of 28 days until 31 days after presentation. Extensive autografting was performed to close the wound 71 days after admission. The patient recovered fully and was discharged from the hospital 135 days after admission.

Necrotizing fasciitis is an infectious process that progressively destroys the subcutaneous fascia and fat while relatively sparing the underlying muscle (14). Mixed aerobic and anaerobic microorganisms or group A streptococci have generally been considered responsible for necrotizing fasciitis (13), and the condition is associated with substantial morbidity and mortality in the absence of aggressive surgical and antibiotic therapy (7). A review of the English literature revealed seven case reports of *Haemophilus*-associated necrotizing fasciitis (1, 3–5, 7, 9, 10, 12, 13).
Among these cases of necrotizing fasciitis associated with *H. influenzae*, the first case was of lower limb necrotizing fasciitis caused by *H. influenzae* type b in a 13-month-old infant (3). The second case was caused by unencapsulated *H. influenzae* in a 45-year-old patient with insulin-dependent diabetes mellitus who developed necrotizing fasciitis in the right gluteal region and lateral thigh (12). In the third case, fatal lower limb necrotizing fasciitis was caused by *H. influenzae* type f in a 65-year-old patient with a history of hypertension, gout, and excessive alcohol consumption (8). The fourth case occurred in a 79-year-old man with non-insulin-dependent diabetes, with craniofacial necrotizing fasciitis occurring secondary to maxil-
lary sinusitis from which *H. influenzae* (type unknown) was isolated in association with group A streptococci, *Staphylococcus aureus*, and *Streptococcus pyogenes* (11). The fifth case occurred in a 19-month-old infant with necrotizing fasciitis involving the parapharyngeal space, from which nontypeable *H. influenzae* was isolated in association with *S. aureus*, *Bacteroides fragilis*, and *Peptostreptococcus* species (1). In the sixth case, necrotizing fasciitis was associated with *H. aphrophilus* in a 35-year-old patient; it was caused by intravenous injection of a dissolved methylphenidate hydrochloride tablet (5). The final case involved cervical necrotizing fasciitis caused by *H. aphrophilus* in a 5-month-old infant (4). Necrotizing fasciitis caused by *H. influenzae* type b thus appears rare. The present case thus represents the first case of adult necrotizing fasciitis caused by *H. influenzae* type b.

In Japan, *H. influenzae* type b vaccination is not conducted routinely in childhood. The widespread use of effective conjugate vaccines has substantially decreased infections with *H. influenzae* type b (2, 10). Conversely, the incidence of invasive *H. influenzae* disease among persons over 65 years old and invasive nontypeable *H. influenzae* disease increased from 1996 to 2004 (6). The frequency of cases of *H. influenzae* type f involving necrotizing fasciitis has remained almost unchanged during this period (6). Whether necrotizing fasciitis caused by *H. influenzae* is becoming more common is therefore unclear.

Invasive *H. influenzae* disease has occurred in the extreme ages of life in patients with predisposing conditions such as an age of >65 years and diabetes mellitus (7). Diabetes mellitus is a clinical characteristic that may facilitate the development of necrotizing fasciitis (13). Our patient displayed predisposing factors such as old age (81 years), diabetes mellitus, and no vaccination against *H. influenzae* type b, allowing the development of necrotizing fasciitis caused by *H. influenzae* type b.

We reported the case of an 81-year-old Japanese woman with diabetes mellitus who developed necrotizing fasciitis caused by *H. influenzae* type b in which extensive debridement and antibiotic therapy were effective. Physicians should consider that invasive *H. influenzae* type b disease, including necrotizing fasciitis, can occur even in elderly patients.

### REFERENCES