

***Pasteurella multocida* septic shock in an immunocompromised host**

Choque séptico por Pasteurella multocida em imunocomprometido

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Abstract

Pasteurella multocida is the most common cause of soft tissue infection in humans following bites caused by dogs and (particularly) cats. Transmission may also occur after scratches inflicted by these animals. The authors present the case of a 78-year-old immunocompromised male who presented to the emergency department with fever and inflammatory signs on his right hand following a cat scratch. He was started on empirical intravenous antibiotics which, after isolation of *Pasteurella spp.* on a swab sample, was subsequently directed. A total of 3 weeks of antibiotics were administered, the patient improved and was discharged. Ten days after he returned to the hospital with septic shock secondary to recurrence of the cellulitis, and *Pasteurella multocida* was identified on blood cultures. After availability of the antibiotic sensitivity test, 6 weeks of levofloxacin and penicillin were administered. The patient recovered, despite being immunocompromised and *Pasteurella spp.* bacteremia having a relevant mortality rate.

Keywords: *Pasteurella multocida*. Shock. Septic. Immunocompromised host.

Resumo

A *Pasteurella multocida* é um dos agentes mais comuns em infeções dos tecidos moles ocorrendo após mordedura de cães e (particularmente) gatos. A transmissão também pode ocorrer após arranhadelas desses animais. Os autores apresentam o caso de um homem de 78 anos, imunocomprometido, que recorre ao serviço de urgência por febre e sinais inflamatórios na mão direita após arranhadela de gato. Iniciou antibioterapia endovenosa empírica, dirigida após isolamento de *Pasteurella spp.* em zaragatoa. Após 3 semanas de antibioterapia o doente melhorou e teve alta. Dez dias após retorna ao hospital por choque séptico com ponto de partida em recorrência da celulite, havendo crescimento de *Pasteurella multocida* em hemoculturas. Após resultado do teste de suscetibilidade a antimicrobianos, completou 6 semanas de levofloxacina e penicilina. O doente recuperaria, não obstante ser imunocomprometido e as taxas de mortalidade serem consideráveis na bacterémia por *Pasteurella spp.*

Palavras-chave: *Pasteurella multocida*. Choque séptico. Hospedeiro imunocomprometido.

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Case report

A 78-year-old male with hypertension and untreated acute myeloid leukemia was observed at the emergency department due to inflammatory signs of his hand starting 1 week after being scratched by his domestic cat, without cleaning or disinfection of the wounds. At admission, he was febrile and hemodynamically stable, his right hand had exuberant edema, erythema, with purpura, bullae and necrotic areas (Fig. 1), with significant pain, but no lymphangitis or lymphadenopathies, and no abscesses on ultrasound. Laboratory workup revealed anemia (hemoglobin 7.2 g/dL), thrombocytopenia ($119 \times 10^9 /L$), normal leucocyte count with 15.3% blast cells, elevated C-reactive protein (30.7 mg/dL, normal < 0.5 mg/dL), and elevated creatinine (1.97 mg/dL). He was started on doxycycline and piperacillin/tazobactam, de-escalated to amoxicillin/clavulanic acid after the swab sample grew *Pasteurella* spp. without antibiotic resistance. Blood cultures were negative and *Bartonella* serology revealed past infection. After 2 weeks of intravenous antibiotics and very significant improvement (only two local non-exudative ulcers without inflammatory signs, violaceous areas or detachment), the patient was discharged with another week of oral amoxicillin/clavulanic acid.

However, 10 days after discharge, he returned to the emergency complaining of worsening of cutaneous lesions, fever, nausea, and vomiting; he was hypotensive and the dorsum of his right hand exhibited an edematous and erythematous plaque with two necrotic ulcerations and fluctuation in its distal portion. C-reactive protein (8.7 mg/dL) and procalcitonin (208 ng/mL, normal ≤ 0.5 ng/mL) were elevated. Septic shock secondary to cellulitis was assumed, requiring vasopressor support and empiric treatment with meropenem plus vancomycin. Antibiotics were switched to doxycycline and levofloxacin after blood cultures and local swab sample revealed the growth of *Pasteurella multocida* and, subsequently, to levofloxacin and penicillin as resistance to doxycycline was documented. Magnetic resonance imaging showed an 8 mm abscess in his first finger, without bone or tendon involvement. The patient improved after 10 days of levofloxacin and penicillin (Fig. 2) and was discharged at day 21, under oral levofloxacin and cotrimoxazole, completing a total of 6 weeks of antibiotics. There was almost complete skin healing after 12 weeks (Fig. 3).

Discussion

P. multocida, a Gram-negative coccobacillus from the oral, gastrointestinal and upper respiratory tract flora of



Figure 1. Cellulitis of the hand at admission, exuberant edema of hand and distal forearm with erythema, purpura, extensive bullae and necrotic plaques, without abscesses.



Figure 2. Cellulitis 10 days after the second admission, still with an edematous and purpuric plaque and two ulcers with better defined borders and no purulent exudation.



Figure 3. Almost complete resolution of cellulitis at 12 weeks, still with an erosive area with 4-5 mm of longest axis.

cats and dogs, is the most important infectious agent after cat bites^{1,2}. It may also be transmitted by animal scratches, similarly to cat scratch disease caused by *Bartonella henselae*¹. Infections by *P. multocida*, which are growing due to the increase of pets³, usually present as a skin and soft tissue infection, but can also cause pneumonia⁴, bacteremia and, rarely, septic shock, mostly in elderly and immunocompromised hosts³⁻⁵, as in the present case. *Pasteurella spp.* bacteremia is estimated to occur in 11% of the cases with a mortality rate ranging from 7% to 31%². This case highlights the negative impact of immunocompromisation on the evolution and morbimortality of some infectious diseases. The patient, despite adequate initial antibiotic therapy, worsened and was readmitted with recurrent cellulitis and septic shock caused by the initially identified agent. A longer antibiotic course was needed and was ultimately successful.

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Conflicts of interest

The authors have no conflicts of interest to declare.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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