

Foresee Your Next Patient

Pasteurella multocida Bacteremia and Necrotizing Fasciitis From a Pet Cat

Eesha Chakravarty, MD • Simrat Kaur Veera, DO •
Pratap Reddy, MD • Rajat Mukherji, MD • Jitendra Patel, MD

An 85-year-old man was admitted to the hospital with altered mental status, uncontrolled hypertension, and tachycardia that had been noted during a regularly scheduled hemodialysis session. The lower part of his right leg was tender, with erythema, edema, and a small ulcer on the lateral aspect of the ankle. While his motor skills were intact, sensation in the distal phalanges and dorsal aspect of the foot was decreased. Two scratch marks were noted adjacent to the ulcer and extending to the dorsal aspect of the right foot.

His medical history was significant for kidney failure, type 2 diabetes, atrial fibrillation, and chronic obstructive pulmonary disease. At presentation, he was febrile with leukocytosis (14,900 white blood cells/ μ L) and was started on vancomycin and cefepime. Chest radiography findings were benign, and computed tomography scanning of the head showed no acute changes. Since he reported pain in the right ankle, radiography was performed, the findings of which showed no acute fracture and no gas in the subcutaneous tissues.

Blood cultures returned positive for gram-negative bacilli, identified the next day as *Pasteurella multocida*. On further questioning, the patient reported that he had been scratched by his pet cat on his right foot a few days prior to admission. He denied being bitten by the cat. Antibiotics were then adjusted



AFFILIATIONS:

Kingsbrook Jewish Medical Center, Brooklyn, New York

CITATION:

Chakravarty E, Veera SK, Reddy P, Mukherji R, Patel J. *Pasteurella multocida* bacteremia and necrotizing fasciitis from a pet cat. *Consultant*. Published online November 11, 2020. doi:10.25270/con.2020.11.00010
Received May 26, 2020. Accepted September 27, 2020.

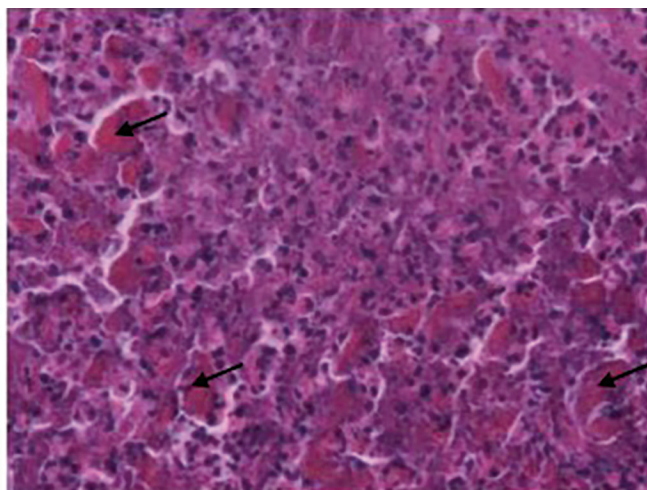
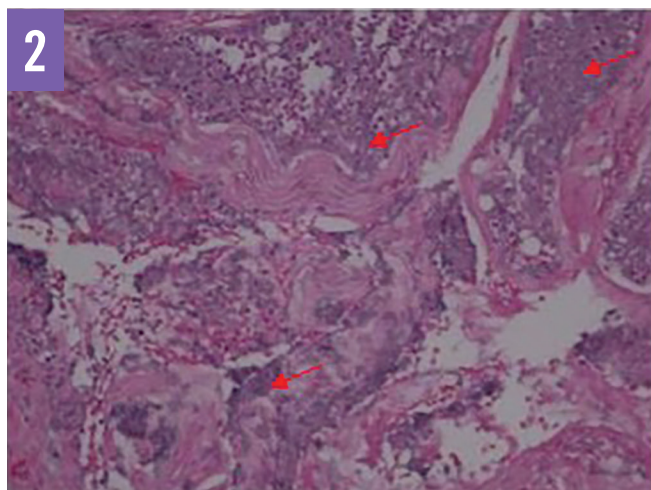
DISCLOSURES:

The authors report no relevant financial relationships.

CORRESPONDENCE:

Eesha Chakravarty, MD, Kingsbrook Jewish Medical Center, 585 Schenectady Ave, Brooklyn, NY 11203 (eesha@gmail.com)

The patient's right leg showing erythema to mid-calf and black, necrotic tissue after the first debridement.



Hematoxylin and eosin stain of tissue from right lower leg showing multiple fragments of necrotic tissue (red arrows) and hemorrhagic tissue (black arrows), with fibrocollagenous and adipose tissue showing hemorrhage, necrosis and abscesses.

to piperacillin-tazobactam and vancomycin.

Despite appropriate antibiotics, edema and erythema continued to spread proximally toward the right knee with a sharp demarcation circumferentially. The patient continued to report worsening pain in the leg. An incision and drainage procedure was performed, and necrotic grayish tissue from the area was excised (**Figure 1**).

Histopathology tests revealed multiple fragments of fibrocollagenous and adipose tissue showing hemorrhage, necrosis, and abscesses (**Figure 2**).

A second debridement was performed 2 weeks later. The pain subsided, as did the erythema and swelling, by the fourth week in the hospital, and the patient was eventually discharged home on oral antibiotics. The discharge diagnosis was necrotizing fasciitis secondary to *P multocida* infection.

Discussion. Necrotizing fasciitis is a potentially lethal condition that destroys muscle fascia, spreading quickly to surrounding tissues. Mortality can be high, and morbidity may include amputation if a limb is affected.¹ Thus, it is imperative that the diagnosis be made early, allowing for immediate intervention.

Based on causative organisms, necrotizing fasciitis can be classified into 2 broad categories: polymicrobial (type I), a mixed aerobic and anaerobic infection, and monomicrobial (type II), most commonly caused by single strains such as type A β -hemolytic streptococci or other β -hemolytic species.² Each type is further categorized as gas-forming or non-gas-forming.

P multocida is an uncommonly reported cause of necrotizing soft-tissue infections.³ When it manifests with this complication, it is associated with a high mortality rate.³ Dog bites, cat bites, cat scratches, and rarely dog licks, transmit the infection to humans.⁴ Furthermore, several risk factors are associated with

progression to necrotizing soft-tissue infections, including diabetes, malignancy, and obesity.⁵ Our patient had several risk factors that made him more susceptible to necrotizing fasciitis—ie, diabetes, kidney failure and associated immunocompromization, obesity, and the portal entry for the organism, which was a seemingly innocuous cat scratch. One study showed that diabetes is a clinical risk factor for limb loss in necrotizing fasciitis.⁶ Another study reported on 5 cases of necrotizing fasciitis due to *P multocida*, and each patient had multiple risk factors.³ Of the 5 patients, 4 died as a result of the infection.³

The reservoirs for *P multocida* are domesticated animals as well as animals in the wild. Humans are more likely to acquire infection from domesticated animals. Sources of infection include cattle, rabbits, rats, tigers, lions, and wolves.^{7,8} While bites and scratches are more frequently implicated, licking by a pet animal of an area of broken skin or even kissing a pet animal has resulted in introduction of the infection in humans.^{7,9,10} Pet saliva has been implicated in the occurrence of the disease in children.¹¹ Transmission between humans is rare, although cases have documented proximity to colonized individuals and contact with contaminated blood products as a source of infection.^{11,12}

An important feature of this infection is that a seemingly innocent wound infection or a mild scratch, as was the case in our patient, can progress to have potentially dire consequences. Bacteremia is a rarely reported complication and can result in septic shock and multiorgan failure, particularly in the presence of immunocompromising conditions.¹³ Necrotizing fasciitis should be considered as a potential complication of a *P multocida* wound infection, and management should be aggressive. Appropriate antibiotics, which should be administered promptly, include the following: penicillin G, piperacillin, piperacillin-

tazobactam, ampicillin, amoxicillin-clavulanate, cephalosporins (second-, third-, and fifth-generation), carbapenems, tetracyclines, aztreonam, trimethoprim-sulfamethoxazole, fluoroquinolones, and tigecycline.^{6,7,14,15} Surgical intervention may improve outcomes.¹⁶ ■

REFERENCES:

1. Anaya DA, McMahon K, Nathens AB, Sullivan SR, Foy H, Bulger E. Predictors of mortality and limb loss in necrotizing soft tissue infections. *Arch Surg*. 2005;140(2):151-158. doi:10.1001/archsurg.140.2.151
2. Wong CH, Chang HC, Pasupathy S, Khin LW, Tan JL, Low CO. Necrotizing fasciitis: clinical presentation, microbiology, and determinants of mortality. *J Bone Joint Surg Am*. 2003;85(8):1454-1460.
3. Milani-Nejad N, Tyler K, Grieco CA, Kaffenberger BH. *Pasteurella multocida* ecthyma complicated by necrotizing fasciitis. *Dermatol Online J*. 2017;23(4):13030/qt1h02t0tc.
4. Lam PW, Page AV. *Pasteurella multocida* non-native joint infection after a dog lick: a case report describing a complicated two-stage revision and a comprehensive review of the literature. *Can J Infect Dis Med Microbiol*. 2015;26(4):212-217. doi:10.1155/2015/963529
5. Cheng NC, Tai HC, Chang SC, Chang CH, Lai HS. Necrotizing fasciitis in patients with diabetes mellitus: clinical characteristics and risk factors for mortality. *BMC Infect Dis*. 2015;15:417. doi:10.1186/s12879-015-1144-0
6. Leiblein M, Marzi I, Sander AL, Barker JH, Ebert F, Frank J. Necrotizing fasciitis: treatment concepts and clinical results. *Eur J Trauma Emerg Surg*. 2018;44(2):279-290. doi:10.1007/s00068-017-0792-8
7. Chun ML, Buekers TE, Sood AK, Sorosky JI. Postoperative wound infection with *Pasteurella multocida* from a pet cat. *Am J Obstet Gynecol*. 2003;188(4):1115-1116. doi:10.1067/mob.2003.266
8. Burdge DR, Scheifele D, Speert DP. Serious *Pasteurella multocida* infections from lion and tiger bites. *JAMA*. 1985;253(22):3296-3297. doi:10.1001/jama.1985.03350460096030
9. Chang K, Siu LK, Chen YH, et al. Fatal *Pasteurella multocida* septicemia and necrotizing fasciitis related with wound licked by a domestic dog. *Scand J Infect Dis*. 2007;39(2):167-170. doi:10.1080/00365540600786572
10. Kawashima S, Matsukawa N, Ueki Y, Hattori M, Ojika K. *Pasteurella multocida* meningitis caused by kissing animals: a case report and review of the literature. *J Neurol*. 2010;257(4):653-654. doi:10.1007/s00415-009-5411-0
11. Siahianidou T, Gika G, Skiathitou AV, et al. *Pasteurella multocida* Infection in a neonate: evidence for a human-to-human horizontal transmission. *Pediatr Infect Dis J*. 2012;31(5):536-537. doi:10.1097/INF.0b013e318245debd
12. Bryant BJ, Conry-Cantilena C, Ahlgren A, et al. *Pasteurella multocida* bacteraemia in asymptomatic plateletpheresis donors: a tale of two cats. *Transfusion*. 2007;47(11):1984-1989. doi:10.1111/j.1537-2995.2007.01421.x
13. Chatelier E, Mahieu R, Hamel J-F, et al. *Pasteurella* bacteraemia: impact of comorbidities on outcome, based on a case series and literature review. *Int J Infect Dis*. 2020;92:89-96. doi:10.1016/j.ijid.2020.01.003
14. Pankey GA. Tigecycline. *J Antimicrob Chemother*. 2005;56(3):470-480. doi:10.1093/jac/dki248
15. Weber DJ, Hansen AR. Infections resulting from animal bites. *Infect Dis Clin North Am*. 1991;5(3):663-680.
16. Cocanour CS, Chang P, Huston JM, et al. Management and novel adjuncts of necrotizing soft tissue infections. *Surg Infect (Larchmt)*. 2017;18(3):250-272. doi:10.1089/sur.2016.200