

A Sublatissimus Dorsi Abscess Due to *Pasteurella multocida* Caused by a Cat Scratch

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Summary: We encountered a 51-year-old male patient who was not immunocompromised. Thirteen days before his admission, his right forearm was scratched by his pet cat. Swelling, redness, and purulent discharge appeared at the site, but he did not seek medical attention. He developed a high fever and was hospitalized with a diagnosis of septic shock, respiratory failure, and cellulitis on plain computed tomography. After admission, the swelling on his forearm was relieved with empirical antibiotics, but the symptoms spread from his right axilla to his waist. We suspected necrotizing soft tissue infection and made a trial incision in the lateral chest up to the latissimus dorsi, but were unable to prove it. However, an abscess was later found under the muscle layer. Second incisions were made to allow the abscess to drain. The abscess was relatively serous, and no tissue necrosis was observed. The patient's symptoms improved rapidly. In retrospect, the patient probably already had the axillary abscess on admission. It may have been detected at this point if contrast-enhanced computed tomography had been performed, and early axillary drainage may have accelerated the patient's recovery, which could also have prevented the formation of the latissimus dorsi muscle abscess. In conclusion, the *Pasteurella multocida* infection on the patient's forearm induced a very unusual presentation and caused an abscess to form under the muscle, unlike necrotizing soft tissue infections. Early contrast-enhanced computed tomography may aid earlier and more appropriate diagnosis and treatment in such cases. (*Plast Reconstr Surg Glob Open* 2023; 11:e4856; doi: [10.1097/GOX.0000000000004856](https://doi.org/10.1097/GOX.0000000000004856); Published online 27 February 2023.)

Bacteria from animals' oral cavities cause infections in humans through bites and scratches. Cats are the second leading cause of animal bites/scratches, accounting for 20% to 30%.¹ Multiple pathogens are often involved, with *Pasteurella multocida* being the most common, followed by streptococci and staphylococci. Appropriate prophylactic antibiotics against those are necessary for all patients with significant cat bites (especially hands) and scratches, as bite infection rates are as high as 30% to 50%.²

Pasteurella multocida causes a variety of infections. The most common include skin and soft tissue and local abscess, followed by osteomyelitis and respiratory

infections.³ Patients with liver cirrhosis and immunodeficiency are particularly prone to severe disease and sepsis.³ The mortality rate is 25%, even in immunocompetent patients.³ Necrotizing soft tissue infections is rare, but occurs mainly in patients with underlying diseases, in whom it exhibits a mortality rate of 80%.⁴ We report a very rare case involving a patient with no underlying disease, who developed sepsis from a scratch on his forearm caused by a cat and suspected necrotizing soft tissue infection in his lateral chest, resulting in a submuscular abscess.

PATIENT

The patient was a 51-year-old man with no underlying medical conditions. His right forearm had been scratched by his cat 13 days before admission. Swelling, redness, and purulent discharge appeared at the site, but he did not seek medical attention.

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Received for publication November 13, 2022; accepted January 24, 2023.

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DOI: [10.1097/GOX.0000000000004856](https://doi.org/10.1097/GOX.0000000000004856)

Disclosure: The authors have no financial interest in relation to the content of this article.

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.

He presented with a high fever and subcutaneous swelling and tenderness from his forearm to right axilla. He was in a clear state of consciousness, and had not experienced nausea or vomiting. A physical examination revealed the following: temperature, 38.8 °C; blood pressure, 83/54mm Hg; pulse rate, 119 beats/min; respiratory rate, 26 breaths/min; and arterial oxygen saturation level, 93%. He was diagnosed to have developed sepsis (based on a quick sepsis-related organ failure assessment) and suspected respiratory failure. Laboratory test results were as follows: white blood cell count (WBC), 33600/ μ L; hemoglobin A1c, 6.3% (normal value: 4.6–6.2%); C-reactive protein, 24.8mg/dL (normal value: 0–0.14 mg/dL). Plain computed tomography (CT) showed reticular densification in the subcutaneous connective tissue of the right axilla and upper arm. His axillary lymph nodes were swollen, but his neck and supraclavicular nodes were not. Cellulitis was diagnosed because there was no gas, myofascial hypertrophy, or subfascial effusion. For treatment, incisional drainage of the wound on the forearm and culturing were performed. Sulbactam/ampicillin (SBT/ABPC) and azithromycin were started on admission day, but the patient's shock did not improve. Gram-negative rod bacteria were detected in the blood culture, and the SBT/ABPC were replaced with meropenem. Post-admission day (PAD)2: The patient's WBC reduced to 18,100/ μ L. His shock and respiratory failure were ameliorated. The wound on his forearm was less red and swollen, but had spread from his right axilla to lumbar area.

Although plain CT showed no obvious findings, other than cellulitis of the lateral chest, we decided to perform a test incision to confirm the presence of necrotizing soft tissue infection (Figs. 1 and 2). The incision was made in the center of the region affected by diffuse erythema, just above the latissimus dorsi muscle, but no pus or tissue necrosis was seen. However, we still suspected it because his tenderness, WBC, and C-reactive protein values did not reduce, and clindamycin was initiated.

PAD3: *Pasteurella* spp. were cultured from the blood and exudate from the original wound. The meropenem was switched back to SBT/ABPC, and the clindamycin was completed. PAD6: SBT/ABPC susceptibility was confirmed.



Fig. 1. PAD1: Plain CT indicating cellulitis of the chest.



Fig. 2. Axilla on the left, waist on the right. Redness, swelling, and tenderness extended from the right axilla to the waist. A test incision up to the latissimus dorsi was performed under local anesthesia.



Fig. 3. PAD12: Symptoms persisted. Contrast-enhanced CT showed a large abscess under the latissimus dorsi muscle.

PAD7: WBC was 13,300/ μ L. PAD9: WBC was 20,700/ μ L. A fever of 39 °C was observed. There was still no pus or necrosis at the incision site. We looked for infections on other sites. PAD12: The patient's chest tenderness worsened. Contrast-enhanced CT showed a large abscess under the latissimus dorsi muscle (Fig. 3). PAD15: Under general anesthesia, we made two incisions at the superior border of the latissimus dorsi muscle and at the right axilla, and the abscess extending under the pectoralis major, minor, and latissimus dorsi was drained. The abscess was relatively serous, and no tissue necrosis was observed. Those incisions were not closed, and Penrose drains were inserted (Fig. 4). PAD24: Antibiotic treatment was ended. PAD32: CT confirmed significant improvement. PAD33: The patient was discharged from hospital. (See figure, Supplemental Digital Content 1, which shows an incision along the superior margin of the latissimus dorsi muscle. No gross necrosis of tissue was observed. Penrose drains were inserted without closing those wounds. <http://links.lww.com/PRSGO/C443>.)



Fig. 4. PAD15: Incision design of right axilla. Under general anesthesia, two incisions were made in the superior border of the latissimus dorsi and right axilla to allow drainage of the abscess extending under the pectoralis major and minor muscles. The abscess was relatively serous.

DISCUSSION

This patient had no underlying medical conditions, but developed sepsis, probably because the infected area was left untreated for 13 days. Caution should be exercised in such cases, as delays in diagnosis or treatment may worsen the outcome.

Regarding treatment, cultures from wounds and other sources should be taken immediately to identify the bacterium and confirm its antibiotic susceptibility. For possible *Capnocytophaga* infections or cat-scratch disease, SBT/ABPC, meropenem, clindamycin, and azithromycin are used empirically.

Established infections usually require surgical debridement and drainage, in addition to appropriate antibiotic therapy.⁵ Despite adequate doses of SBT/ABPC from admission, the patient did not recover from shock. Although a diagnosis of toxic shock syndrome could not be made, necrotizing soft tissue infection was suspected because the symptoms of infection persisted. In cases of common necrotizing soft tissue infection, exploration into the submuscular layer is rarely necessary. However, contrast-enhanced CT subsequently showed fluid accumulation under the latissimus dorsi muscle (Fig. 3). After second incisions, the patient's symptoms improved immediately. Therefore, the test incision into the submuscular layer was appropriate. Additionally, if a contrast-enhanced CT scan had been performed on admission, it probably would have shown the axillary abscess, and an axillary

incision would have helped the patient recover from shock more quickly and prevented the development of the sublatissimus dorsi muscle abscess.

Abscess formation in the lungs and brain caused by *Pasteurella multocida* is rare,^{3,6} and it is even rarer at other sites. However, a similar thoracic abscess was reported in one case.⁷ Cases of iliopsoas muscle abscess formation, presumably via cellulitis, lymphangitis, and inguinal lymph node necrosis, have also been reported.⁸ It is likely that our patient's abscess formed similarly.

In conclusion, *Pasteurella multocida* infections of the forearm can cause inflammation of the regional lymph nodes and, unlike necrotizing soft tissue infections, may induce submuscular abscess formation. Immediate contrast-enhanced CT is considered to be useful for early diagnosis and treatment.

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ACKNOWLEDGMENTS

This report was based on the course of treatment of the patient in accordance with the Declaration of Helsinki. The treatment for this patient is within the scope of medical insurance coverage in Japan and does not include experimental elements.

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