

Post-Cat Bite Septic Arthritis Of The Hand Caused By *Pasteurella Multocida*

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Citation

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Abstract

We report a case of *Pasteurella multocida* infection which developed into septic arthritis. The patient was a 25-year-old Malay male who developed fever with abscess formation at the second and third web space of his right hand and septic arthritis involving the metacarpophalangeal joint of the right middle finger and ring finger after he was bitten by a dying stray cat. The organism was isolated in pure culture from pus and tissue specimens from the joint cavity and web spaces, and identified as *Pasteurella multocida*. The patient responded to a 1-week course of intravenous amoxicillin-clavulanate therapy, was discharged home with a 6-week dose of oral amoxicillin-clavulanate and had an uneventful recovery. Management of cat bites involve early, thorough wound irrigation, plus wide-spectrum empiric antibiotics such as amoxicillin-clavulanate and later guided by culture results. A radiograph is indicated to rule out the presence of foreign body or teeth fragments, as well as fractures or bone involvement. Surgical debridement and drainage is required in established infections, to remove devitalised tissue and any foreign bodies in order to prevent the sequelae of infection and long-term morbidity.

INTRODUCTION

An animal bite can result in a break in the skin, a bruise, or a puncture wound. Pets are the most common cause of bites, with dog bites occurring most often, followed by cats¹. A major concern in all bite wounds is subsequent infection. Cat bites may have a higher chance of infection due to their longer and pointed teeth, which can produce deeper puncture wounds. *Pasteurella multocida* (*P. multocida*) is the commonest pathogen of cat bite wounds².

CASE REPORT

A 25-year-old teacher presented with two day's history of right hand swelling and fever. Two days prior to that, a dying stray cat bit him when he was trying to remove the cat from a classroom. The cat bite was very strong, deep into his hand, leaving it wet with saliva, with two puncture marks. Later at night, he went to a clinic due to unbearable pain and swelling of his hand. He was given painkiller and a course of unidentified antibiotic. On the next day, he started to have fever, more severe pain and swelling. He went to another clinic and subsequently referred to UKMMC.

Apart from being febrile, other systemic examinations were unremarkable. The dorsal aspect of his right hand was swollen, erythematous and tender. He was not able to move the metacarpophalangeal joints of the right middle finger and

ring finger due to severe pain. They were two puncture wounds at the second and third web spaces, which were discharging pus. Laboratory investigations showed leukocytosis with neutrophil predominance, and raised C-reactive protein (CRP). X-ray of the right hand revealed swollen soft tissue with no bony changes. He was put on intravenous amoxicillin-clavulanate 1.2g bd and intravenous tramadol 50mg tds. Incision and drainage was done the next day. Intra-operative findings showed that the puncture wound had gone through penetrating the deep fascia and the tendon sheath to the joint cavity. There was presence of approximately 5 ml of pus in the web spaces and the joint cavity. Culture and sensitivity of pus and tissue yielded pure growth of gram negative bacillus, which was identified as *P. multocida* by API® 20E (bioMerieux, France) identification system. The organism was sensitive to all antibiotics tested, namely amoxicillin-clavulanate, ampicillin, amikacin, cefepime, cefotaxime, ceftazidime, cefuroxime, ciprofloxacin, gentamicin and imipenem. No blood specimen was sent for culture. His condition improved tremendously with fever defervescence and only minimal pain. Daily dressing showed good sign of healing with granulation tissue. Thus, the wound was closed by delayed primary suturing, 5 days later. After completion of 1-week course of intravenous amoxicillin-clavulanate, he was discharged home with a 6-week dose of oral amoxicillin-clavulanate.

DISCUSSION

The family Pasteurellaceae includes the genera *Pasteurella*, *Haemophilus*, and *Actinobacillus*. *Pasteurella* spp are non-motile, Gram-negative, facultative anaerobe, non-spore forming bacilli or coccobacilli. Of the *Pasteurella* spp. known to infect humans, *P. multocida* is the most important. *P. multocida* grows well on various artificial media including chocolate and sheep blood agar, thus is not difficult to isolate or identify. Most species are catalase-positive, oxidase-positive, alkaline phosphatase-positive and reduce nitrate to nitrite. It gives a strongly positive spot indole test and does not grow on MacConkey agar³.

Pasteurella spp. can be found as commensals or parasitic organisms in the upper respiratory and gastrointestinal tract of domestic, wild animals and birds. *Pasteurella* spp. are commonly isolated pathogens in most animal bites, particularly cat and dog bites. *P. multocida* is found in the oropharynx of 70% to 90% of domestic cats, 25% to 50% of dogs, and many other animals⁴. A prospective study with patients with clinical symptoms of infection due to cat bites in Sweden by Westling et al. found that *P. multocida* was isolated in 70% of the patients; in addition, anaerobic pathogens were isolated in 16% concurrently with *P. multocida*, while *Staphylococcus aureus* was isolated in only two patients. *Pasteurella* spp. was also isolated from 80% of the pharynx of the biting cats².

Skin and soft tissue infection is the most common disease in human following animal bite. Almost any group of organisms can cause infections (bacteria, fungi and viruses), which originate from the patient's skin and the animal's oral cavity. It has been shown that more than half of cat bite wounds become infected whereas only 15 to 20% of dog bite wounds become infected¹. Wound infections associated with animal bites usually have a polymicrobial etiology, which may include organisms such as *S. aureus*, streptococcal species, and anaerobes in addition to *Pasteurella*.

Inflammation, pain and redness develop at the site of injury usually occur within 2-12 hours of injury as demonstrated in this case. According to Dryden, infected bites presenting less than 12 hours after injury are particularly likely to be infected with *Pasteurella* spp., whereas those presenting more than 24 hours after the event are likely to be infected predominantly with staphylococci or anaerobes⁵. Signs of systemic toxic effects such as chills, fever and regional lymphadenopathy may be present. Blood should be sent for culture and sensitivity in the presence of systemic

symptoms. Abscesses and tenosynovitis are the most frequent complications of *Pasteurella* soft tissue infections, with septic arthritis and osteomyelitis being less common. Septic arthritis and osteomyelitis result either from local extension of soft-tissue infection or from direct inoculation of the organism into the joint capsule or periosteum. Chevalier et al reported 4 cases of *P. multocida* septic arthritis with demonstration of the organism in the joints⁶. Septic arthritis of the hand and wrist is relatively uncommon, where the most common cause is penetrating trauma such as a human or animal bite, while the most common causative organism is *Staphylococcus aureus*⁷. *P. multocida* infrequently causes infection of central nervous system, respiratory system, abdominal system and heart, and bacteremia⁴.

Management of cat bite starts from primary care. Wound should be thoroughly irrigated and antibiotic prophylaxis should be commenced. Microbiological findings suggest that empirical antibiotic therapy for cat bites should cover *Pasteurella*, *Streptococci*, *Staphylococci* and anaerobes. Amoxicillin-clavulanate is the treatment of choice for empirical treatment of infected cat or dog bite due to its characteristic wide spectrum⁴. Although susceptibility of human *P. multocida* isolates to beta-lactams is almost universal, beta lactamase production by some isolates has been reported⁸. A fluoroquinolone, doxycycline, or trimethoprim-sulfamethoxazole can be considered as an alternative for resistant *Pasteurella* or patients with intolerance to β -lactams. A radiograph of the site of injury is indicated to rule out the presence of foreign body or teeth fragments, as well as fractures or bone involvement. Surgical debridement and drainage is required in established infections, to remove devitalised tissue and any foreign bodies. The sequelae of infection in inadequately treated hand infections may progress from cellulitis, subcutaneous abscess, compartment syndrome, ascending tenosynovitis and septic emboli, which may lead to gangrenous fingers and hand. Healing process may be slow particularly in local infections that extend to the bone or tendons. Treatment should consist of prolonged antimicrobial therapy with frequent drainage of the involved joints. No *Pasteurella* vaccine is currently available for human use. Diseases associated with animal bites can be prevented by precautions when handling animals, pet safety and proper hygiene.

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