A Case of Recurrent Pasteurella Bacteremia in an Immunocompetent Patient with No Animal Bite

DEF  Fnu Zarlasht
EF  Muzammil Khan

Corresponding Author:  Fnu Zarlasht, e-mail: linnyc777@yahoo.com
Conflict of interest:  None declared

Patient:  Male, 61
Final Diagnosis:  Recurrent pasteurella bacteremia
Symptoms:  Ankle pain
Medication:  —
Clinical Procedure:  —
Specialty:  Infectious Diseases

Objective:  Rare disease
Background:  Pasteurella multocida is a gram negative-penicillin sensitive bacterium and is part of normal respiratory microbiota of animals (e.g., cats and dogs) and some birds. Various infections in humans, such as cellulitis, rarely bacteremia, endocarditis, meningitis, and septic arthritis, are a result of domestic cat or dog bites. These infections are rarely seen in an immunocompetent person, without an associated animal bite.

Case Report:  We present a case of refractory Pasteurella multocida bacteremia without any animal bite in an immunocompetent person.

Conclusions:  Pasteurella multocida bacteremia has been seen in immunocompromised patients and mostly after a cat or dog bite or scratch but might also happen in immunocompetent humans with only pet licking rather than biting, which might increase hospital and emergency department visits or admissions in the future.

MeSH Keywords:  Bacteremia • Pasteurella Multocida • Thrombophilia

Full-text PDF:  https://www.amjcaserep.com/abstract/index/idArt/907251
**Background**

*Pasteurella multocida* is a gram-negative penicillin-sensitive bacterium and is part of normal respiratory microbiota of animals (e.g., cats and dogs) and some birds. Usually systemic infections occur after an animal bite or a scratch. Most of the resulting systemic infections, such as cellulitis, septic arthritis, endocarditis, and meningitis, are observed in immunocompromised patients [1–3]. We present a case of *Pasteurella multocida* bacteremia in an immunocompetent patient with only cat licking [3].

**Case Report**

A 61-year-old male presented due to chief complaint of left foot and ankle swelling and generalized body aches with intermittent chills. The patient had no shortness of breath, chest pain, abdominal pain, urinary symptoms, diarrhea, headaches, runny nose, sore throat, tick bites, or skin rashes. The patient had a healthy cat which licks him, but he had no cat bites or any other bites. The cat’s immunization status was up-to-date as per the patient. This patient had no significant past medical history and his outpatient primary care clinic visits were up-to-date. He was not taking any medications at home.

On presentation, the patient was not in any acute respiratory distress, but was tachycardiac (heart rate 128 beats/minute), blood pressure 86/53 mm Hg, saturation was 95% on room air and he was afebrile. The patient was alert and oriented to time, place, and person. His cardio-pulmonary and gastro-intestinal examination was unremarkable. His left ankle was tender but not erythematous or warm and his left foot was swollen; other extremities were unremarkable. He had good and equal bilateral pulses.

His laboratory tests revealed white cell count (WBC) of 7.5 K/µL with 10% bandemia, hemoglobin 13.5 gm/dL, and platelets 72 K/mcL. He had acute kidney injury (creatinine 1.41 mg/dL, glomerular filtration rate 51 mL/min/1.73 m²), low potassium at 3.4, and lactic acidosis of 4.1 mmol/L. Red blood cell morphology did not show any schistocytes. Urinalysis was negative for any infections, and only showed high specific gravity of 1.031. Liver function test was positive for mildly deranged AST/ALT at 74/72 U/L and total bilirubin 1.4 mg/dL. Procalcitonin was 29.83 ng/mL.

During the next 20 days, his WBC continued to worsen, peaked to 20 K/µL on day 6 then trended down. Hemoglobin remained stable, sepsis-induced thrombocytopenia improved from 72 K/mcL to 262 on day 8. Mild acute kidney injury resolved. Liver function tests initially worsened but then resolved and lactic acidosis also resolved. A detailed follow-up of these tests is shown in Table 1.

Blood cultures were drawn; the patient was started on broad spectrum intravenous antibiotics meropenem (500 mg three times a day), vancomycin (1 gm two times a day) and admitted to the intensive care unit.

On day 2, magnet resonance imaging (MRI) of his left ankle-foot was done which showed diffuse soft tissue edema and reticulation around the ankle. A trans-thoracic echocardiogram ruled out endocarditis. The patient was sent for arthrocentesis but due to lack of fluid in the ankle joint, a tap was not possible.

His blood cultures came back positive for *Pasteurella multocida* for which the intravenous antibiotic meropenem was continued.

|   | Day 1 | Day 4 | Day 6 | Day 8 | Day 10 | Day 20 |
|---|-------|------|------|------|-------|-------|
| WBC (k/µL) | 7.5   | 15.8 | 21   | 18   | 13.8  | 9.9   |
| Hemoglobin (gm/dL) | 13.5 | 13.2 | 13.6 | 12.1 | 10.5  | 11.1  |
| Platelet (k/mcL) | 72   | 36   | 99   | 262  | 587   | 661   |
| Creatinine/GFR (mg/dL)/(ml/min/1.73 m²) | 1.41/51 | 1.03/60 | -    | -    | -     | 0.54/60 |
| AST (unit/liter) | 74   | 223  | 93   | 71   | 62    | 69    |
| ALT (unit/liter) | 72   | 167  | 82   | 69   | 89    | 89    |
| Bilirubin (mg/dL) | 1.4  | 1.6  | 1.2  | 0.8  | 0.6   |       |
| Lactic acid (mmol/L) | 4.1  | 2.1  |      |      |       |       |

**Table 1. Laboratory follow up of the patient during first hospital stay.**
and ciprofloxacin was added for double coverage. *Pasteurella multocida* cultures showed very good sensitivity to ciprofloxacin, meropenem, and piperacillin-tazobactam.

Due to worsening left lower extremity edema, an ultrasound of the left lower extremity was repeated on day 6, which showed new partially occlusive deep venous thrombus in the left popliteal vein and the left posterior tibial vein, for which he was started on enoxaparin treatment on day 8 once his sepsis-induced thrombocytopenia was resolved.

During follow-up, the patient continued to be in the intensive care unit; his mental status remained stable. He started to have purplish discoloration of all finger and toe tips.

### Table 2. Rheumatologic Laboratory investigations.

| Test                                      | Value       |
|-------------------------------------------|-------------|
| Fibrinogen                                | 744 mg/dl (range 180–440) |
| Prothrombin time                          | 11.9 sec (range 9–12.5)  |
| Activated partial prothrombin time        | 27 sec (24–33) |
| Anti-thrombin III                         | 78% (range 76–128) |
| Lupus-anticoagulant                       | Moderately present |
| Factor V Leiden                           | Negative    |
| HIT antibody                              | 0.146 (normal <0.399) |
| Complement C3                             | 114 mg/dl (range 90–180) |
| Complement C4                             | 29 mg/dl (range 10–40) |
| Protein C activated                       | 77% (range 83–168) |
| Protein S Free                            | 89% (range 74–147) |
| Methylene tetrahydrofolate reductase(MTHFR c. 1286 A>C) | Negative |
| Methylene tetrahydrofolate reductase(MTHFR c. 665 C>T) | Negative |
| Antinuclear antibody (ANA)                | Negative    |
| Double stranded DNA antibody (DsDNA)      | Negative    |
| Cardiolipin IgM                           | 144 MPL (range 0–12) |
| Cardiolipin IgA                           | 7 APL (range 0–11) |
| Cardiolipin IgG                           | 22 GPL (range 0–14) |
| RNP antibody                              | Negative    |
| Smith antibody                            | Negative    |
| SSA antibody                              | Negative    |
| SSB antibody                              | Negative    |
| SCL-70 antibody                           | Negative    |
| Centromere antibody                       | Negative    |
| A phagocyte antibody IgG and IgM          | Normal      |
| IgA total                                 | 455 mg/dl (range 66–436) |
| IgM total                                 | 51 mg/dl (range 43–279) |
| IgG total                                 | 921 mg/dl (range 791–1643) |
| Hepatitis C antibody and B core antigen   | Negative    |
| Cryoglobulin                              | Negative    |
| Lyme IgM and immunoblot                   | Negative    |
| Malaria smear                             | Ruled out malaria and babesia |
Extensive workup for disseminated intravascular coagulation, vasculitis, hypercoagulable syndrome, and autoimmunity was done, which showed moderately positive lupus anticoagulant antibodies, decreased protein-C activity, and positive anti-cardiolipin IgM antibodies; details are shown in Table 2.

This patient was diagnosed with thrombophilia (causing left lower extremity DVT) secondary to positive anticoagulant antibodies, moderately positive lupus anticoagulants and low protein-C activity. Due to low-normal complements level, ANA and DsDNA, lupus, vasculitis, connective tissue disease, and rheumatoid arthritis were of low suspicion. Multiple blood cultures were negative prior to discharge.

Multiple sub-specialties were involved in this case, including rheumatologist, vascular surgeon, orthopedic, and infectious disease and it was mutually decided to complete antibiotics for four weeks once blood cultures are negative and to continue anticoagulation for thrombophilia. The patient was discharged to a rehabilitation center after his prolonged hospital stay.

In the outpatient setting, the patient continued to have digital ulcerations and his right forefoot turned into wet gangrene despite of being on antibiotics.

He was readmitted for right fore-foot amputation and his blood cultures were sent again. He underwent right fore-foot amputation and his blood cultures came back positive again for Pasteurella multocida. He was started again on intravenous antibiotic piperacillin-tazobactam (3.375 gm three times a day) for recurrent Pasteurella multocida bacteremia. Deep tissue cultures and bone biopsy from the gangrenous, infected toes were sent out and results showed enterococcus group-D and staphylococcus coagulase negative for which he was started antibiotic piperacillin-tazobactam (3.375 gm three times a day) for recurrent Pasteurella multocida bacteremia. The patient was discharged again to a rehabilitation center after his prolonged hospital stay.

During this whole course of stay, it was not clear why this patient had recurrent Pasteurella bacteremia without any clear source.

**Discussion**

*Pasteurella multocida* infections are usually seen in cat (75%) and dog (50%) bites. Licking of non-intact wounds can also lead to various infections. A literature review showed direct transmission occurs through contact with these animals or indirect transmission through infected blood transfusion, placental or close contact with a colonized person.

This bacteremia causes a variety of infections like cellulitis, skin abscesses, septic joints, bacteremia, endocarditis, meningitis, and spontaneous bacterial peritonitis in cirrhotic patients [1–4]. Mortality from *Pasteurella multocida* bacteremia has been documented as 30% [5–7].

Usually these diseases have been documented in immunocompromised patients like patients with active cancer, HIV positive, cirrhotic, chronic kidney diseases, or patients after chemotherapy and radiotherapy [8,9]. In this case, the patient was completely immunocompetent and there was no pet bite.

**Conclusions**

The number of domestic animals is increasing day by day in the USA. We should consider this organism as a differential diagnosis not only in immunocompromised patients but in immunocompetent patients as well. This case also shows that this organism can cause diseases not only with pet bites or scratches but also with licking, due to which emergency department visits or hospital admissions will likely increase in the future.

**Conflicts of interest**

None.

**References:**

1. Narsana N, Farhat F: Septic shock due to Pasteurella multocida bacteremia: A case report. J Med Case Rep, 2015; 9: 159
2. Hendrie J: Pasteurella multocida bacteremia in humans: A clinical report. Can Fam Physician, 1974; 20(4): 79–81
3. Kawashima S, Matsukawa N, Ueki Y et al: Pasteurella multocida meningitis caused by kissing animals: A case report and review of the literature. J Neurol, 2010; 257(4): 653–54
4. Weber DJ, Wolfson JS, Swartz MN, Hooper DC: Pasteurella multocida infections: Report of 34 cases and review of the literature. Medicine (Baltimore), 1984; 63(3): 133–54
5. Tseng HK, Su SC, Liu CP, Lee CM: Pasteurella multocida bacteremia due to non-bite animal exposure in cirrhotic patients: Report of two cases. J Microbiol Immunol Infect, 2001; 34: 293–96
6. O’Neill E, Moloney A, Hickey M: Pasteurella multocida meningitis: Case report and review of the literature. J infect, 2005; 50(4): 344–45
7. Bryant BI, Conry-Cantilena C, Ahlgren A et al: Pasteurella multocida bacteremia in asymptomatic plateletpheresis donors: A tale of two cats. Transfusion, 2007; 47(11): 1984–89
8. Yokose N, Dan K: Pasteurella multocida sepsis due to a scratch from a pet cat, in a post-chemotherapy neutropenic patient with non-hodgkin lymphoma. Int J Hematol, 2007; 85(2): 146–48
9. Randhawa E, Woytanowski JR, Schultz S, Bluen B: Pasteurella multocida bacteremia and osteomyelitis from a diabetic foot ulcer. American J Med Case Rep, 2017; 5(8): 229–31