Urinary tract infection with *Pasteurella multocida* in a patient with cat exposure and abnormal urinary tract physiology: Case report and literature review

Joel T. Costanzo IIa, Amy L. Wojciechowskia,b,⁎, Rajinder P.S. Bajwaa

a Niagara Falls Memorial Medical Center, 621 10th Street, Niagara Falls, NY, 14302, United States
b D’Youville College School of Pharmacy, 320 Porter Avenue, Buffalo, NY 14201, United States

ARTICLE INFO

Keywords:
*Pasteurella multocida*
urinary tract infection
case report

ABSTRACT

*Pasteurella multocida* is a gram-negative organism that commonly colonizes the mouth of cats and dogs, and is known to cause infection in humans associated with animal bites or scratches. Sites of infection other than skin and soft tissue are rare, but have been reported in patients with specific risk factors including anatomical abnormalities or immunosuppression. Herein, we report a case of a symptomatic urinary tract infection caused by *P. multocida* in a 59 year old female who presented to the hospital with complaints of systemic symptoms including malaise, rigors, and chills, as well as thick, malodorous urine. The patient self-catheterized multiple times daily due to urostomy with Kock pouch. Treatment with piperacillin/tazobactam followed by amoxicillin resulted in resolution of the infection.

Introduction

*Pasteurella multocida* is a small, gram-negative coccobacillus that is known to be part of the normal oral flora of cats and dogs [1]. Of the *Pasteurella* species, cats and dogs have the highest carriage rate of *P. multocida*, with 70 to 90 percent in cats and 20 to 50 percent in dogs [2]. In humans, *P. multocida* is most commonly associated with skin and soft tissue infections from cat bites or scratches. The *Pasteurella* species as a whole are usually susceptible to penicillin [1]. Herein, we report a case of a urinary tract infection (UTI) caused by *Pasteurella multocida*.

Case report

A 59-year-old female presented to the emergency department with complaints of general malaise, rigors, and chills. She also complained of thick, malodorous urine on self-catheterization. Her past medical history was significant for cervical cancer status post colostomy and urostomy with Kock pouch (continent ileostomy), nephro lithiasis, and UTIs. The patient reported using an 18 french coude disposable catheter on herself four to six times per day. Upon physical examination, she was found to be afebrile with a temperature of 37.5 °C, a blood pressure of 79/61 mmHg, respiratory rate of 18, and an oxygen saturation of 96% on room air. Complete blood count revealed leukocytosis with white blood cells of 23.5 × 10³ cells/microL. Red blood cells, hemoglobin and hematocrit were all within normal limits. A urinalysis was performed and was positive for nitrite, 3+ leukocyte esterase, > 100/hpf white blood cells, many bacteria, moderate yeast, and few epithelial cells. Blood and urine cultures were collected in the emergency department prior to initiation of antibacterials. Based on her physical presentation, urinalysis results, and past medical history, she was diagnosed with a complicated UTI and admitted as an inpatient for further treatment.

In the emergency department, antibacterial therapy was started with 3.375 g of piperacillin/tazobactam. On admission, renally dose-adjusted piperacillin/tazobactam (2.25 g IV q6 h) was continued for empirical treatment of the complicated UTI. Three days later, the urine culture was finalized with greater than 100,000 CFU/mL *Pasteurella multocida*, which was susceptible to all antimicrobial agents tested (amikacin, ampicillin, ampicillin/sulbactam, aztreonam, cefazolin, ceftriaxone, ciprofloxacin, gentamicin, meropenem, nitrofurantoin, piperacillin/tazobactam, tobramycin, trimethoprim/sulfamethoxazole). The antimicrobial regimen was streamlined to oral amoxicillin 500 mg three times daily. At time of discharge three days later, her white blood cell count had normalized to 6.4 × 10⁹ cells/microL and her systemic symptoms had improved. The patient was given a prescription upon discharge for amoxicillin to complete a ten day total course.

http://dx.doi.org/10.1016/j.idcr.2017.07.002

Received 6 July 2017; Received in revised form 7 July 2017; Accepted 8 July 2017

2214-2509/ © 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/BY-NC-ND/4.0/).
**Table 1**

| Author (Year) | Age | Gender | Predisposing Factor(s) | Known Animal Exposure | Treatment | Successful |
|---------------|-----|--------|------------------------|-----------------------|-----------|------------|
| Dixon [4] (1967) | 62 | Female | Bladder carcinoma | 1 pet cat | 1.5 g IV ampicillin, then 500 mg ampicillin q8 h for 10 days | Yes |
| Komorowski [5] (1974) | 63 | Male | Pelvic radiotherapy, prostate adenocarcinoma, TURP | Unknown | 600,000 units of penicillin IM BID for 7 days | Yes |
| Bailah [6] (1977) | 15 | Male | Ileal loop, self-catheterization | 2 pet cats, pet rabbit | 70 mg gentamicin IM once | Yes |
| Conley [7] (1983) | 77 | Female | Advanced age | Unknown | Trimethoprim/sulfamethoxazole DS BID for 10 days | Yes |
| Mann [9] (1987) | 31 | Female | Prior pyelonephritis | 1 pet dog | Ampicillin 500 mg QID for 14 days Amikacin 500 mg IV q6 h, cephalothin 1 g q6 h for 24 h. Cephradine 500 mg PO for 14 days total. | Yes |
| Liu [10] (2003) | 56 | Female | Indiana pouch with urinary diversion, catheterization | Unknown | Ampicillin/sulfamethoxazole, amoxicillin/clavulanate 14 days total. | Yes |

**Discussion**

*Pasteurella multocida* is a pathogen that colonizes the mouth of cats and dogs, and as such is primarily associated with skin and soft tissue infections in humans secondary to animal bites [1]. Rarely, *P. multocida* has been reported to be associated with other sites of infections, including pneumonia, upper respiratory tract infections, endocarditis, meningitis and UTIs [3]. A literature review of UTIs caused by *P. multocida* revealed nine published cases with patient-specific information, summarized in Table 1 [4–11]. There are also several earlier papers which mentioned the presence of urinary tract infection with *P. multocida* but did not provide details about the patient case or outcomes, and as such these are not included in our review [3,12]. In six of the nine published case reports, preexisting urinary pathology was present, predisposing the patients to UTIs. Animal exposure was reported in six of the nine cases as well, suggesting a potential source of the *P. multocida* organism.

In all reported cases where antibacterial therapy was discussed (eight of nine), successful treatment was achieved, with the most common therapy utilized being penicillins, aminoglycosides, and trimethoprim/sulfamethoxazole. Although the organism is generally susceptible to ampicillin, the preferred treatment for most infections due to *P. multocida* is amoxicillin/clavulanate or ampicillin/sublactam because they are usually associated with animal bites and therefore anaerobic coverage is necessary. However, in the case of UTI due to *P. multocida*, anaerobic coverage is likely not warranted as most infections of the urinary tract are monomicrobial.

In the present case, the patient had several predisposing factors, including a history of cervical cancer which led to a urostomy in 1989. Because of this urinary tract pathology, the patient self-catheterized multiple times daily, which increases her risk of urinary tract infections. In fact, the patient had a history of recurrent urinary tract infection, including some caused by multidrug resistant bacteria such as extended-spectrum beta-lactamase (ESBL) producing *Escherichia coli*. Upon identification of *P. multocida* in our patient’s urine culture, further questioning regarding pets in the home revealed that she had two pet cats in her apartment, and an additional four cats live in the apartment above her with her son, with free passage between the apartments for the cats. She did, however, report good hand hygiene prior to catheter insertion, and had no known prior infection related to exposure to these animals. The cats were not declawed, however the patient denied any history of recent bites or scratches from any of the cats. Upon initiation of therapy active against *P. multocida*, our patient improved quickly and was able to be discharged home to complete her treatment course. She has had no known recurrences of *P. multocida* infection and reported no adverse sequelae from her urinary tract infection.

This case highlights the importance of taking a detailed patient history, including questions regarding animal exposure, in order to determine the source of the infection. Cats are a common reservoir of *P. multocida* so the infection described is likely due to contact with the animals. Knowledge of the source of the pathogen can help guide clinicians to counsel patients on ways to prevent future infections. In the case of *P. multocida* infection, a household with multiple cats is likely to be colonized with the organism so complete avoidance is likely not feasible. Specific measures, however, may be useful in preventing future infections. In this case, the patient could be instructed to isolate catheter insertion to a room of the house that the animals are not able to freely travel, such as a bathroom with the door regularly kept closed. The importance of hand washing and sterile insertion technique should also be emphasized.

In conclusion, *P. multocida* is a rare cause of urinary tract infection but it can occasionally be found in patients with anatomic abnormalities of the urinary tract who have exposure to animals, especially cats. In our case, urinary tract infection with *P. multocida* was likely due to exposure to cats in a patient predisposed to infection due to presence of...
urostomy with Kock pouch requiring self-catheterization multiple times daily.

Conflicts of interest statement

The authors declare that they have no conflict of interest. The patient provided written consent to allow us to publish this de-identified case report.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

[1] Kuhnert P, Christensen H. Pasteurellaceae: biology, genomics and molecular aspects. Caister Academic Press: Norfolk, UK, 2008.
[2] Owen CR, Buker EO, Bell JF, Jellison WL. Pasteurella multocida in animals’ mouths.
[3] Hubbert WT, Rosen MN. Pasteurella multocida infections: II. Pasteurella multocida infection in man unrelated to animal bite. Am J Public Health Nations Health 1970;60:1109–17.
[4] Dixon JM, Keresteci AG. Renal infection with Pasteurella multocida. Can Med Assoc J 1967;97:28–9.
[5] Komorowski RA, Farmer SG. Pasteurella urinary tract infections. J Urol 1976;111:817–8.
[6] Baliah T, Neter E. Pasteurella multocida infection of urinary tract in patient with ileal loop. Urology 1977;9:294–5.
[7] Cooley FE, Carlson JR, Oefinger PE, Cahall DL. Pasteurella multocida urinary tract infection. Clin Microbiol News 1983;5:153–5.
[8] Warren JS, Smith JW. Pasteurella multocida urinary tract infection. Arch Pathol Lab Med 1984;108:401–2.
[9] Mann BA, Quenzer RW. Pasteurella multocida urinary tract infection. West J Med 1987;147:400–1.
[10] Liu W, Chemaly RF, Tuohy MJ, LaSalvia MM, Procop GW. Pasteurella multocida urinary tract infection with molecular evidence of zoonotic transmission. Clin Infect Dis 2003;36:658–60.
[11] Cortez JMC, Imam AA, Ang JY. Pasteurella multocida urinary tract infection in a pediatric patient with end-stage renal disease. Pediatr Infect Dis J 2007;26:183–5.
[12] Talbot JM, Sneath PH. A taxonomic study of Pasteurella septica, especially of strains isolated from human sources. J Gen Microbiol 1966;22:303–11.