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CLINICAL VIGNETTE

Pasteurella Multocida Pneumonia

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Case Report

The patient is a 58-year-old woman with a history of longstanding asthma who complained of a waxing and waning persistent productive cough for several years. She also had a history of post-nasal drip. She had been placed on several rounds of azithromycin, started on nasal steroids for her post nasal drip and was on fluticasone/salmeterol for her asthma. Her asthma and nasal symptoms seemed to be well controlled with medications and the productive cough improved after antibiotics. However due to a recurring productive cough, she was referred to a pulmonary consultant for evaluation. She had never smoked, but had a history of childhood exposure to secondhand smoke from her parents. She previously worked in wood processing and had no exposure to coal dust, silica dust, chemical fumes or asbestos. She denied symptoms of gastroesophageal reflux. There is no history of allergies to dust, pollen or animals. She reported having pet cats and rabbits at home.

On exam, she had normal vital signs with oxygen saturation of 95% on room air. On pulmonary exam, she was able to speak comfortably in full sentences. Her lungs were clear to auscultation bilaterally without wheezes or rales. Her cardiovascular exam revealed normal heart rate and rhythm, and mild pretibial edema. Her lymphatic exam revealed no lymphadenopathy. Laboratory data showed normal complete blood count (CBC) and chemistries.
Chest x-ray showed clear lung fields without infiltrates. Her cardiac imaging showed no ischemia and normal left ventricular function with ejection fraction of 58%. Her echo showed normal left ventricular function and size.

Pulmonary function tests showed mild obstructive ventilatory defect without reversibility and normal diffusion consistent with asthma without reversibility or chronic obstructive pulmonary disease (COPD).

Ultrasound of her legs showed no deep venous thrombosis (DVT).

She underwent a chest computed tomography (CT) scan that revealed extensive branching tree-in-bud opacities with thickening of the subtending airways and mucus
Plugging compatible with
infectious/inflammatory
bronchiolitis in the lingula, bilateral lower lobe and right middle lobe.
Patient underwent bronchoscopy for her abnormal CT finding. Evaluation revealed thick mucopurulent white secretions throughout the trachea and left mainstem bronchus. The underlying mucosa was noted to be friable and mildly edematous in appearance diffusely. Bronchoalveolar lavage was performed in the basal segments of the left lower lobe and in the medial segment of the right middle lobe. AFB, fungal, mycoplasma, CMV, Legionella and viral cultures were negative. Biopsy of the lung showed moderate chronic inflammation and focal acute inflammation, no granulomas and neoplasia.

Cultures from the BAL grew out Pasteurella multocida. The patient was referred to Infectious Disease and started on a 2-week course of amoxicillin/clavulanate mg p.o. q.12 h. The likely source of the Pasteurella multocida infection was thought to be the patient's pet cats and rabbits. After treatment, the patient reported significant improvement in her productive cough, however symptoms recurred about 2 weeks after her antibiotics were finished. Due to her underlying lung disease, she was placed on a 6-week course of amoxicillin/clavulanate

therapy to attempt eradication. Follow-up CT showed decrease of airway inflammation and tree-in-bud opacities. Clinically, the patient had a decrease in her productive cough. She underwent a follow-up bronchoscopy that revealed thick mucopurulent whitish secretions throughout the bronchial trees. The mucosa was noted to be very friable. Bronchoalveolar lavage was performed and sent for Gram stain and culture, fungal stain and culture, AFB stain and culture, viral studies, Legionella, and Mycoplasma.
Pasteurella organism was not found on that bronchoscopy specimen, however, she did have E. coli. The patient then was treated with a 14-day course of Bactrim, which improved her symptoms. After discontinuation of the antibiotics, the patient continued to have cough that was productive of some whitish sputum. The patient denied any fevers, chills, or night sweats. Repeat sputum revealed no E. coli or Pasteurella infection. Her cough was thought to be related to her chronic bronchiectasis.

The patient was advised that when caring for her rabbits that she wear a mask, wash her hands and wear gloves whenever she is in contact with infected animals or changing litter for the rabbits.

Pasteurella multocida is a small gram-negative coccobacillus that is found in the gastrointestinal tract and nasopharynx of wild and domestic animals including rabbits, cats, dogs, cows and birds. Cats have 50-90% rate of colonization in the oropharynx by P. multocida, dogs have a 50-66% rate, pigs have 51% rate and rats have 14% rate of colonization[1]. Rabbits have a range of 20-90% rate of colonization depending on the detection method used[7].
The organism causes disease by direct inoculation from bites or inhalation of aerosolized organisms. Disease can also be spread by contact with fomites containing the organism. In some instances, Pasteurella multocida can become part of the normal flora of the human respiratory tract. Veterinarian students and animal handlers have been found to carry P. multocida organism without exhibiting any pulmonary symptoms[1]. In a study by Jacques et al., capsulated and noncapsulated organisms were found to have a difference in virulence. Mice and piglets inoculated with capsulated organisms had more severe turbinate infections[5]. The capsulated organisms have a cell surface lipopolysaccharide, which plays a role in virulence[8]. Noncapsulated organisms likely had more exposure of surface adhesins, which promoted respiratory tract colonization[5].

P. multocida is the cause of fowl cholera in chickens and turkeys, hemorrhagic septicemia in cattle and atrophic rhinitis in pigs[8]. In rabbits, rhinitis with nasal discharge, otitis media, pneumonia, conjunctivitis, and septicemia are conditions that have been associated with P. multocida. P. multocida is found most commonly in the middle ears, paranasal sinuses and nares of rabbits[3].

Vaccination with avirulent strains has been used to control infections but vaccinated poultry and cattle can still have outbreaks due to reversion to a more virulent strain[8]. Antibiotics can treat animals that are sick and have symptoms but do not eradicate the bacterial colonization in asymptomatic animals colonized with Pasteurella multocida[7].

In their review of P. multocida cases, Weber et al. reported that in humans, P. multocida can cause local wound infections related to animal bites and scratches, respiratory infections, and systemic infections[10]. In the case of infected dog and cat bites, Pasteurella species were the most frequent isolates from the bites. P. canis was the most common in dogs while P. multocida were most common in cats[6]. P. multocida is the causative agent in 20-50% of the 1-2 million bite wounds from cats and dogs each year in North America[8] The wound infections have rapid onset of erythema, warmth, tenderness and purulent drainage. Local complications include septic arthritis, osteomyelitis, most commonly in a finger or hand after cat bite[10].

P. multocida in the respiratory tract is usually a commensal bacteria in patients with underlying

lung disease. Infections occur after inhalation of organism from aerosolized secretions of infected animals. The organism can be dormant as part of the normal flora until disruption of the host's immunity leads to secondary infection. Pasteurella multocida can cause pneumonia, tracheobronchitis, lung abscess and empyema. Elderly patients with chronic obstructive pulmonary disease, bronchiectasis and malignancy are at risk. In patients with a history of pet exposure and chronic lung disease, there should be consideration of Pasteurella as a potential pulmonary pathogen. P. multocida pneumonia has been named the cat cuddler's cough for this reason[6].

In their study of the genomic and phenotypic differences of P. multocida subgroups, Chen et al. found that P. multocida subspecies septica was more commonly found in local wound infections while P. multocida subspecies multocida was cultured more often from respiratory infections[1].

Systemic infection due to Pasteurella multocida is uncommon in healthy people. Patients who are immunocompromised can develop infections after casual animal contact including bacteremia, meningitis, brain abscess, spontaneous bacterial peritonitis, intra-abdominal abscesses. In their review of patients having positive cultures of Pasteurella multocida at a university hospital in Crete, Greece, Christidou et. al. noted that the majority of their patients were over 70 years of age. Patients have a variety of underlying diseases such as diabetes, malignancies, rheumatoid arthritis, liver dysfunction, chronic pulmonary diseases and systemic lupus erythematosus[2].Duggal et. al. reported a case of a splenectomized patient who had developed septicemia after exposure from a pet rabbit[4].

Pasteurella strains are responsive to ampicillin, penicillin, second and third generation cephalosporins, doxycycline, trimethoprim-sulfamethoxazole, fluoroquinolones, azithromycin, and clarithromycin. Beta lactamase production has been found on testing, therefore beta-lactamase inhibitor should be added for empirical therapy. First generation cephalosporins, clindamycin, and erythromycin have less activity against pasteurella[2,9].

REFERENCES

1. **Chen HI, Hulten K, Clarridge JE 3rd**. Taxonomic subgroups of Pasteurella multocida correlate with clinical presentation. *J Clin Microbiol*. 2002 Sep;40(9):3438-41. PubMed PMID: 12202590; PubMed Central PMCID: PMC130671.
2. **Sanchez S, Mizan S, Quist C, Schroder P, Juneau M, Dawe D, Ritchie B, Lee MD**. Serological response to Pasteurella multocida NanH sialidase in persistently colonized rabbits. *Clin Diagn Lab Immunol*. 2004 Sep;11(5):825-34. PubMed PMID: 15358639; PubMed Central PMCID: PMC515265.
3. **Jacques M, Kobisch M, Bélanger M, Dugal F**. Virulence of capsulated and noncapsulated isolates of Pasteurella multocida and their adherence to porcine respiratory tract cells and mucus. *Infect Immun*. 1993 Nov;61(11):4785-92. PubMed PMID: 8406879; PubMed Central PMCID: PMC281235.
4. **St Michael F, Vinogradov E, Li J, Cox AD**. Structural analysis of the lipopolysaccharide from Pasteurella multocida genome strain Pm70 and identification of the putative lipopolysaccharide glycosyltransferases. *Glycobiology*. 2005 Apr;15(4):323-33. Epub 2004 Nov 10. Erratum in: Glycobiology. 2005 May;15(5):13G. PubMed PMID: 15537789.
5. **Deeb BJ, DiGiacomo RF, Bernard BL, Silbernagel SM**. Pasteurella multocida and Bordetella bronchiseptica infections in rabbits. *J Clin Microbiol*. 1990 Jan;28(1):70-5. PubMed PMID: 2298879; PubMed Central PMCID: PMC269539.
6. **Weber DJ, Wolfson JS, Swartz MN, Hooper DC**. Pasteurella multocida infections. Report of 34 cases and review of the literature. *Medicine (Baltimore)*. 1984 May;63(3):133-54. Review. PubMed PMID: 6371440.
7. **Mathai MG, Ebeo CT, Byrd RP Jr, Fields CL, Roy TM**. Cat cuddler's cough. *Tenn Med*. 2001 Mar;94(3):98-9. PubMed PMID: 11242756.
8. **Christidou A, Maraki S, Gitti Z, Tselentis Y**. Review of Pasteurella multocida infections over a twelve-year period in a tertiary care hospital. *Am J Infect Dis*. 2005; 1(2):107-10.
9. **Duggal A, Waraich K, Cutrona A**. Pasteurella multocida septicemia, due to close contact with a pet rabbit, in a splenectomized patient. *Infect Dis Clin Practice*. 2009; 17(3):196-7.
10. **Talan DA, Citron DM, Abrahamian FM, Moran GJ, Goldstein EJ**. Bacteriologic analysis of infected dog and cat bites. Emergency Medicine Animal Bite Infection Study Group. *N Engl J Med*. 1999 Jan 14;340(2):85-92. PubMed PMID: 9887159.

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