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Don't *bug* me...I'm taking a bath!

A Case Study on Hot Tub Lung

Lindsay Renz, BS, MS, Virginia Reed, MD, Theresa Rohr-Kirchgraber, MD

BACKGROUND

- Hypersensitivity pneumonitis is a unique form of interstitial lung disease that is diverse in its presentation and etiology.
- Hypersensitivity pneumonitis is mediated by an inflammatory reaction to inhalation of an environmental antigen. It is described as a mixed III/IV hypersensitivity reaction that is characterized by lymphocyte predominance and high CD4:CD8 ratio.
- Hot tub lung is one etiology of hypersensitivity pneumonitis which can occur from exposure to mycobacterium antigens in water-related contamination, most notably hot tubs.
- It most commonly presents with patients who have underlying lung disease or are immunocompromised. However, there has recently been an increase in hot tub lung in otherwise healthy individuals.

CLINICAL PRESENTATION

HPI: 58-year old African American female with a history of hypertension and stage 3 breast cancer status post 3 cycles of cyclophosphamide/docetaxel presented to the Emergency Department (ED) with persistent dyspnea, dry cough, and fever. She was discharged earlier that day with a diagnosis of dyspnea with suspicion of pneumonitis after 2 day admission and extensive work-up. Upon discharge, she reported worsening dyspnea with exertion, dry cough, and fever, and returned.

PMH:

- History of stage 3 breast cancer ER/PR+.
- Hypertension, controlled with HCTZ.

PSH:

- Right partial mastectomy, no complications.

Family Hx:

- Denies family history of autoimmune disease, breast cancer, or lung disease.
- Father has CAD.

Social History:

- Denies any hazardous exposures including hot tub, occupational, smoke, construction sites, or toxic chemicals, other than chemotherapy.
- Denies tobacco and illicit drug use. Rare ETOH.

CLINICAL PRESENTATION & IMAGING

ROS:

- Positive for fever.
- Positive for rhinorrhea (chronic).
- Positive for mild tongue soreness (mucositis).

Vitals:

- Temperature 99.5°F (previously 100.3°F)
- Heart rate 98 beats per minute.
- Respiratory Rate 20 breaths per minute.
- Blood pressure 132/77.

PE:

- Pulmonary - Diminished air exchange in bases bilaterally, left sided chest port w/o erythema and non-tender. Effort of breathing is normal. No respiratory distress. No rales, No wheezes.
- Rest of the physical exam is normal.

Work-up:

TTEcho - negative; CT w/ PE work-up was negative, *CT positive for interstitial lung changes*; Troponin x3 negative; Blood culture negative; Urine Culture negative; Respiratory Viral Panel negative; CMV PCR negative; EBV PCR negative; WBC within normal limits; Mono Ab negative; IgG/IgM PCR negative

Imaging & Procedure Findings:

- Chest Xray showed interstitial infiltrates which had progressed while hospitalized.
- Chest CT showed interstitial lung disease with positive emphysematous changes.
- Patient underwent bronchoscopy with bronchoalveolar lavage (BAL) which showed severe lymphocytic alveolitis with significant inflammatory debris suggestive of hypersensitivity pneumonitis. Lymphocytic predominance with high CD4:CD8 ratio.

Differential Diagnosis:

- Hypersensitivity Pneumonitis (Hot Tub Lung) due to mycobacterium avium intracellulare
- Chemotherapy-induced Pneumonitis
- Sarcoidosis
- EBV or CMV
- Mycobacterial Infection

Further History Taking:

Patient stated that she has been using her indoor bathtub to soak after difficult chemotherapy sessions to make her "feel better". Her bathtub has jets and she would sit surrounded by the warm bubbling water relaxing. She had recently started to notice that her breathing would acutely worsen every time she used the tub.

Assessment and Plan:

- Diagnosis of Hypersensitivity Pneumonitis (Hot Tub Lung) due to exposure of mycobacterium avium complex.
- Advised to avoid indoor bathtub use to prevent further exposure.
- Prescribed Prednisone to decrease inflammation and relieve symptoms.



Figure 1: PA (left) and lateral (right) views of chest x-ray showing linear interstitial pattern ground glass opacities greater at lung bases.

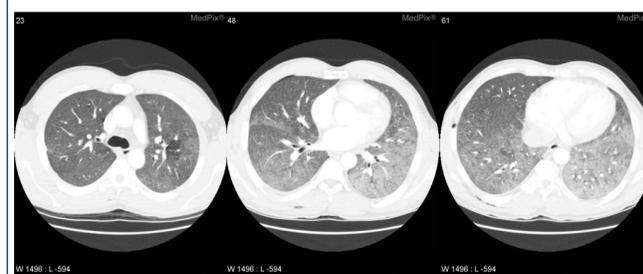


Figure 2: Chest CT shows diffuse ground glass attenuation greater at lung bases with a few nodular opacities.

CONCLUSION

- While the patient's vague symptoms of dyspnea and fever did not point to a specific diagnosis, the additional history revealed possible exposure to mycobacterium antigen through "hot tub like" contamination.
- Repeating the history to dig deeper into the patient's daily activities revealed an essential piece of information that led to the diagnosis.
- This case is one of the first cases to document hot tub lung in a bathtub.

CLINICAL SIGNIFICANCE

- This case highlights the importance of history taking and listening to our patients. Many times the patients have the answer, but it is the job of healthcare providers to step back and look at the whole patient.
- Health professionals benefit from getting to know patients on a personal level not only for better quality of care, but also to help uncover difficult etiologies.
- With the prevalence of bathtub use, physicians must remember to ask about not only hot tub use, but also bathtub use for potential exposure to MAC.

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