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ASPERGILLUS PNEUMONIA-A DIAGNOSIS OF SUSPICION

Emergency Medicine

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KEYWORDS

Clinical presentation:-
A 59-year-old woman, status post cadaveric renal transplant 2 weeks ago, presents to the ED with a fever. The patient has had 10 days of worsening dry, non-productive cough, chills, mild shortness of breath, and a fever up to 100.4˚. She reports that the dry cough has been present for 2 months, but has become worse over the last several days. She also reports feeling increasing fatigue and wheezing. She denies dysuria or frequency, diarrhea, nausea, or vomiting. Her review of systems is otherwise negative.

Past medical history
The patient has a history of end-stage renal disease secondary to polycystic kidney disease. She also has a history of supraventricular tachycardia, asthma, hypertension, hyperlipidemia, hypothyroidism, and total abdominal hysterectomy. The patient denies alcohol, tobacco, or recreational drug use. She is an avid gardener. She has a family history of polycystic kidney disease in both her mother and her sister.

Medications
The patient takes tacrolimus, mycophenolate mofetil, iron, fluticasone, atenolol, estradiol, calcium, flecainide, folic acid, atorvastatin, ezetimibe, docusate, and aspirin

Allergies
The patient has no known drug allergies.

Physical exam and ancillary studies:-
Vital signs:
Temperature-99.6˚F.
BP-110/70 mmHg
Pulse-80 bpm,
Respiratory rate-18/min
Oxygen saturation-98% on room air.

General: The patient is awake, alert, and oriented. No apparent distress present

Head,Eye,Ear,Nose,Throat Examination:
She has no conjunctivitis or scleritis. Her oral mucosa is moist without lesions. She has no pharyngeal erythema or exudates. There is no cervical, supraclavicular, or axillary lymphadenopathy.

Lungs: Bilateral Air entry equal.No wheeze, rales, or rhonchi present. Her chest is resonant to percussion. There is no change in tactile fremitus.

Cardiovascular:
The patient's heart beat is regular. She has a soft systolic murmur.

Abdomen: The patient's abdomen is soft, non-tender, and non-distended. Her right flank incision is intact without drainage or erythema.

Extremity: Her extremities have no clubbing, cyanosis, or edema.
Neurologic: The patient has a normal neurologic exam.

Pertinent labs: All of the patient's lab values are within normal limits except for a creatinine of 1.9.

Radiographs: the patient's chest X-ray shows no abnormalities.

Clinical course:-
The transplant patient with a fever requires a comprehensive evaluation, the specifics of which are as follows:
This patient was identified to be at high risk for opportunistic infection, as she was a recent transplant recipient on maximal immuno suppression. Although her chest X-ray showed no specific acute disease, her symptoms pointed to a likely pulmonary process. Therefore, the patient underwent a CT of her chest, which is shown below. While awaiting this study, she received broad-spectrum antibiotics, and the transplant service was contacted for the patient to be admitted. After admission, the patient underwent bronchoscopy and bronchoalveolar lavage based on the abnormalities on her chest CT. This is the diagnostic study of choice for pulmonary aspergillosis. These studies identified an ulcerating lesion in the trachea with copious secretions. Cultures of the lesion and a trans-bronchial biopsy were positive for Aspergillus and the patient was started on voriconazole. She quickly improved once appropriate therapy was instituted, and was discharged home with a 2 month course of voriconazole.

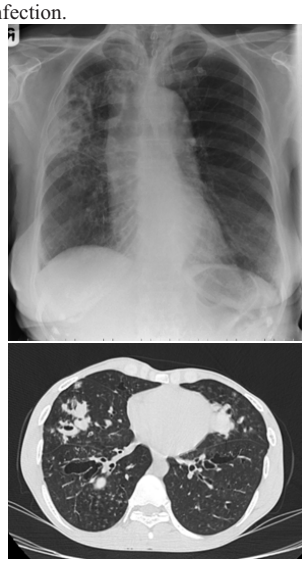
Questions for thought:-
- What is causing this patient's symptoms?
- Does a recent history of a kidney transplant make a difference in the diagnostic approach?
- What workup should you initiate for this patient in the ED?
- What can be done for the patient in the ED while waiting for the workup to be completed?

DISCUSSION:-
Epidemiology: Aspergillus is a ubiquitous fungal organism found frequently in soil and decaying organic matter. The most common pathogenic species include A. fumigatus (most common), A. niger, A. flavus, and A. glaucus. Aspergillosis is the second most common opportunistic fungal infection (after candidiasis) in the immuno compromised patient and occurs almost exclusively through inhalation of spores. Invasive aspergillosis is extremely uncommon in the immunocompetent population, but affects 5–25% of immunocompromised individuals.

Pathophysiology:
pulmonary aspergillosis generally begins after inhalation of spores. Alveolar macrophages, which usually kill Aspergillus species, are unable to eradicate the spores if macrophage dysfunction exists, or the immune system is suppressed by cytotoxic medications (immuno suppressants) or another underlying infection (HIV, leukemia). The spores germinate, producing hyphae, which then manage to evade host defenses via numerous secreted proteases and other immuno suppressive metabolites.

Presentation:
Aspergillus most often causes pulmonary disease, but has been shown to cause endocarditis, sinus infection, disseminated disease, or cutaneous infection after direct implantation during trauma. Pulmonary aspergillus infection generally occurs in three forms: allergic bronchopulmonary aspergillosis, invasive aspergillosis, and aspergilloma. Allergic bronchopulmonary aspergillosis generally affects asthmatics or cystic fibrosis patients who present with elevated IgE levels and complain of upper respiratory infection (URI) symptoms (cough, fever, wheezing, dyspnea, pleuritic pain) with hemoptysis. Invasive aspergillosis frequently affects leukemia patients who present with URI symptoms, unremitting fevers not responding to standard antibiotic regimen and have radiographic

evidence of pulmonary cavitations or bronchopneumonia. Aspergilloma (mycetoma or "fungus ball") most often presents as a round density in the upper lobes and 50–80% of patients present with hemoptysis (30% subsequently have massive bleeding). Most serious infections occur several months after the transplant; however, earlier infections may occur if the patient experiences an unusual epidemiological exposure (for example, travel, construction, gardening). Early diagnosis combined with aggressive and specific therapy is vital to the patient's well-being and survival. Despite a reduced inflammatory response, a fever in these patients will often be the first sign of infection.



This chest CT shows bilateral upper lobe nodules concerning for an atypical pneumonia.

Diagnosis :-Aspergillus pneumonia.

Definitive therapy:

A febrile transplant patient should be hospitalized and receive broadspectrum antibiotics soon after appropriate initial fever workup labs are obtained. Once a specific infectious agent has been identified, the antibiotics should be tailored accordingly. Invasive aspergillosis carries a mortality of 93–100% in a bone marrow transplant patient, and 38% in a kidney transplant patient. Traditionally, amphotericin has been the standard antifungal therapy. Recently, new antifungal agents with fewer side-effects such as caspofungin and voriconazole have been used with good results. Surgery is reserved for Aspergillus infection complication or hemoptysis associated with invasive pulmonary disease. Generally a lobectomy is required for complete eradication.

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