January 2015 Pulmonary Case of the Month: More Red Wine, Every Time

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History of Present Illness

A 41-year-old man travelling from Texas to Las Vegas, Nevada presents to the Emergency Room in Albuquerque, New Mexico with petechial rash, photophobia and headache of 2 weeks duration. The patient complains of general malaise, arthralgia, trouble sleeping, shortness of breath associated with cough and intermittent bilateral lower extremity swelling of 3 weeks duration.

PMH, SH & FH

The patient was prescribed lisinopril and metformin for hypertension and diabetes mellitus, respectively. He admitted occasional drinking, smoking a variable quantity for 30 years but currently not smoking. He denied any illicit drug use.

Physical Exam

Vitals: Heart Rate-92, Blood Pressure-116/45 mm Hg, Respiratory Rate-44 breaths/min, Temperature- 37.2°C, SpO2-98% on non-rebreather mask.

General: His mental status was not altered.

HEENT: No papilledema was appreciated on eye exam.

Neck: JVP not appreciated.

Lungs: he had diminished breath sounds bilaterally on auscultation.

Heart: His heart had a regular rate and rhythm with no murmurs rubs or gallops.

Abdomen: No abdominal distention or lower extremity edema appreciated.

Skin: A petechial rash was noted most prominently in the lower extremities.

Based on the initial presentation the **most appropriate investigations** would be?

1. CBC, CT head, echocardiogram, blood cultures, metabolic panel, inflammatory markers
2. CBC, UA, lumbar puncture, chest x-ray, inflammatory markers, metabolic panel
3. Echocardiogram, CBC, UA, venous blood gases, bronchoscopy, CT head
4. Stress test, CXR, inflammatory markers, lumbar puncture, ultrasound abdomen, metabolic panel
5. UA, lumbar Puncture, bronchoscopy, echocardiogram, CT head, inflammatory markers

Correct!

2. CBC, UA, lumbar Puncture, CXR, inflammatory markers, metabolic panel

The patient has presented with a constellation of symptoms. The basic investigations would be one which would try to rule in/out broader categories of the pathological processes which might be going on.

The CBC can be revealing with regards to anemia and possible infectious processes. Lumbar puncture is important to r/o meningitis given pt.'s initial presentation symptoms. UA and metabolic panel can help in identifying infectious process plus identifying any chemical abnormality which would give a clue to underlying pathological process which might be going on. The patient was hypoxic and it would be worthwhile to get a CXR as a scanning modality to identify a possible pulmonary disease process. Venous blood gases (VBG) will not be able to assess the oxygen status and CT chest will not be an appropriate initial investigation. ECHO can be a reasonable investigation since the patient was complaining of lower extremity swelling, however, it did not necessarily need to be done on initial presentation as overt signs of heart failure were not appreciated during physical examination. Inflammatory markers can help us in assessing if the process is acute or chronic. CT of the head is not warranted in this patient as he does not have papilledema on physical examination. Bronchoscopy is not an appropriate initial investigation.

Our patient had a lumbar puncture which was unremarkable for an infectious process. His creatinine was grossly elevated along with pro-BNP, CRP and ESR. Troponins were negative and UA showed microscopic hematuria. Potassium was slightly elevated at 5.2. A chest x-ray (CXR) was performed (Figure 1).

Figure 1. Portable CXR done in the Emergency Department shows the patient to have basilar predominant confluent hazy opacities.

What is the **probable differential** based on CXR, history and presenting labs?

1. Auto-immune disorder, pulmonary edema, community acquired pneumonia, coccidioidomycosis
2. Hydatid cysts, asbestosis, pulmonary embolism, tuberculosis
3. Pulmonary edema, auto-immune disorder, hydatid cysts, community-acquired pneumonia
4. Pulmonary embolism, malignancy, coccidiomycosis, asbestosis
5. Tuberculosis, community-acquired pneumonia, pulmonary edema, malignancy

Correct!

1. Auto-Immune Disorder, Pulmonary Edema, Community Acquired Pneumonia, Coccidioidomycosis

The patient does not have risk factors concerning for tuberculosis and his physical exam findings make malignancy an improbable diagnosis. Although he has a history of long distance travel, his hypoxia of apparent 2 weeks duration makes the diagnosis of pulmonary embolism very unlikely. This patient's presentation is not at all supportive for typical hydatid cyst disease.

Based on the CXR he could have an unresolving pneumonia. Given the geographical location where the patient lives coccidioidomycosis is a serious consideration. Elevated inflammatory markers are supportive of a possible auto-immune process and intermittent swelling might suggest a possible cardiac etiology which makes pulmonary edema possible based on the CXR findings.

To find the definitive etiology of this patient's pathology the **most appropriate tests** would include?

1. Brain biopsy, cardiac catheterization, ECHO, rheumatologic panel, pulmonary function tests
2. Brain biopsy, high resolution chest CT, bronchoscopy, ECHO, tumor markers
3. Renal biopsy, stress test, CT angiography, tumor markers, pulmonary function tests
4. Skin biopsy, bronchoscopy, ECHO, rheumatologic panel, high resolution chest CT
5. Skin biopsy, stress test, CT Angiography, tumor markers, pulmonary function tests

Correct!

4. Skin biopsy, Bronchoscopy, ECHO, Rheumatologic panel, High resolution chest CT

Skin and renal biopsies can both aid in the diagnosis of systemic vasculitis. Skin biopsy would be less invasive and would be the appropriate initial approach. If it's negative, then the more invasive renal biopsy can be considered. High resolution CT of the chest can aid in forming the differential for possible causes of hypoxia in this patient but a bronchoscopy may be more revealing as it can directly sample the pathology. A rheumatologic panel would aid in narrowing the differential with regards to possible auto-immune etiology of disease in the patient. ECHO can help in assessing the cardiac function in the patient since initial pro-BNP was elevated so this would be a reasonable investigation given this clinical scenario.

Brain biopsy would not be appropriate in this clinical scenario. Findings in the patient are not concerning for malignancy thus tumor markers would not yield much. Cardiac catheterization, Stress test and CT angiography do not have any definite indication in this patient and would not be diagnostically relevant.

Our patient had a bronchoscopy with bronchoalveolar lavage which yielded a progressively bloody return. The skin biopsy was consistent with changes associated with vasculitis. Rheumatologic work up showed the patient to be positive for c-ANCA (anti-PR3) and rheumatoid factor.

The **differential for diffuse alveolar hemorrhage** include(s):

1. Churg-Strauss syndrome
2. Cytotoxic drug therapy
3. Necrotizing granulomatous vasculitis
4. Sub-acute bacterial endocarditis
5. All of the above

Correct!
5. All of the above

Diffuse alveolar hemorrhage (DAH) is most often recognized by obtaining a bloody return when bronchial alveolar lavage (BAL) is performed. The differential for diffuse bronchial alveolar hemorrhage is vast and requires a series of investigations for a definite etiology. We can classify DAH as a clinical picture which consists of anemia, hemoptysis, and respiratory failure (hypoxic in origin) and diffuse radiographic pulmonary infiltration.

In our patient the lab findings were consistent with diagnosis of necrotizing granulomatous vasculitis (NGV, formerly known as Wegner's granulomatous disease). He did not have any history suggesting exposure to cytotoxic drugs and there were no risk factors in him which would make us concerned for sub-acute bacterial endocarditis.

Therapy most appropriate for a patient with NGV may include:

1. Cyclophosphamide
2. High dose steroids
3. Plasma exchange
4. Rituximab
5. All of the above

Correct!
5. All of the above

The mainstay of NGV treatment is immunosuppression in order to induce complete remission of the disease. The options for this purpose include steroids, rituximab, cyclophosphamide, methotrexate and plasma exchange.

The combination of agents is dependent on the severity of disease. For mild disease glucocorticoids in combinations with methotrexate is considered a good starting point. Patients with moderate to severe disease should have their treatment initiated with glucocorticoids plus cyclophosphamide or rituximab.

Plasma exchange is indicated in addition to medication therapy for those patients who meet the following criteria serum creatinine > 5.7, requirement for dialysis and pulmonary hemorrhage.

References

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