

Location:Emergency Room.

Vital signs:Temperature 39.3C(103F); heart rate 112/min, regular; blood pressure 112/70 mmHg; respirations 12 per minute;

HPI:

The patient is a 39-year-old white male who presents with a two-day history of increasing fevers and chills with a temperature up to 39.2 the previous evening. He complains of anorexia, diffuse joint pains, and back pain. He also has some myalgias and has noted several painful spots on his fingers. He denies any chest pain, SOB, palpitations, cough, abdominal pain, headache, and seizures. He is feeling nauseated but no vomiting. His REVIEW OF SYSTEMS is positive for a history of recent IV drug use. His past medical history is significant for personality disorder, tobacco abuse, and alcohol abuse. SH: He smokes 2 PPD for the past 15 years, drinks alcohol almost everyday. He admits using IV drug abuse from the past 5 years. He was tested for HIV, and Hepatitis B and C recently for pre-employment and were negative. He is allergic to sulfa. He is not on any medication. How do you approach this case?

Order physical exam:

General
HEENT/Neck
Lungs
Heart
Abdomen
Extremities
Skin
Neuro/psych

Results:

General:The patient is an ill-appearing white male who appears his stated age.
HEENT:Oropharynx is clear, except for some palatal petechiae. Pupils are equal, round and reactive to light. Conjunctivae show a small hemorrhage. Funduscopic examination is unremarkable. Neck: Supple; no lymphadenopathy, thyromegaly or bruits. Cardiovascular: Tachycardic, soft holosystolic murmur heard at the left lower sternal border, increased by inspiration and decreased by expiration. Lungs: Clear to auscultation bilaterally. Abdomen is soft, nontender, nondistended. No hepatosplenomegaly appreciated. Extremities:The other arm shows two recent needle tract marks. There is a fine petechial rash noted of the bilateral lower extremities below mid tibia. Several digits on the feet have splinter hemorrhages. In addition, the digits of the hand show several splinter hemorrhages. There are two palpable painful small violaceous nodules on the digits of the right hand.

Review order:

Pulse oximetry, stat
IV access, stat
CBC with differential, stat
BMP, stat
PT/PTT, stat
Blood cultures, stat every 10 minutes x 3
UA, stat
Chest -X-ray, PA and lateral, stat
ECG, 12 lead, stat
Urine toxicology screen, routine

Results:

O2 saturation is 97% on room air. CBC with differential shows a white count 18,000/cmm with 89% polymorphonuclear leukocytes, 10 band neutrophils, 12 lymphocytes, hemoglobin 12, hematocrit 35.5, and platelets 309,000/cmm. X ray of the chest shows 2 very small wedge shaped infiltrates with cavitation. Electrolytes are normal; BUN is 25 and creatinine is 0.9. PT/PTT are WNL. EKG shows sinus tachycardia. UA is WNL. Tox screen is positive for opiates.

Order:

Vancomycin, IV, continuous
Gentamicin, IV, continuous
Acetaminophen, oral, one time (for fever)
Normal saline, IV, continuous

*Admit to floor/ward

Vitals every 4 hours
Pulse oximetry every 4 hours
Urine output, routine
Bed rest with bathroom privileges
Pneumatic compression stockings
NPO

*Advance the clock for 8 hours

TEE (Transesophageal echocardiogram), stat
CBC with diff, next morning

Consider ordering following if he was not tested before:

HbsAg, routine (For hepatitis B screening)
Hepatitis C antibody, serum, routine
HIV-1/HIV-2 serology, routine

Check "Call me with the next available result"

Results:

Preliminary blood culture results show staphylococcus aureus, methicillin sensitive growing in 4 out of 4 bottles. Basic metabolic panel: Normal electrolytes and renal function. Results of transesophageal echocardiogram reveal vegetations on the tricuspid valve approximately 5 mm in length. There is no evidence of perivalvular disease.

Review orders:

D/C Vancomycin (double click on this order; the software will ask you, do you want to cancel this order?)

Order Nafcillin, IV, continuous

Central line placement, routine (for continued IV antibiotic therapy for a total of four to six weeks).

Daily blood cultures until sterile and once after the completion of antibiotic course (4 to 6 weeks) to document the cure

Examine the patient next day

Interim exam:

The patient's temperature down trends with a T-max of 37.8 on first day of admission. He is hemodynamically stable.

Order review:

The patient is continued on the nafcillin and gentamicin for five days. He is then switched to nafcillin alone (D/C gentamicin after 5 days).

Smoking cessation

Limit alcohol

Safe sex

Seat belt use

No illegal drug use

Exercise program

Advise patient SBE prophylaxis

* Follow up in 1 week.

Primary diagnosis

Right sided infective endocarditis from MSSA

Discussion:

Early cases of infective endocarditis may be difficult to diagnosis if there is a concomitant infection elsewhere in the body. His physical exam had several findings suspicious for an endocarditis infection including splinter hemorrhages, also nodes on his hands on the pulp of his fingers, petechiae of the lower extremities and on the palate, conjunctival hemorrhages.

'Duke criteria' for the diagnosis of IE:

Major:

1. Positive blood cultures
2. Positive echocardiogram for IE

Minor:

1. Predisposing factors such as IV drug abuse
2. Fever of $>38^{\circ}\text{C}$ ($>100.4^{\circ}\text{F}$)
3. Evidence of embolic phenomena
4. Evidence of immunologic phenomena such glomerulonephritis, Osler's nodes etc.
5. Equivocal blood cultures
6. Equivocal echo findings

Presence of 2 major or one major and 3 minor or 5 minor criteria is required for the diagnosis of IE.

What 'empirical' antibiotic should I use?

1. In a patient with H/O IV drug abuse, the antibiotic choice should cover MRSA (methicillin resistant staphylococcus aureus) and gram-negative organisms i.e. Vancomycin and gentamicin.
2. Blood culture-negative native valve endocarditis is treated with ceftriaxone and gentamicin.
3. Blood culture-negative prosthetic valve endocarditis is treated with ceftriaxone and gentamicin plus vancomycin.

When should I obtain CVTS (cardiovascular thoracic surgeon) consult?

The indication for cardiac surgery in patients with infective endocarditis is not fully agreed upon. However, some of the indications include, moderate to severe heart failure secondary to valvular dysfunction or partially dehiscd unstable prosthetic valve, prosthetic valve endocarditis with Staph aureus or Staph epidermidis or relapse of the prosthetic valve after prosthetic valve endocarditis after appropriate antimicrobial therapy, and large ($>10\text{ mm}$) hypermobile vegetations, which can potentially cause septic embolism.

In patients with suspected infective endocarditis one should aim therapy at the most likely organism. Staph aureus is the most common organism isolated in this setting of IV drug use. The patient should be screened for other signs of endocarditis including a urinalysis which may show hematuria, chest X ray which in this case was suspicious for septic pulmonary emboli which can be seen more often in the setting of tricuspid valve endocarditis in IV drug users. Transesophageal echocardiography has become an important mode of helping to diagnose infective endocarditis and help guide management. There are a number of complications of infective endocarditis, especially with left sided disease that should be monitored for vigilantly. These are mainly embolic in nature and include CNS embolus with stroke-like syndromes or subtle neurologic defects. Emboli to the kidney may cause focal glomerulonephritis, which induces hematuria, or renal failure may ensue secondary to diffuse proliferative glomerulonephritis. One may see arrhythmias including various degrees of heart block and pericarditis, myocarditis or myocardial abscess. Heart failure as noted above in the indications for surgery is also a potential major complication of infective endocarditis. This patient managed to avoid most of the complications possibly because of early presentation and early treatment of his endocarditis. In patients in whom one suspicious of major complications, it could be appropriate to obtain CT scans of the head, chest, abdomen, and pelvis looking for other sites of embolic disease or infarction. One should monitor as well renal function for evidence of kidney failure secondary to glomerulonephritis or infarction or emboli. The patient should receive four to six weeks total of antimicrobial therapy directed at the results of the blood cultures obtained. In this case with Staph aureus optimal therapy is with the penicillinase resistant penicillin, nafcillin, 2 grams IV Q4H. He also received gentamicin for three to five days initially. In patients intolerant to nafcillin an appropriate substitute antimicrobial therapy would be cefazolin with or without gentamicin. In patients

who have allergies or who have methicillin resistant Staph aureus, vancomycin would be the agent of choice.

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