**AHD – Endocarditis**

**Learner Guide**

**Learning objectives:**

* Identify at risk populations for endocarditis and explain why this risk is increased.
* Initiate appropriate work-up for suspected endocarditis based on history and physical examination.
* Recognize patients who require surgical intervention for infective endocarditis.
* Prescribe appropriate prophylaxis for medical procedures for patients at increased risk of infective endocarditis.

**Case 1:** Mr. Stephan Bovis is a 48-year-old male with h/o IVDU who presents with “passing out”. He was watching TV when he lost consciousness. No symptoms prior to this episode and this has never happened before. He has mild SOB for last week. SOB is present at all times but worse with exertion. He has also noticed 3 weeks of increased fatigue, intermittent fevers, and chills.

PMH: No known PMH

Medications: PRN tylenol

Social: Occasional alcohol consumption, smokes 1 ppd, uses IV heroin. Last use 2 days ago.

Recent injection sites: foot

Physical Exam:

Vitals: T 101, BP 95/45, HR 105, RR 20, 98% RA

Gen: Diaphoretic, mild discomfort

HEENT: PERRL, normal conjunctivae, MMM, multiple dental caries

CV: Tachycardic, regular rhythm, nl S1/S2, no murmur appreciated, no JVD, no edema

Resp: CTAB

Abd: Soft, NT/ND, +BS

Skin: Track marks present on bilateral forearms, no erythema or tenderness of feet at recent injection sites

**1. What is syncope and how might this patient have syncopized? What else is on your differential diagnosis?**

**2. Why does IVDU create risk for endocarditis? What other patients are at risk for endocarditis?**

**3. What else would you look for on physical exam?**

HEENT:

CV:

Abd/Renal:

MSK:

Skin:

Neuro:

**4. You are admitting this patient to general medicine service. What orders do you want to place?**

**5. What organisms are you concerned about? What empiric antibiotics would you start?**

**Case Continued:**

CXR was normal. UA was negative for blood, RBCs, WBCs, LE and nitrites. ECG shows NSR. It’s the next morning and you are seeing your patient on pre-rounds. In the quiet of the 7NW bed you now notice a new 2/6 blowing diastolic decrescendo murmur at the 3rd left ICS which increases with isometric hand grip. The patient has just come back from TTE but the results aren’t back yet.

**6. How does this change your plan?**

**7. What if instead of hearing a murmur, the TTE returns with findings of an 11 mm oscillating vegetation on the anterior leaflet of aortic valve? What is your next step?**



**Break here for questions for the expert.**

**Case Continued:**

Patient undergoes TEE for the new murmur. TEE shows a 7 mm vegetation on the aortic valve with moderate aortic regurgitation and EF of 55%. Then on hospital day 4 the team gets called for bradycardia on tele.

**8. What are your next steps?**

**9. Should this person have surgery? What are the indications for early surgery in left-sided endocarditis?**

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| **Indications for Early Surgical Intervention** |
| Cardiac | 1.2.3. |
| Infectious | 1.2.3.  |
| Vegetation size/Embolic complications | 1.2.  |

**10. What if instead the patient had right-sided endocarditis with septic pulmonary emboli? Is surgery indicated, why or why not?**

**11. What if instead the patient already had a prior history of endocarditis with a mechanical AVR on warfarin and he presented with recurrent endocarditis with the emboli to brain as above? What would you do with his anticoagulation?**

**Case Continued:**

Patient undergoes AVR and does well post-operatively. His cultures grew MSSA.

**12. If the patient had prosthetic valve would this change your antibiotics?**

He completes a 6 week course of nafcillin. He is then seen in the IM Hoxworth clinic to establish care with a new PCP. He hasn’t seen a dentist in years so you refer him to a dentist who recommends deep cleaning and tooth extraction.

**12. Does the patient need antibiotic prophylaxis? If so, why and with what antibiotic? What are the indications for antibiotic prophylaxis prior to dental procedures?**

**13. What is your differential diagnosis for culture negative endocarditis?**

**14. Which antibiotic would you choose in the following cases?**

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| 25 yo with history of IVDU with tricuspid valve endocarditis and right leg weakness. MRI shows small abscess. Blood culture with MSSA. |  |
| 68 yo M presenting with 4-6 weeks of fevers and weight loss. Blood cultures + for *Strep gallolyticus* |  |
| 40 yo F with history of fistulizing Crohn’s on TPN. Blood cultures with Candida albicans.  |  |

**Appendix**

**High Risk Echocardiogram features:**

* Large (>10mm in diameter) or mobile vegetations
* Severe valvular insufficiency
* Abscess cavities or pseudoaneurysms
* Valvular perforation or dehiscence
* Evidence of decompensated heart failure

**Modified Duke Criteria for Endocarditis**

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| **Definite IE** |
| **Pathologic criteria** |
| Microorganism: demonstrated by culture or histological examination of a vegetation, a vegetation that has embolized, or an intracardiac abscess specimen **OR** |
| Pathologic lesions: vegetation or intracardiac abscess confirmed by histological examination showing active endocarditis. |
| **Clinical criteria** |
| Using specific definitions listed in Table 2: |
| 2 major criteria **OR** |
| 1 major and 3 minor criteria **OR** |
| 5 minor criteria |
| **Possible IE** |
| 1 major criterion and 1 minor criterion **OR** |
| 3 minor criteria |
| Rejected IE |
| Firm alternate diagnosis for manifestations of endocarditis **OR** |
| Resolution of manifestations of endocarditis, with antibiotic therapy for four days or less **OR** |
| No pathologic evidence of infective endocarditis at surgery or autopsy after antibiotic therapy for four days or less |
| Does not meet criteria for possible infective endocarditis, as above |

**Definition of Terms Used in the Modified Duke Criteria for the Diagnosis of IE**

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| **Major Criteria** |
| **Blood culture positive for IE** |
| **Typical microorganisms consistent with IE from 2 separate blood cultures** |
| Viridans streptococci |
| *Streptococcus gallolyticus* (formerly *S. bovis*), including nutritional variant strains (*Granulicatella* spp and *Abiotrophia defectiva*) |
| HACEK group: *Haemophilus* spp, *Aggregatibacter* (formally *Actinobacillus actinomycete comitants*), *Cardiobacterium hominis*, *Eikenella* spp, and *Kingella kingae* |
| *Staphylococcus aureus* |
| Community-acquired enterococci, in the absence of a primary focus; **OR** |
| **Persistently positive blood culture, defined as recovery of a microorganism consistent with IE from:** |
| Blood cultures drawn more than 12 hours apart **OR** |
| All of three or a majority of four or more separate blood cultures, with first and last drawn at least one hour apart |
| **Single positive blood culture for *Coxiella burnetii* or antiphase I IgG antibody titer >1:800** |
| **Evidence of endocardial involvement** |
| **Positive echocardiogram for IE** |
| TEE recommended in patients with prosthetic valves, rated at least “possible IE” by clinical criteria, or complicated IE (paravalvular abscess) |
| Definition on positive echocardiogram |
| Oscillating intracardiac mass on valve or supporting structures, in the path of regurgitant jets, or an implanted material in the absence of an alternative anatomic explanation **OR** |
| Abscess **OR** |
| New partial dehiscence of prosthetic valve |
| **New valvular regurgitation** |
| Increase in or change in preexisting murmur not sufficient |
| **Minor criteria** |
| Predisposition: predisposing heart condition or intravenous drug use |
| Fever: 38.0°C (100.4°F) |
| Vascular phenomena: major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhages, and Janeway lesions |
| Immunological phenomena: glomerulonephritis, Osler nodes, Roth spots, and rheumatoid factor |
| Microbiological evidence: positive blood culture but does not meet a major criterion as noted above (excludes single positive cultures for coagulase-negative staphylococci and organisms that do not cause endocarditis) **OR** serological evidence of active infection with organism consistent with IE |
| Echocardiographic minor criteria eliminated |