**Teaching Case Template**

Authors: Dr. Joseph Litner; Dr. Hillary Harper Reviewer: Sharon Griswold, MD MPH

Case Title: Endocarditis

# Target Audience: medical students and residents

Primary Learning Objectives: key learning objectives of the scenario

1. Recognize the stigmata of endocarditis on physical examination

2. Order the appropriate diagnostic tests to evaluate for endocarditis

3. Appropriately treat and disposition the patient presenting with endocarditis

Secondary Learning Objectives: detailed technical goals, behavioral goals, didactic points

1. Apply the Modified Duke criteria to make a diagnosis of endocarditis

2. Interpret echocardiographic findings of valvular vegetation

3. Interpret chest radiography findings of pulmonary emboli suggestive of tricuspid

disease

## Critical Actions Checklist

1. Place patient on cardiac monitor with pulse oximetry
2. Obtain bedside ECG
3. Recognize endocarditis and initiate appropriate consultation with infectious disease; ICU
4. Administer antibiotic therapy
5. Recognize involvement of the right side of heart and request TEE
6. Perform adequate fluid resuscitation, 2-3L
7. Demonstrate / utilize effective communication techniques such as specifying order details and closed loop communication

## Environment (if using as a simulation case)

1. Room Set Up – ED room; monitored bay
   1. Props – ECG; CXR; physical exam pictures included; TEE image
2. Distractors – none

**For Examiner Only**

Author: Dr. Joseph Litner, Dr. Hillary Harper Reviewer: Sharon Griswold, MD MPH

Case Title: Bacterial Endocarditis

**CASE SUMMARY**

**CORE CONTENT AREA**

Cardiovascular

**SYNOPSIS OF HISTORY/ Scenario Background**

A 40 year old male with history of intravenous drug use is brought in by EMS complaining of aches and pains, fever and shortness of breath that has been getting worse over the past 2 days.

Past medical history: none

Medications: none scheduled

Allergies: Penicillin

Social history: Habits- tobacco; alcohol; IV drug use

**SYNOPSIS OF PHYSICAL**

Vital Signs: Temp 39.9 º C (103.8 º F) oral

BP 100/80

Pulse 120

Respiratory Rate 28

Pulse Oximetry 93% on room air

**Physical Examination:**

Pertinent Positives: CV- Tachycardic and a systolic murmur is present

Pulmonary- Diffuse rales

Extremities- Splinter hemorrhages seen in nails; Osler nodes (tender

subcutaneous nodules seen on the finger pads)

Janeway lesions (non-tender macular lesions on palms and

soles)

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**CRITICAL ACTIONS**

**Scenario branch points/ PLAY OF CASE GUIDELINES**

Key teaching points or branch points that result in changes in patient’s condition

1. **Critical Action**

Administer Oxygen

Cueing Guideline: Patient repeats that they feel short of breath.

1. **Critical Action**

Thorough physical examination looking for stigmata of bacterial endocarditis such as the heart murmur; splinter hemorrhages; Osler’s nodes and Janeway lesions.

Cueing Guideline: Patient complains of pain on fingertips.

1. **Critical Action**

Order appropriate labs- blood cultures (at least 2 sets); ESR and CRP and appropriate diagnostic tests- CXR, EKG, TEE

Cueing Guideline: Question of how to evaluate the heart murmur.

1. **Critical Action**

Interpret labs; and interpret the tricuspid valve vegetation on TEE image and signs of septic emboli on CXR

Cueing Guideline: Reminder to the IVDU and which side of the heart would be more likely affected.

1. **Critical Action**

Give antibiotics to cover staph and strep species.

Cueing Guideline: Ask what the most likely etiologic organisms are; allow ID consult.

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**HISTORY**

**Onset of Symptoms:** Over the past 2 days the patient has complained of chills and feeling

warm and now has increasing trouble catching his breath.

**Background Info:** A 40 year old male with history of intravenous drug use is brought in by EMS complaining of aches and pains, fever and shortness of breath that has been getting worse over the past 2 days.

**Chief Complaint: “**I have felt chills then felt hot and had trouble breathing”

**Past Medical Hx:** None

**Past Surgical Hx:** None

**Habits:** Smoking: up to one pack of cigarettes/day if can get them

ETOH: several cans of beer on most days

Drugs: Intravenous drug use of heroin

**Family Medical Hx:** Unknown

**Social Hx:** Marital Status: Divorced

Children: none

Education: high school

Employment: works occasionally in construction

**ROS:** List pertinent positives and negatives:

GEN- Positive for chills alternating with feeling warm

HEENT- Neck stiffness and mild headache; no visual changes

CV- No chest pain or palpitations

Pulm- Shortness of breath; trouble catching breath

MSK- generalized aches

Neuro- no weakness; no dizziness

Derm- tender spots on tips of fingers

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**PHYSICAL EXAM**

**Patient Name: Mr. Jones Age & Sex: 40 y/o Male**

**General Appearance:** Thin, disheveled male who appears uncomfortable but in no acute

distress

**Vital Signs:** Temp 39.9 º C (103.8 º F) oral

BP 100/80

Pulse 120

Respiratory Rate 28

Pulse Oximetry 93% on room air

**Head:** Normocephalic; Atraumatic

**Eyes:** PERRL; EOMI; anicteric

**Ears:** Tympanic membranes unremarkable

**Mouth:** Poor dentition but no sign of intra-oral abscess; mucous membranes moist

**Neck:** No LAD; no JVD seen; no carotid bruits; supple; no menigismus

**Skin:** Visible bruising and marks along arms from needle insertions

**Chest:** No crepitis; non tender to palpation

**Lungs:** Diffuse rales

**Heart:** Tachycardic rate; holosystolic murmur heard across precordium

**Back:** No midline ttp; no costovertebral angle tenderness to palpation

**Abdomen:** Normoactive bowel sounds; soft, non distended, non tender, no organomegaly

**Extremities:** Finger tips have tender subcutaneous nodules on finger pads; Nails with small splinter hemorrhages; Soles of feet and palms of hands with non tender erythematous macular lesions

**Rectal:** Normal tone; no gross blood

**GU:** No perineal lesions; normal

**Neurological:** Alert and oriented to person, place, time and date; CN 2-12 intact; Motor Strength 5/5 in UE and LE symmetrically; Reflexes 2+; Sensory- intact

**Mental Status:** Alert and oriented to person, place, time and date

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**STIMULUS INVENTORY**

#1 Emergency Admitting Form

#2 CBC

#3 BMP

#4 U/A

#5 Cardiac Enzymes

#6 Toxicology

#7 CXR

#8 CT Head

#9 Ultrasound images or video clips

#10 Photos, videos or sound clips of patient’s presentation

#11 Debriefing materials

**Learner Stimulus #1**

**ABEM General Hospital**

**Emergency Admitting Form**

Name: Mr. Jones

Age: 40 years

Sex: Male

Method of Transportation: EMS

Person giving information: Patient

Presenting complaint: joint aches, fever, and difficulty breathing

**Background:** A 40 year old male with history of intravenous drug use is brought in by EMS complaining of aches and pains, fever and shortness of breath that has been getting worse over the past 2 days.

**Triage or Initial Vital Signs**

Temp 39.9 º C (103.8 º F) oral

BP 100/80

Pulse 120

Respiratory Rate 28

Pulse Oximetry 93% on room air

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**LAB DATA & IMAGING RESULTS**

**Stimulus #2**

**Complete Blood Count (CBC)**

WBC 17,000/mm3

Hgb 10 g/dL

Hct 37%

Platelets 329,000/mm3

Differential

Neutrophil 13.9% **Stimulus #5**

Lymphs 2.1% **Cardiac**

Monos 0.9% Troponin 0.012 ng/ml

Eos 0.0%

**Stimulus #6**

**Stimulus #3 Toxicology**

**Basic Metabolic Profile (BMP)** Serum

Na+ 139 mEq/L Salicylate Neg

K+ 3.6 mEq/L Acetaminophen Neg

CO2 24 mEq/L Tricyclics Neg

Cl- 105 mEq/L ETOH 70 mg/dl

Glucose 100 mg/dL

BUN 18 mg/dL Urine

Creatinine 1.0 mg/dL Cocaine Neg

Cannabinoids Neg PCP Neg

**Stimulus #4** Amphetamines Neg

**Urinalysis** Opiates Pos

Color yellow Barbiturates Neg

Sp gravity 1.010 Benzodiazepines Neg

Glucose neg

Protein neg

Ketone neg

Leuk. Est. neg

Nitrite neg

WBC 0-1

RBC 0-1

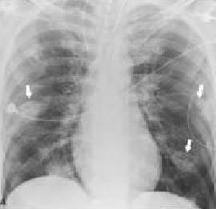
**Stimulus #7**

EKG- Sinus tachycardia

**Diagnostic Imaging**

**Stimulus #8**

CXR: Multiple areas of round or wedge-shaped multiple peripheral opacities with poorly defined margins



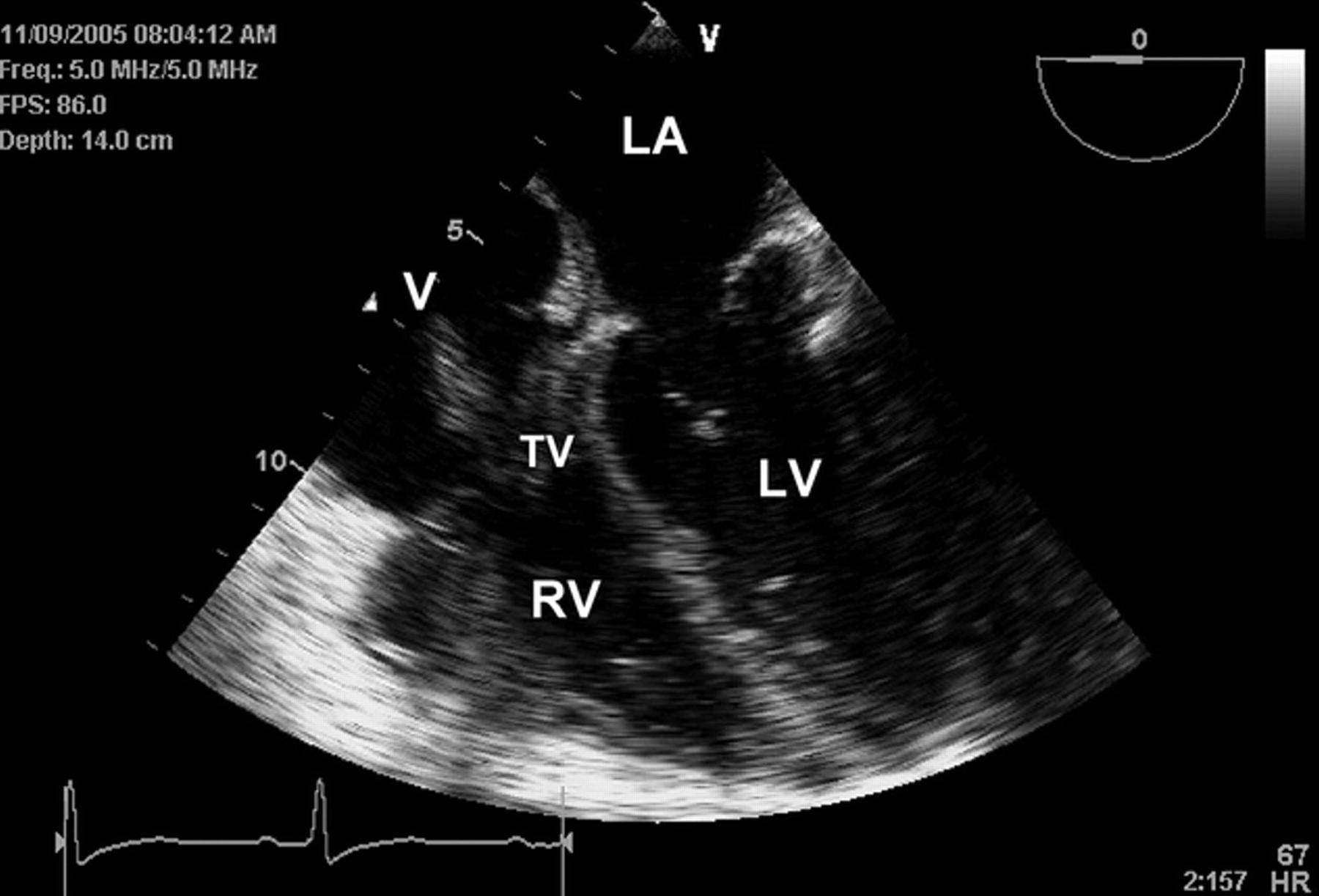
http://06-2010-icuroom.blogspot.com/

**Stimulus #9**

Head CT: Negative

**Stimulus #10**

TEE: Visible vegetation on tricuspid valve



Source: **Skubas N et al. Anesth Analg 2006;103:1410-1411**

**Feedback/ Assessment Forms**

**Bacterial Endocarditis**

**Candidate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Examiner \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Critical Actions:**

* Critical Action #1: Must address the abnormal vital sign on pulse oximetry prior to second cue.
* Critical Action #2: Must uncover at least one of the physical stigmata of endocarditis on exam for partial credit, and all for full point value.
* Critical Action #3: Must include at least 2 sets of blood cultures in lab testing for full credit.
* Critical Action #4: Must interpret the vegetation on tricuspid valve.
* Critical Action #5: Must include Vancomycin in antibiotic coverage.

**Dangerous Actions:** (Performance of one dangerous action results in failure of the case)

* Dangerous Action #1: Failure to address hypoxia.
* Dangerous Action #2: Failure to consider endocarditis in the differential.
* Dangerous Action #3: Failure to include appropriate antibiotic coverage.

**Overall Score:**

* Pass
* Fail

**Optional Addendum 2:**

**Core Competency Assessment**

**Case Name Here**

**Candidate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Examiner \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Does Not Meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Patient Care** |  |  |  |
| **Medical Knowledge** |  |  |  |
| **Interpersonal Skills and Communication** |  |  |  |
| **Professionalism** |  |  |  |
| **Practice-based Learning and Improvement** |  |  |  |
| **Systems-based**  **Practice** |  |  |  |

**For Examiner**

Date: Examiner: Examinee(s):

Scoring: In accordance with the Standardized Direct Observational Tool (SDOT)

The learner should be scored (based on level of training) for each item above with one of the following:

NI = Needs Improvement

ME = Meets Expectations

AE = Above Expectations

NA= Not Assessed

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Critical Actions** | **NI** | **ME** | **AE** | **NA** | **Category** |
| Place patient on cardiac monitor with pulse oximetry |  |  |  |  | PC, MK, PBL |
| Obtain bedside ECG |  |  |  |  | PC, MK |
| Recognize endocarditis and initiate appropriate consultation with infectious disease; ICU |  |  |  |  | PC, MK, PBL |
| Administer antibiotic therapy |  |  |  |  | PC, MK, PBL |
| Recognize involvement of the right side of heart and request TEE |  |  |  |  | PC, MK, PBL |
| Perform adequate fluid resuscitation, 2-3 L |  |  |  |  | PC, MK, PBL |
| Demonstrate / utilize effective communication techniques such as specifying order details and closed loop communication |  |  |  |  | MK, ICS |

The score sheet may be used for a variety of learners. For example, in using the case for 4th year medical students, the key teaching points of the case may be the recognition of shock and treatment with appropriate fluid resuscitation. Other items may be marked N/A= not assessed.

Category: One or more of the ACGME Core Competencies as defined in the SDOT

PC= Patient Care

Compassionate, appropriate, and effective for the treatment of health problems and the promotion of health

MK= Medical Knowledge

Residents are expected to formulate an appropriate differential diagnosis with special attention to life-threatening conditions, demonstrate the ability to utilize available medical resources effectively, and apply this knowledge to clinical decision making

PBL= Practice Based Learning & Improvement

Involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care

ICS= Interpersonal Communication Skills

Results in effective information exchange and teaming with patients, their families, and other health professionals

P= Professionalism

Manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population

SBP= Systems Based Practice

Manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value

**Debriefing Materials:**

**Please see attached powerpoint.**

**Add 4-6 keywords for future searching functions**

Endocarditis; fever and heart murmur; IV/intervenous drug use

**References**

**See Power Point**

**Has this work been previously published?**

**No**