Acute Care & Critical Care Case-Based Reviews

Acute Cardiovascular Disorders

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HIGH-YIELD
MED REVIEWS

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HIGH-YIELD
MED REVIEWS

Introduction

Anthony Busti, MD, PharmD, MSc, FNLA, FAHA

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Agenda

- Cases 1-4
- ACEP Clinical Policy Review
- A special coupon code & giveaway opportunity
- Live Q&A

HIGH-YIELD
MED REVIEWS

Integrated Case-Reviews

- Case 1 -

HIGH-YIELD
MED REVIEWS

Case 1

- 27-year-old male comes in with acute onset of “chest discomfort” with palpitations. He also reports he has a sensation that it’s harder to breathe.
- This started about 30 minutes prior to arrival.
- He denies any PMH or allergies
- He denies any medication use (including OTC)
- The triage nurse checks him in and sends the patient back to the critical care room for a reported pulse of 210 beats per minute.

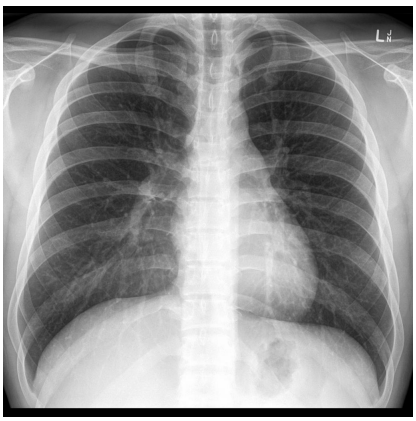
HIGH-YIELD
MED REVIEWS

Case 1

- VS:
  - Temp = 98.8, P = 200 bpm, BP = 135/89, RR = 22, O2Sat = 96% (RA)
- Differential Diagnosis:
  - Afib with RVR
  - Aflutter
  - PE
  - Cardiac tamponade
  - Tension pneumothorax
  - Toxic ingestion
  - _____
  - _____

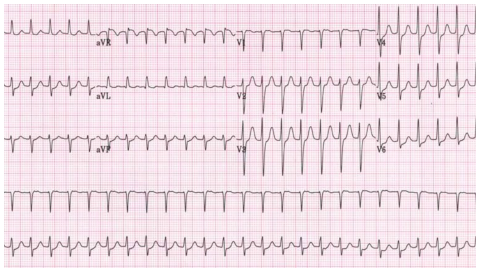
HIGH-YIELD MED REVIEWS

Case 1



HIGH-YIELD MED REVIEWS

Case 1



HIGH-YIELD MED REVIEWS

Case 1

- Plan:
  - IV placement (most proximal position)
  - Stop cock with 20 cc syringe of NS + IVF
  - Extend + _____ just above the level of heart
  - Crash cart set up → Continuous ECG
  - _____

HIGH-YIELD MED REVIEWS

Case 1

Core Principles of Pharmacokinetics	
Absorption	Parenteral administration so → IV Push F (bioavailability) = 100%
Distribution	_____ → helps distribute towards heart
Metabolism	Rapid uptake by endothelial cells and metabolism by adenosine kinase
Elimination	Rapid metabolism → half-life = _____
Core Principle of Pharmacodynamics	
Mechanism of Action	Slows nodal conduction leading to bradycardia and/or short period of asystole

HIGH-YIELD MED REVIEWS

Case 1

- What happens if adenosine doesn't work?
  - Adenosine 12 mg x __ dose(s)
  - What if that fails or if the patient decompensates?
    - "Synchronized cardioversion" vs. "Defibrillation"
    - Synchronized cardioversion at _____ → _____ joules
- What is the initial dose if you have a central line?
  - _____ IVP
- What about if the patient is a heart transplant?
  - _____ IVP

HIGH-YIELD MED REVIEWS

Integrated Case-Reviews

- Case 2 -

HIGH-YIELD MED REVIEWS

Case 2

- A 54-year-old female with a PMH of DM2, HTN, HFrEF, chronic low-back pain comes in by EMS with reports of waking up this morning with a sudden onset of shortness of breath.
- She denies any chest pain or pressure, N/V, cough, but indicates she has had worsening bilateral LE swelling.
- EMS reports her BP in route was 213/106 mmHg and a pulse of 105 bpm. She is on supplemental O2 at 5 liters per min.

HIGH-YIELD MED REVIEWS

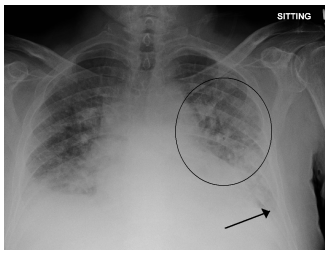
Case 2

- VS:
  - P = 110 bpm, BP = 210/105 mmHg, RR = 24, O2 sat on RA is 86% → 93% on 4 L per NC
- Exam:
  - Awake, but visible in respiratory distress, Bilateral crackles on lung exam, 2+ Bilateral LE edema cool to touch
- Differential Diagnosis:
  - _____
  - NSTEMI or STEMI
  - Pneumothorax
  - PE
  - Pneumonia

HIGH-YIELD MED REVIEWS

Case 2

Chest Radiograph (AP)



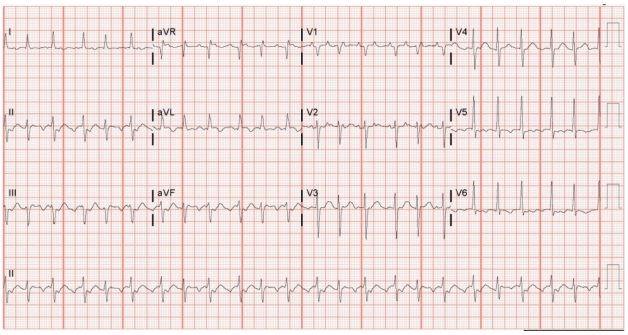
Bedside US (_____)

Imaging is done for 3 reasons:

1. Add to the _____ findings
2. Help determine _____
3. Rule out pneumothorax if _____ are to be used

HIGH-YIELD MED REVIEWS

Case 2



HIGH-YIELD MED REVIEWS

Case 2

- Treatment Plan
  - NPPV (CPAP or BiPAP)
    - Can this also make the patient worse?
  - Vasodilators
    - _____ (Dose and Route): Does it matter?
  - Diuretic therapy
    - Drug, dose, route?
    - Does the rate of administration matter?
    - Evidence: Does the TRANSFORM-HF Trial change anything?

HIGH-YIELD MED REVIEWS

Case 2

- What if the patient was hypotensive?
  - What impact does that have on NPPV, vasodilators, and diuretics
  - Inotrope of choice?
    - _____ → but ….
    - +/- Vasopressor → drug of choice?
      - _____

HIGH-YIELD MED REVIEWS

Integrated Case-Reviews

- What Does ACEP Recommend? -

HIGH-YIELD MED REVIEWS

ACEP Clinical Policy Statements

- In adult patients presenting to the ER with suspected acute HF, is the diagnostic accuracy of point-of-care lung ultrasound sufficient to direct clinical management?
  - Level A Recommendations: None.
  - Level B Recommendations
    - ***Use point-of-care lung ultrasound*** as an imaging modality in conjunction with medical history and physical examination to diagnose acute heart failure syndrome ***when diagnostic uncertainty exists***, as the accuracy of this diagnostic test is sufficient to direct clinical management.*
      - * Use of lung ultrasound requires that the equipment is available, and the physician is proficient in its use.
  - Level C Recommendations: None.

HIGH-YIELD MED REVIEWS

ACEP Clinical Policy Statements

- In adult patients presenting to the ER with suspected acute HF, is early administration of diuretics safe and effective?
  - Level A Recommendations: None
  - Level B Recommendations: None
  - Level C Recommendations
    - Although ***no specific timing of diuretic therapy can be recommended***, physicians may consider earlier administration of diuretics when indicated for emergency department patients with acute heart failure syndrome, because it may be associated with reduced length of stay and inhospital mortality (Consensus recommendation).
    - Physicians should be confident in the diagnosis of acute heart failure syndrome with volume overload in a patient before the administration of diuretics because treatment with diuretics may cause harm to those with an alternative diagnosis (Consensus recommendation).

HIGH-YIELD MED REVIEWS

ACEP Clinical Policy Statements

- In adult patients presenting to the ER with suspected acute HF, is vasodilator therapy with high-dose _____ administration safe and effective?
  - Level A Recommendations: None
  - Level B Recommendations: None
  - Level C Recommendations
    - Consider ***using _____. as a safe and effective treatment option when administered to patients with acute heart failure syndrome and elevated blood pressure*** (*Consensus recommendation*).*
      - * Although _____ infusions of up to _____ mcg/min have been described as "standard dosing," some may consider a dosage of _____ mcg/min or higher as "high dose." "High dose" _____ has also been described as bolus intravenous dosing of 2,000 mcg every 3 to 5 minutes.

HIGH-YIELD MED REVIEWS

ACEP Clinical Policy Statements

- In adult patients presenting to the ER with symptomatic acute HF, is there a defined group that may be safely discharged home for outpatient follow-up?
  - Level A Recommendations: None
  - Level B Recommendations
    - Do not rely on current acute heart failure syndrome risk stratification tools alone to determine which patients may be discharged directly home from the emergency department.
    - ***Consider using the Ottawa Heart Failure Risk Scale (OHFRS) to help determine which higher-risk patients for adverse outcome should not be discharged home***.
  - Level C Recommendations
    - Consider using the **Emergency Heart Failure Mortality Risk Grade for 7-day mortality (EHMRG7) or the STRATIFY decision tool** to help determine which higher-risk patients for adverse outcome should not be discharged home.
    - Use shared decision-making strategies when determining the appropriate disposition of AHFS patients (*Consensus recommendation*).

HIGH-YIELD MED REVIEWS

Integrated Case-Reviews

- Case 3 -

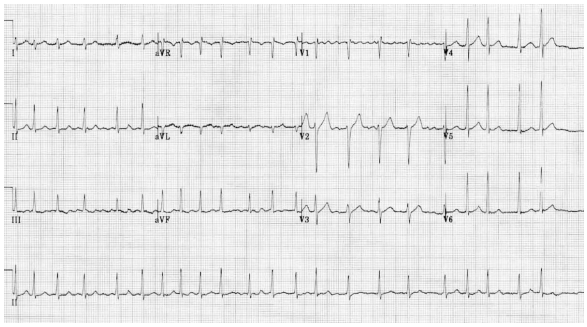
HIGH-YIELD MED REVIEWS

Case 3

- A 48-year-old male with a PMH of HFpEF, HTN, gout, and depression comes in with worsening SOB and palpitations and is found to be in AFib with RVR.
- VS:
  - P = 152 bpm, BP = 149/89
- Exam:
  - Awake and alert
  - Irregularly irregular pulse
  - Unremarkable lung exam
  - 1+ bilateral LE edema

HIGH-YIELD MED REVIEWS

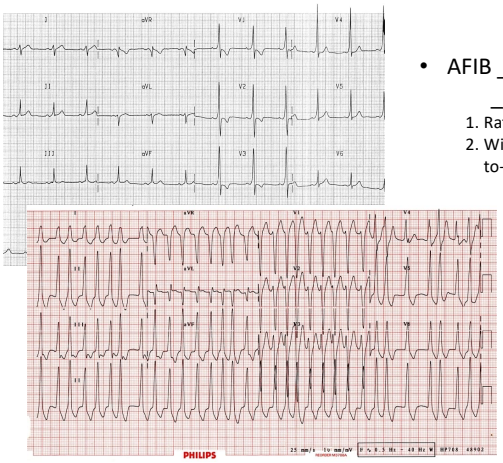
Case 3



- Why is the rate in RVR commonly around 150?
- What else do we need to worry about before jumping to treatment?

HIGH-YIELD MED REVIEWS

Case 3



- AFIB _____
  _____
  1. Rates > _____
  2. Wider QRS with some beat-to-beat variability

Case 3

- Treatment Plan:
  - Rate or rhythm control with which agent?
    - Diltiazem vs. Beta-blockers vs. Digoxin vs Antiarrhythmic
    - Evidence: _____ Trial → rate control > rhythm control which had trends to worse outcomes
  - What if the patient has WPW?
    - _____
  - To what goal pulse?
    - _____Trial
      - Pulse < _____ bpm = < _____ bpm in preventing CV events
  - Other considerations:
    - Fluid overload, electrolyte abnormalities, thyroid disorders

HIGH-YIELD MED REVIEWS

Integrated Case-Reviews

- Case 4 -

HIGH-YIELD MED REVIEWS

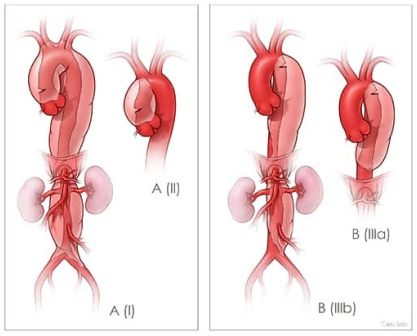
Case 4

- A 45-year-old male with a well-known history of cocaine abuse and uncontrolled hypertension due to medication non-compliance comes in complaining of sudden onset of severe chest pain radiating to the back between his shoulder blades.
- Upon walking into the room, the patient is sweating, visibly uncomfortable, and has the following VS:
  - P = 110, BP = 225/112

HIGH-YIELD MED REVIEWS

Case 4

HIGH-YIELD MED REVIEWS



HIGH-YIELD MED REVIEWS

Case 4

- Who is at risk:
  - Hx of HTN and cocaine use
  - Connective tissue disorders (Marfan, Ehlers-Danlos Syndromes)
  - Bicuspid aortic valves
- Approaches to Treatment
  - Consult CVT surgery
  - Control the pain → reduces sympathetic tone
  - Get pulse and BP under control (especially Type A)
    - Classic teaching = P < _____ bpm and SBP < _____ mmHg
    - Treatments:
      - Rate Control: Beta-blockers: Esmolol or labetalol
      - Afterload Reductions: +/- nicardipine or clevidipine or nitroprusside

HIGH-YIELD MED REVIEWS

ACEP Clinical Policy Statements

- Are there any decision tools to identify those with low-risk for diagnosis of aortic dissection (AD)?
  - _____
- Can D-dimer be used to identify low-risk patients?
  - _____
- What imaging is best?
  - CTA = TEE = MRA
- Does a target heart rate or BP lowering reduce mortality or morbidity?
  - _____ targets but both pulse and SBP should be treated

HIGH-YIELD MED REVIEWS

ACEP Clinical Policies

- Acute VTE -

HIGH-YIELD MED REVIEWS

ACEP Clinical Policy Statements

- Can a clinical prediction rule be used to identify a group of patients at very low risk for the diagnosis of PE for whom no additional diagnostic workup is required?
  - Level B: Yes; the _____ rule
- Does a negative age-adjusted D-dimer result identify a group of patients at very low risk for the diagnosis of PE for whom no additional diagnostic workup is required?
  - Level B: In patients older than 50 years deemed to be low or intermediate risk for acute PE, clinicians may use a negative age-adjusted D-dimer* result to exclude the diagnosis of PE.
    - *For highly sensitive D-dimer assays using fibrin equivalent units (FEU) use a cutoff of age×10 µg/L; for highly sensitive D-dimer assays using D-dimer units (DDU), use a cutoff of age×5 µg/L.?
- In adult patients with subsegmental pulmonary embolism (PE), is it safe to withhold anticoagulation?
  - Given the lack of evidence, anticoagulation treatment decisions for patients with subsegmental PE without associated deep venous thrombosis (DVT) should be guided by individual patient risk profiles and preferences. [Consensus recommendation]

ACEP Clinical Policy Statements

- In adult patients diagnosed with acute pulmonary embolism (PE), is the initiation of anticoagulation and discharge from the emergency department (ED) safe?
  - Level C: Selected patients with acute PE who are at low risk for adverse outcomes as determined by ***Pulmonary Embolism Severity Index (PESI), simplified PESI (sPESI), or the Hestia criteria may be safely discharged from the ED on anticoagulation***, with close outpatient follow-up.
- Is treatment with a Non–Vitamin K Antagonist Oral Anticoagulant (NOAC) safe and effective compared with treatment with low-molecular-weight heparin (LMWH) and vitamin K antagonist (VKA)?
  - Level B: In selected patients diagnosed with acute DVT, a NOAC may be used as a safe and effective treatment alternative to LMWH/VKA.
  - Level C: Selected patients with acute DVT may be safely treated with a NOAC and directly discharged from the ED.

ACEP Clinical Policies

- NSTEMI-

HIGH-YIELD
MED REVIEWS

ACEP Clinical Policy Statements

- In adult patients without evidence of STEMI, can initial risk stratification be used to predict a low rate of 30-day major adverse cardiac events?
  - Level B: Yes; The History, ECG, Age, Risk factors, Troponin (_____) score can be used as a clinical prediction instrument for risk stratification.
    - A low score (≤ ___) predicts a 30-day major adverse cardiac event miss rate within a range of 0% to 2%
- In adults ruled out for NSTEMI and low-risk, when should patients follow up?
  - Level C: 1-2 weeks
    - If _____ available; but if not, then obs admission

ACEP Clinical Policy Statements

- Should patients with _____ receive immediate antiplatelet therapy in addition to aspirin to reduce 30-day major adverse cardiac events?
  - Level C: _____ and glycoprotein IIb/IIIa inhibitors ***may*** be given in the emergency department ***or delayed*** until cardiac catheterization

ACEP Clinical Policies

- Reperfusion Therapy for STEMI-

HIGH-YIELD
MED REVIEWS

ACEP Clinical Policy Statements

- In STEMI, are there patients for whom treatment with fibrinolytic therapy decreases the incidence of MACE when PCI is delayed?
  - Level B: Fibrinolytics may be administered to patients when door-to-balloon (D2B) time is anticipated to _____.
  - Level C: A dose reduction _____ considered when administering fibrinolytics to patients aged 75 years or older.
- In STEMI, does transfer to a PCI center decrease the incidence of MACE?
  - Level B: Yes, patients with STEMI should be transferred to a PCI-capable hospital as soon as possible.

ACEP Clinical Policy Statements

- In adult patients undergoing reperfusion therapy, should _____ be avoided to prevent adverse outcomes?
  - Level C: Because safety has *not* been established, clinical judgment should be used in deciding whether to provide or withhold _____ in patients undergoing reperfusion therapy.
  - But, what about _____?

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Live Q&A

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