

# Cardiology Tachycardia

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# Tachycardia



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Question: A 34 y.o. female presents in clinic with 2-3 months of feeling her heart skip and race. No h/o syncope or lightheadedness. She takes no meds, does not drink caffeinated beverages, runs 3 miles four times/week. Exam is normal. GAD-7 score = 0. EKG in the office shows an occasional PVC but o/w normal. CBC, CMP, TSH are normal. Which of the following is most helpful at this time?

- A. Trial of propranolol 10-20 mg bid
- B. A 48 hour holter monitor
- C. Institute fluoxetine to treat anxiety
- D. Cardiac nuclear perfusion testing

# Correct Answer is A

- This is a classic presentation of benign palpitations. A trial of a beta blocker is reasonable. An event monitor targets the specific cardiac events and might be better than a 24-48 hour Holter monitor which might not capture the event. Stress reduction may be beneficial. Chasing a potential diagnosis of CAD in an otherwise healthy very low risk female invites false (+) results and harmful intervention

# Tachycardia Definitions

- Tachycardia: pulse  $>100$
- Sinus tachycardia is a physiologic increase in the pulse to accommodate the oxygenation needs of the body
- A resting heart rate  $>150$  is not normally physiologic
- Arrhythmia or dysrhythmia – lack of sinus rhythm

# Symptoms of Tachycardia

- Palpitations
- Dyspnea
- Dizziness
- Syncopal or pre-syncopal spell
- Chest pain
- Anxiety

# Sinus Tachycardia

- Causes of non-cardiac sinus tachycardia include
  - Fever
  - Anemia
  - Dehydration
  - Exercise
  - Anxiety
  - Excess caffeine
  - Substance abuse (cocaine, THC, etc.)
  - Hyperthyroidism
  - Pulmonary embolus
  - Shock
  - Medications (beta-2 agonists, stimulant drugs for ADHD, etc.)



# Outpatient Management

- Perform a pertinent history and physical exam!
- 12 lead electrocardiogram
- Order labs: CBC, TSH, chemistry panel
- Discretionary labs: urine drug screen, VMA
- Further testing
  - 2-D Echocardiogram
  - Holter monitor or event recorder

# Cardiac Causes of Tachyarrhythmias

- Atrial fibrillation
- Atrial flutter
- Multifocal atrial tachycardia (MAT)
- Supraventricular tachycardia (SVT)
  - Narrow complex and wide complex
- Accessory pathway tachycardias
- Ventricular tachycardia

# Key Points

- Use ACLS algorithms
- V tach without a pulse of V. fib → defibrillate
- Stable V. tach → cardiovert
- Differentiate regular from irregular rhythms
  - This changes the DDx

# Atrial Fibrillation



Question: A 76 y.o. male presents to clinic with complaint of heart skipping. No chest pain, dyspnea, or edema. No syncope. No prior CAD, MI, HF, or DM. PMHx – HTN and high chol. EKG shows A. fib. with a ventricular rate of 105. Vital signs are stable and patient feels well. Which of the following is not an appropriate therapy to decrease the risk of stroke?

- Send the patient to the ED for evaluation
- Warfarin 10 mg a day for 2 days, then decrease to 5 mg and check INR
- Rivaroxaban 20 mg qHS
- Clopidogrel 300 mg load then 75 mg daily
- Apixaban 5mg bid

# Correct Answer is D

- Patient has new onset A fib with RVR. He is clinically stable. A trip to the ED, while not optimal, is acceptable
- His CHADS<sub>2</sub>-VASC score is 3 due to HTN and age >75, suggesting treatment with anticoagulants
- Clopidogrel is not an acceptable option without combining it with aspirin when a patient cannot take warfarin or another anticoagulant

# Atrial Fibrillation - Epidemiology

- Most common arrhythmia in clinical practice
- (Most likely to show up on the Board exam)
- Up to 1% of the US population has A. fib
- 70% of cases between the ages of 65 – 80
- Median age is 75

# Definitions

- Lone AF = patients less than 60 (50 historically) without clinical or echocardiographic evidence of cardiopulmonary disease, to include HTN



# AFib/Flutter – Historical Perspective

- Prior to the 1990's, atrial flutter was presumed to be a low-risk condition as the atria were contracting
  - → Assumed lower risk of forming thrombus
- Unless a patient was symptomatic, this condition was frequently clinically tolerated
- Evidence now shows that A. flutter should be considered on a spectrum with A. fib. and treated as such

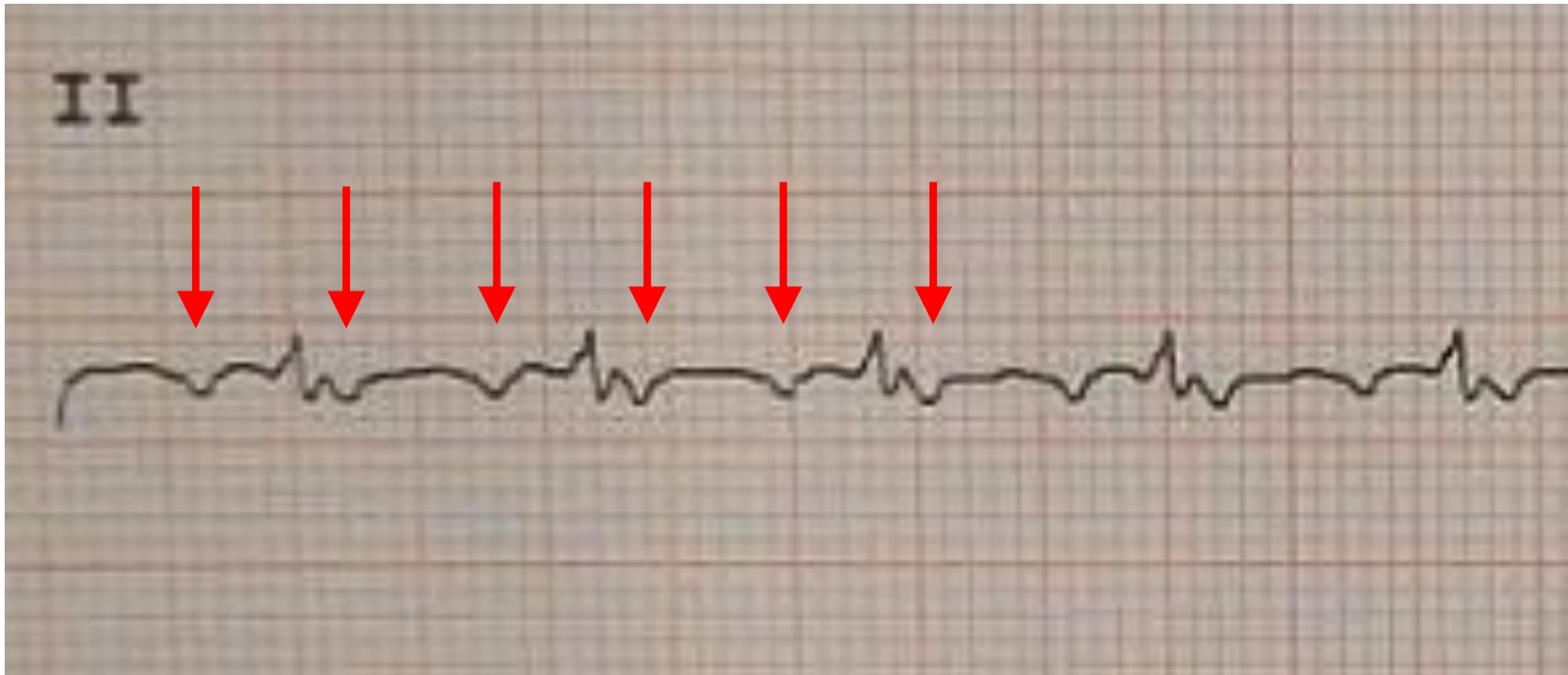
# Atrial Flutter Clinical Cue

- A flutter frequently conducts at 2:1 through the AV node
- The atrial rate for A. flutter is 280-300
- Atrial rate of 300, 2:1 conduction
  - → Ventricular rate of 150 and regular
- Consider appropriate carotid massage to see if the flutter waves will reveal themselves at 3:1 or 4:1 conduction

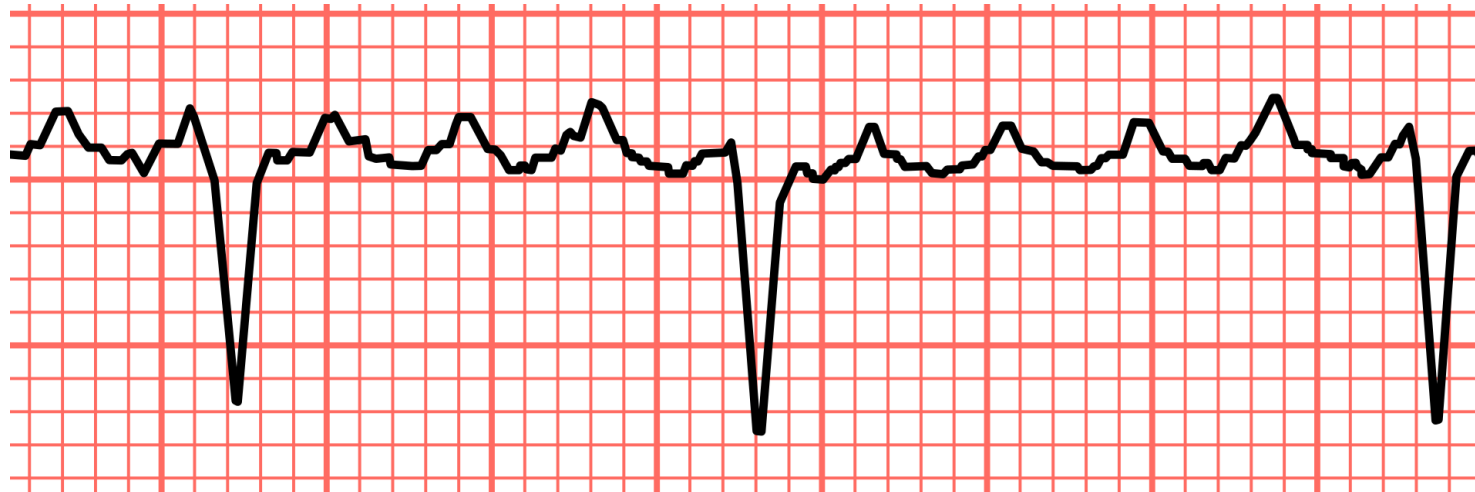
# Atrial Flutter with 2:1 Conduction Pulse ~150



# Atrial Flutter at 2:1 conduction



# Atrial Flutter with 4:1 Conduction Pulse ~75



# Risk Factors for atrial fibrillation

- HTN, heart failure, CAD
- Valvular abnormalities, esp. mitral
- Obesity
  - Left atrial size increases with BMI
- Sleep apnea
- Left atrium larger than 4 cm
- Congenital heart disease, esp. ASD

Question: Which of the following is an uncommon cause of atrial fibrillation?

- Hyperthyroidism
- Cardiac amyloidosis
- Holiday heart (Celebration with alcoholic beverages)
- COPD exacerbation
- Enlarged left atrial size

# Correct Answer is B

## A. Fib. Reversible Causes

- Alcohol (Holiday heart)
- Hyperthyroidism
- Pericarditis, myocarditis
- Surgery
- Myocardial Infarction
- Pulmonary embolus, pulmonary disease



# Evaluation

- Assess for reversible causes and patient's clinical status
  - EKG
  - Echo – EF, Left atrial size, valvular pathology, pulmonary pressures
  - Labs
    - CBC – anemia
    - CMP – kidney and liver
    - TSH – thyroid
    - Consider BNP/pro-BNP
    - Consider EtOH levels/UDS as indicated
  - CXR

# Goals of Therapy

- Improve symptoms
  - Up to 10% of ejection fraction may be attributed to the atrial kick
  - Restoration of sinus rhythm may improve symptoms
- Reduce morbidity
- Reduce mortality

Question: According to the AFFIRM and RACE trials, which one of the following is the correct statement regarding atrial fibrillation treatment?

- Rate control leads to better survival outcomes
- Rhythm control leads to better survival outcomes
- Rate control is associated with better cardiovascular outcomes
- Rhythm control is associated with better cardiovascular outcomes
- Rate control is as effective as rhythm control

# Correct Answer is E

## Rate vs. Rhythm Control

- AFFIRM (Atrial Fibrillation Follow-up Investigation of Rhythm Management)
  - Rate of ischemic stroke was 1%/year in both rate and rhythm control groups
  - In both groups, most strokes occurred in patients whose warfarin was stopped or was subtherapeutic

# Meds For Prevention of Stroke In Nonvalvular A. Fib

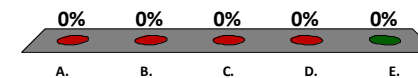
- Warfarin/Coumadin – years of utility
- Clopidogrel/Plavix + aspirin when warfarin not indicated
- Dabigatran/Pradaxa (thrombin inhibitor)
  - 150 mg bid, start when INR <2
  - Renal dosing 75 mg bid with CrCl 15-30 ml/min; <15 ml/min use not defined

# Meds For Prevention of Stroke In Nonvalvular A. Fib

- Rivaroxaban/Xarelto (factor Xa inhibitor)
  - 20 mg PO daily with evening meal, start when INR < 3
  - Renal dosing necessary 15 mg when CrCl 15-50 ml/min; <15 ml/min, avoid use
- Apixaban/Eliquis (factor Xa inhibitor)
  - 5 mg bid
  - 2.5 mg twice daily for 2 of the following risk factors
    - Age ≥80 years, weight ≤60 kg, or serum creatinine ≥1.5 ml/dL
- Edoxaban/Savaysa (factor Xa inhibitor)
  - 60 mg daily,
  - Don't use with CrCl >95; not studied therefore FDA not approved

Question: A 65 y.o. female has A. fib and is s/p mechanical aortic valve repair. What is the correct INR range for her Coumadin?

- A. 1.0 – 1.5
- B. 1.5 – 2.0
- C. 1.5 – 2.5
- D. 2.0 – 3.0
- E. 2.5 – 3.5



# Correct Answer is E

## Warfarin and INR dosing

- For nonvalvular A. fib
  - INR goal 2.0 – 3.0
- For valvular A. fib
  - INR goal is 2.5 – 3.5



# Acuity and Anticoagulation

- Onset less than 48 hours
  - Consider cardioversion, medical or electrical
- Duration >48 hours and nonurgent
  - Consider cardioversion
    - Anticoagulate for three weeks
    - Cardiovert
    - Continue anticoagulation for four weeks

# Acuity and Anticoagulation

- Duration unknown and need to cardioversion is urgent
  - Transesophageal echo to assess presence of left atrial thrombus, especially left atrial appendage
  - If not thrombus, cardiovert
  - If thrombus present, assess risk: benefit ratio
  - Anticoagulate for four weeks thereafter at minimum

# Anticoagulation: Risk vs. Benefit

- Rate of ischemic stroke in patients with nonvalvular AF averages 3-5% per year (2-7 times higher than in those without AF)
- Risk of stroke on warfarin 1-2% depending on trial
  - Roughly half the risk of stroke in nonvalvular AF

# CHADS<sub>2</sub>-VASC Score for Stroke Risk

- The CHADS<sub>2</sub>-VASC risk score is the most popular calculator for stroke risk in non-valvular a. fib. and has been best validated in different patient populations

Question: CHADS<sub>2</sub> –VASC score for atrial fibrillation does not comprise which one of the following parameters?

- A. Diagnosed heart failure, past or current
- B. Hypertension treated or untreated
- C. Age <75 years
- D. Diabetes mellitus
- E. Secondary prevention in patients with prior ischemic stroke, TIA or thromboembolism

# Correct answer = C

## CHA<sub>2</sub>DS<sub>2</sub>-VASc

- CHF – 1 pt
- HTN – 1 pt
- Age
  - 65-74 → 1 pt
  - >75 → 2 pts
- DM – 1 pt
- Stroke/TIA/VTE hx – 2 pts
- Sex
  - Female → 1
  - Male → 0
- Vascular disease – 1 pt

“Regardless of the approach, the need for anticoagulation is based on stroke risk and not on whether sinus rhythm is maintained.”

## Recommendations for Use of Antithrombotic Therapy to Prevent Embolization in Nonvalvular A. Fib

- For all patients with nonvalvular AF and a CHADS<sub>2</sub>–VASC score = 0 is low risk and may not require AC.
- A score =1, low-moderate risk and antiplatelet (ASA) or AC may be considered
- A score  $\geq 2$  or greater, moderate-high risk and AC should be considered
- In patients who cannot take anticoagulant therapy, consider ASA 325 mg daily plus clopidogrel 75 mg daily, rather than aspirin alone (consider cost in addition)
- Note: the combination of ASA and clopidogrel produces a similar risk of bleeding to that seen with warfarin



# Key Points

- Use the CHADS<sub>2</sub>–VASC score to determine need for anticoagulation
- Rate control is as good as rhythm control
- Warfarin still the gold standard for AC with mechanical valves
  - INR 2.0–3.0 for nonvalvular A. Fib
- Rapid ventricular response (RVR) is common and can readily be controlled with an IV diltiazem drip