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

Case Title: Atrial Fibrillation

# Target Audience: medical students and residents

Primary Learning Objectives: key learning objectives of the scenario

1. Identify the rhythm atrial fibrillation and assess whether the patient is stable

2. Order the appropriate diagnostic tests to help identify etiology of atrial fibrillation

3. Appropriately treat and disposition the patient presenting with atrial fibrillation with rapid ventricular response

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

1. Recommend the appropriate rate control and rhythm control agents for atrial fibrillation

2. Consider and identify aberrant conduction rhythms presenting similar to atrial fibrillation

Critical actions checklist

1. Place patient on cardiac monitor with pulse oximetry
2. Obtain bedside ECG
3. Recognize atrial fibrillation and initiate rate control when hemodynamically stable
4. Recognize hemodynamic instability and cardiovert with synchronized, electrical cardioversion
5. Identify potential causes of atrial fibrillation and order appropriate diagnostic tests for these

6. Appropriately disposition the patient with atrial fibrillation

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; Can use simulation model with ECG monitoring
2. Distractors – none

**For Examiner Only**

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Case Title: Atrial Fibrillation

**CASE SUMMARY**

**CORE CONTENT AREA**

Cardiovascular

**SYNOPSIS OF HISTORY/ Scenario Background**

A 60 year old male presents to the ED with palpitations and shortness of breath that started just prior to arrival. He is brought in by EMS. En route they have administered adenosine 6 mg which did not change his symptoms.

Past medical history: similar episodes of heart racing 4 years ago requiring treatment with some drug for 2 years.

Medications: None

Allergies: Sulfa

Social history: Habits- smokes 3 packs of cigarettes/week for the past 40 years, no illicit or over the counter drugs; drinks 4 cups of coffee daily. Alcohol- 1-2 servings/week. Occupation- retail store manager; under increased stress at work.

**SYNOPSIS OF PHYSICAL**

Initial scenario conditions: Vital signs, initial physical examination, any pertinent patient physiology

Vital Signs: Temp 98.6 º F

BP 138/79

Pulse 165

Respiratory Rate 24

Pulse Oximetry 97% on room air

**Physical Examination:**

Pertinent Positives: CV- Tachycardic; irregular rhythm

Pulmonary- Mild tachypnea but clear to auscultation

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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**

Recognize atrial fibrillation with rapid ventricular response on ECG monitoring or rhythm strip

Cueing Guideline: Patient repeats that they feel heart palpitations.

1. **Critical Action**

Obtain a thorough history including time of onset; frequency of episodes; associated symptoms; any history of atrial fibrillation medications.

Cueing Guideline: Patient mentions they remember being on a heart medicine for 2 years after some palpitations a few years ago

1. **Critical Action**

Order appropriate labs and tests- CBC, Chem 10, cardiac enzymes, TSH, CXR, UDS

1. **Critical Action**

Rate control with an appropriate agent (e.g. diltiazem). Once unstable, cardiovert with 100-200 Joules.

Cueing Guideline: Reminder by nurse about repeating blood pressure; or mention of decreasing blood pressure to recognize signs of instability.

**SCORING GUIDELINES**

(Critical Action No.)

1. Must recognize atrial fibrillation for the point.

2. For full points, must obtain history to include a history of palpitations.

3. Subtract point for leaving off cardiac enzymes, TSH.

4. Must use rate control agent appropriately. Once patient becomes unstable, must cardiovert. Give additional points given for obtaining informed consent prior to patient becoming unstable.

**For Examiner Only**

**HISTORY**

**Onset of Symptoms:** Heart palpitations with some shortness of breath for about 30 minutes

**Background Info:** A 60 year old male with complaints of heart palpitations and shortness of breath is brought in by EMS. En route he was given adenosine 6 mg IV which did not change his symptoms.

**Chief Complaint:** heart palpitations; difficulty breathing

**Past Medical Hx:** similar episodes of heart racing 4 years ago requiring treatment with some drug for 2 years.

**Past Surgical Hx:** None

**Habits:** Smoking: up to three packs of cigarettes/week

ETOH: 1-2 servings/week

Drugs: No illicit drug use; No OTC supplement use

Caffeine: 4 cups of coffee/day

**Family Medical Hx:** Parents both with hypertension; father with MI at age 55

**Social Hx:** Marital Status: Divorced

Children: none

Education: college

Employment: retail store manager; under increased stress at

work.

**ROS:** No fever, felt well prior to the palpitations. No diaphoresis. No cough. No GI or GU complaints.

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**PHYSICAL EXAM**

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

**General Appearance:** Overweight male who appears stated age; no acute distress

**Vital Signs:** Temp 98.6 º F

BP 138/79

Pulse 165

Respiratory Rate 24

Pulse oximetry 97% on room air

**Head:** Unremarkable

**Eyes:** Unremarkable

**Ears:** Unremarkable

**Mouth:** Unremarkable

**Neck:** Supple, No JVD, no neck masses

**Skin:** no rash, no lacerations, no petechiae/purpura

**Chest:** symmetric expansion, non tender to palpation

**Lungs:** tachypnea but clear to auscultation bilaterally

**Heart:** Tachycardic rate with an irregularly irregular rhythm; no rubs/murmurs/gallops

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

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

**Extremities:** No clubbing, cyanosis or edema

**Rectal:** normal tone, no gross blood

**Pelvic:** deferred

**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

**For Examiner Only**

**STIMULUS INVENTORY**

#1 Emergency Admitting Form

#2 CBC

#3 BMP

#4 U/A

#5 Cardiac Enzymes

#6 Toxicology

#7 Thyroid Tests

#8 CXR

#9 ECG

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

#11 Debriefing materials

**For Examiner Only**

**LAB DATA & IMAGING RESULTS**

**Stimulus #2 Stimulus #5**

**Complete Blood Count (CBC) Cardiac Enzymes**

WBC 10,000/mm3 Troponin 0.03

Hgb 13 g/dL

Hct 39%

Platelets 350,000/mm3

Differential

Segs 60%

Bands 0%

Lymphs 35%

Monos 3%

Eos 1%

**Stimulus #6**

**Stimulus #3 Toxicology**

**Basic Metabolic Profile (BMP)** Serum

Na+ 140 mEq/L Salicylate Neg

K+ 3.6 mEq/L Acetaminophen Neg

CO2 24 mEq/L Tricyclics Neg

Cl- 105 mEq/L ETOH 0 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 Neg

Color yellow Barbiturates Neg

Sp gravity 1.010 Benzodiazepines Neg

Glucose neg

Protein neg **Stimulus #7**

Ketone neg **TSH** 4.0

Leuk. Est. neg

Nitrite neg **Stimulus #8**

WBC 0-1 **ECG**

RBC 0-1

**Stimulus #9**

**CXR** NACPD

**Learner Stimulus #1**

**ABEM General Hospital**

**Emergency Admitting Form**

Name: Mr. Smith

Age: 60 years

Sex: Male

Method of Transportation: EMS

Person giving information: Patient

Presenting complaint: Heart pounding and short of breath

**Background:** A 60 year old male with complaints of heart palpitations and shortness of breath is brought in by EMS. En route he was given adenosine 6 mg IV which did not change his symptoms

**Triage or Initial Vital Signs**

BP: 138/79

P: 165

R: 24

T : 98.6oF

**Learner Stimulus #2**

**Complete Blood Count (CBC)**

WBC 10,000/mm3

Hgb 13 g/dL

Hct 39%

Platelets 350,000/mm3

Differential

Segs 60%

Bands 0%

Lymphs 35%

Monos 3%

Eos 1%

**Learner Stimulus #3**

**Basic Metabolic Profile (BMP)**

Na+ 140 mEq/L

K+ 3.6 mEq/L

CO2 24 mEq/L

Cl- 105 mEq/L

Glucose 100 mg/dL

BUN 18 mg/dL

Creatinine 1.0 mg/dL

**Learner Stimulus #4**

**Urinalysis (U/A)**

Color yellow

Sp gravity 1.010

Glucose neg

Protein neg

Ketone neg

Leuk. Est. neg

Nitrite neg

WBC 0-1

RBC 0-1

**Learner Stimulus #5**

**Cardiac Enzymes**

Troponin 0.03

**Learner Stimulus #6**

**Toxicology**

Serum

Salicylate neg

Acetaminophen neg

Tricyclics neg

ETOH neg

Urine

Cocaine neg

Cannabinoids neg

PCP neg

Amphetamines neg

Opiates neg

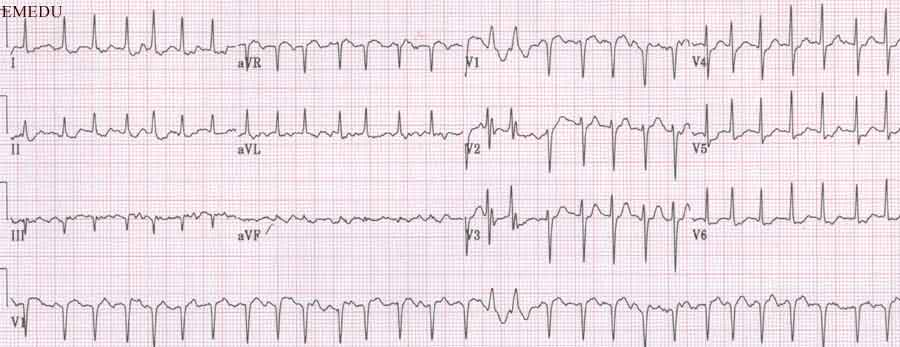
Barbiturates neg

Benzodiazepines neg

**Learner Stimulus #7**

**TSH**  4.0

**Stimulus #8**



Source: EMEDU.Org

**Stimulus #9**



**Feedback/ Assessment Forms**

**Atrial Fibrillation**

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

**Critical Actions:**

* Critical Action #1
* Critical Action #2
* Critical Action #3
* Critical Action #4
* Critical Action #5

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

* Dangerous Action #1
* Dangerous Action #1
* Dangerous Action #1
* Dangerous Action #1
* Dangerous Action #1

**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

**\*\*an example of critical actions for a case**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Critical Actions** | **NI** | **ME** | **AE** | **NA** | **Category** |
| Place patient on cardiac monitor with pulse oximetry |  |  |  |  | PC, MK, PBL |
| Obtain bedside ECG |  |  |  |  | PC, MK |
| Recognize atrial fibrillation and initiate rate control when hemodynamically stable |  |  |  |  | PC, MK, PBL |
| Recognize hemodynamic instability and cardiovert with synchronized, electrical cardioversion |  |  |  |  | PC, MK, PBL |
| Identify potential causes of atrial fibrillation and order appropriate diagnostic tests for these |  |  |  |  | PC, MK, PBL |
| Appropriately disposition the patient with atrial fibrillation |  |  |  |  | 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**

Atrial fibrillation; rate control; cardioversion

**References**

Page RL. Clinical practice: newly diagnosed atrial fibrillation. N Engl J Med 2004;361:2408-16.

Tintinalli JE et al. Emergency Medicine: A comprehensive study guide. 6th ed. New York, NY: McGraw-Hill; 2004.

Levis JT, Garmel GM. Clinical emergency medicine casebook. New York, NY: Cambridge University Press; 2009.

**Has this work been previously published?**

**No**