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# Initial Evaluation and Early Stabilization: Best Practices for the AF Patient

Wayne Ruppert, CVT, CCCC, NREMT-P Cardiovascular Coordinator Bayfront Health Dade City

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## Wayne Ruppert: Bio

- <u>Developed curriculum for and instruct numerous</u> <u>cardiology education programs based on Cardiac Cath</u> <u>Lab and Electrophysiology Lab case studies</u>
- Interventional Electrophysiology Technologist, St. Joseph's Hospital Pediatric Cardiology Program, 1999-2009
  - Includes assisting Dr. James Irwin during the <u>Arctic Front</u> <u>clinical trials (Cryoablation of Pulmonary Veins for</u> <u>Treatment of Paroxysmal AF</u>) at St. Joseph's Hospital, Tampa, FL (2006-2010)
- Coordinated the successful Atrial Fibrillation Cycle I certification of Bayfront Health Dade City in 2014
- <u>State of Florida Board of Nursing approved CE Provider</u> (CE Broker #50-12998)

### **Evidence Based Reference Sources** for this presentation:

- <u>2014 AHA/ACC/HRS Guideline for the Management</u> of Patients With Atrial Fibrillation
- <u>Risk Stratification for Arrhythmic Events in Patients</u> <u>With Asymptomatic Pre-Excitation: A Systematic</u> <u>Review for the 2015 ACC/AHA/HRS Guideline for</u> <u>the Management of Adult Patients With</u> <u>Supraventricular Tachycardia</u>

## Other Reference Sources: Electrophysiology (EP) Lab Case Studies



EP Catheters within the heart used for obtaining the Electrogram (the "internal ECG") Tracing and for Pace-mapping, an integral component of an EP study Author Wayne Ruppert conducting Pacemapping during EP study at the St Joseph's Hospital Heart Institute, Pediatric Electrophysiology Program, Tampa, FL in 2004



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## **Initial Evaluation and Early Stabilization: Best Practices for the AF** Patient

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## Initial Evaluation and Early Stabilization: Best Practices for the

### **AF** Patient

Wayne Ruppert, CVT, CCCC, NREMT-P

and A-Flutter)

### Why we treat A-fib and A-flutter the same:

Afib and Aflutter share:

- Thrombus risks
- Rate control issues
- Etiology and pathophysiology
- Patients often convert between the two rhythms randomly and frequently

### Why we treat A-fib and A-flutter the same:

Afib and Aflutter share:

- Thrombus risks
- Rate control issues
- Etiology and pathophysiology
- Patients often convert between the two rhythms randomly and frequently
- Patients are often in Afib and Aflutter CONCURRENTLY . . .







## Patient Evaluation Initial Assessment:

# SHOCK ASSESSMENT



## SHOCK = INADEQUTE TISSUE PERFUSION

### - STARTS THE INSTANT YOU SEE PATIENT

- ENDS WHEN YOU REACH THE PATIENT'S SIDE

# SHOCK ASSESSMENT

LOC:	ANXIOUS RESTLESS LETHARGIC UNCONSCIOUS	AWAKE ALERT & ORIENTED
SKIN:	PALE / ASHEN CYANOTIC COOL DIAPHORETIC	NORMAL HUE WARM DRY
BREATHING:	TACHYPNEA	NORMAL
PULSE:	WEAK / THREADY TOO FAST or SLOW	STRONG
STATUS:	SHOCK 🂕	NORMAL

## **Shock: Etiolology**

- Shock may be REVERSIBLE if it is discovered in time, the UNDERLYING CAUSE identified and treated rapidly.
- Shock; common etiology:
  - Cardiogenic (e.g: Acute MI, Dysrhythmia, HF)
  - Insulin Shock (e.g: critically low blood sugar)
  - Hypovolemia (internal or external blood loss)
  - Obstructive (e.g: Pulmonary Embolus)
  - Distributive (e.g: Septic shock)

Patient presents with any of the following:

- ACS SYMPTOMS (typical or atypical)
- SHOCK / Shock-like symptoms (skin pale,
- clammy, diaphoretic) of CARDIAC or unknown etiology
- PALPITATIONS / Irregular Heart Rate
- Appears to be in distress







ECG = A-Fib / Flutter with RVR Patient UNSTABLE with RAPID clinical deterioration ....

STAT 12 Lead ECG read by doctor within 10 minutes reveals Atrial Fibrillation or Atrial Flutter is primary ECG abnormality:



## To Cardiovert or Not to Cardiovert ?

- Presence of hemodynamic instability (shock) determines initial therapy
- Cardiac reserve present to warrant rate control (preferred) over cardioversion.
- Rate of clinical deterioration
- Duration of AF
- EF (if known)
- Is patient currently anticoagulated?
  And if YES, is it in the THERAPEUTIC RANGE?

AHA ACLS 2015

# SVT - UNSTABLE PATIENT (NARROW QRS)

#### ABC S + GENERAL SUPPORTIVE CARE ( OXYGEN, ECG / VS / SAO2 MONITORING, IV ACCESS )

#### **IMMEDIATE SYNCHRONIZED CARDIOVERSION**

- CONSIDER SEDATION
- SYNCHRONIZED CARDIOVERSION REGULAR RHYTHM: 50 - 100 j biphasic

IRREGULAR RHYTHM: 120 - 200 j biphasic

----- monophasic = 200



## If Initial Cardioversion Not Successful:

- Consider repositioning pads
  - Anterior / Posterior placement
  - Change polarity (reverse pad locations)
- Increase energy (joules)
- If monophasic current delivery used, try biphasic
- Apply pressure to anterior pad
- Use a drug such as ibutilide (Corvert) to lower the defibrillation threshold.

### Class II a LOE C

**Post Emergency Cardioversion;** Anticoagulation strategy determinants:

### Duration of Atrial Fibrillation/Flutter

- Less than 48 hours
- 48 hours or more

#### • CHA<sub>2</sub>DS<sub>2</sub>-VASc Stroke Risk Score

- Low risk: scores of 0 1
- High risk: scores of 2 or more

Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent CLASS I LOE B

In patients with nonvalvular AF, the CHA<sub>2</sub>DS<sub>2</sub>-VASc score is recommended for assessment of stroke risk.

CLASS I LOE B

#### **Thromboembolic Event Risk Stratification**

CHA2DS2 - VASc Score

Score Calculation:

- 1 Congestive Heart Failure
- 1 Hypertension
  - l 1 Age 65 74
    - 2 Age 75 or greater
      - 1 Diabetes

- 2 Stroke / TIA \*
- 1 Vascular Disease
  - 1 Gender Female

**TOTAL Points** 

**Post Emergency Cardioversion;** Anticoagulation strategy:

- AF/AFL duration < 48 hours,
- Low Stroke Risk (CHA<sub>2</sub>DS<sub>2</sub>-VASc Score: 0):

anticoagulation (intravenous heparin, LMWH, or a new oral anticoagulant) or **no antithrombotic therapy may be considered for cardioversion, without the need for post cardioversion oral anticoagulation** 

CLASS II b, LOE 3

### CHA2DS2 - VASc Score Score Interpretation:

**Total Points:** 

0 = Low Risk: Antithrombotic therapy may

be omitted (Class IIa, LOE: B)

1 = Intermediate Risk: Non-valvular AF,

Aspirin or oral anticoagulation is

reasonable (Class IIa, LOE: B)

2 or more = High Risk: Oral

Anticoagulation recommended 1, 2, 3

(Class I, LOE: B)

## **Post Emergency Cardioversion;** Anticoagulation Strategy:

- AF/AFL Duration <48 hours, but patient has high risk of stroke (CHA<sub>2</sub>DS<sub>2</sub>-VASc Stroke Risk Score 2 or more):
- AF/AFL Duration 48 hours or more (all patients):

anticoagulation should be initiated as soon as possible and continued for at least 4 weeks after cardioversion unless contraindicated.

### CLASS I, LOE C

#### 17 year old male. Acute onset "heart racing," unstable



### CHARACTERISTICS of W-P-W with Afib & RVR:

- WIDE COMPLEX TACHYCARDIA
- IRREGULARLY IRREGULAR R R INTERVALS !!



#### 17 year old male. Acute onset. Need for anticoagulation ?

 $CHA_2DS_2$ -VASc Score = 0



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# 78 y/o male, acute onset shortness of breath. History of AMI, CHF, Hypertension, CVA, Diabetes, PVD Hemodynamically unstable



78 y/o male.

#### CHA<sub>2</sub>DS<sub>2</sub>-VASc Score = 7 Need for anticoagulation ?


# 78 y/o male, History of AMI, CHF, Hypertension, CVA, Diabetes, PVD



Post-cardioversion: Consider patient's current antithrombotic medications, obtain PT/PTT/INR, *initiate and continue anticoagulation therapy for at least 4 weeks.* 





- For patients with AF/AFL who are hemodynamically stable, the primary objectives are:
  - Maintain Ventricular Heart Rate at an acceptable rate, preferably <80, but can be between 80-110 for patients who are asymptomatic and have preserved left ventricular function. (Class II b LOE B)
  - Rule out thrombus in the Left Atrium and Left Atrial Appendage PRIOR TO restoring sinus rhythm.

Rate control strategy

– QRS Complexes Narrow (<120 ms), no Delta waves present:

IV administration of a **beta blocker** or nondihydropyridine **calcium channel blocker** is recommended to slow the ventricular heart rate in the acute setting in patients without preexcitation.

### Class I, LOE B

- Rate control strategy
  - QRS Complexes Narrow (<120 ms), no Delta waves present:
    - Typical first-line rate control IV meds:
      - Cardizem, Diltiazem (bolus + maintenance drip)
      - Esmolol, Propranolol and Metoprolol

### Class I, LOE B

- Rate control strategy
  - QRS Complexes Narrow (<120 ms), no Delta waves present when HEART FAILURE is also present:
    - Carvedilol (Coreg)

# What would be your rate control strategy for this patient?

37 y/o male, alert, oriented, hemodynamically stable Heart rate 170, no previously known cardiac history



### CHARACTERISTICS of W-P-W with Afib & RVR: - WIDE COMPLEX TACHYCARDIA

- IRREGULARLY IRREGULAR R – R INTERVALS !!



In this case, the ER physician ordered a Diltiazem bolus and maintenance infusion.

During the bolus infusion of Diltiazem, the patient's heart rhythm converted to Ventricular Fibrillation.

He was successfully defibrillated and the Diltiazem was immediately discontinued.

#### Post Defibrillation ECG: small Delta waves are visible ....



# WOLFF-PARKINSON-WHITE EKG CHARACTERISTICS



# WOLFF-PARKINSON-WHITE EKG CHARACTERISTICS



# WOLFF-PARKINSON-WHITE EKG CHARACTERISTICS









BEWARE: This is W-P-W with AF / RVR . . . And Delta Waves are not overtly visible !! Suspect W-P-W with AF/RVR whenever an ECG presents with WIDE QRS COMPLEXES with IRREGULARLY IRREGULAR **R-R INTERVALS !!!** 

Be aware that in cases of Wolff-Parkinson-White with Atrial **Fibrillation and Rapid Ventricular** Response, you may not be able to discern the presence of DELTA WAVES. Therefore whenever a patient presents with any WIDE QRS **COMPLEX TACHYCARDIA** with **IRREGULARLY IRREGULAR R-R** intervals, WPW + AF and RVR should **ALWAYS** be considered.

# Conditions that cause WPW may cause AF also (e.g. Mitral Valve Prolapse)

### WPW can cause AF

In reference to the previous slide ("The Skeleton of the Heart"), when patients have an abnormal "hole" in the fibrous skeleton of the heart, the electrical energy associated with DEPOLARIZATION "leaks through" to the ventricles, usually preceding the wave of depolarization traversing via the normal conduction system. This abnormal "hole" is the bypass tract associated with the Wolff-**Parkinson-White syndrome.** 

The following slides are a visual depiction of the Atrio-Ventricular conduction of patients with:

- Normal Sinus Rhythm (NSR)
- NSR with Wolff-Parkinson-White (WPW)
- Atrial Fibrillation (AF)
- WPW with AF and Rapid Ventricular Response (RVR)
- WPW with AF/ RVR when AV Nodal Conduction is negated by administration of an AV nodal blocking agent.

### **Normal Sinus Rhythm**



### Normal Sinus Rhythm with Wolff-Parkinson White



### **Atrial Fibrillation**



#### Atrial Fibrillation with Wolff-Parkinson White





### Rate control strategy

 – QRS Complexes Wide. If Delta waves are present or if unable to rule out pre-excitation:

Administration of intravenous amiodarone, adenosine, digoxin (oral or intravenous), or nondihydropyridine calcium channel antagonists (oral or intravenous) in patients with Wolff-Parkinson-White syndrome who have pre-excited AF is potentially harmful because these drugs accelerate the ventricular rate and are known to precipitate VENTRICULAR FIBRILLATION

Class III (harm), LOE B

AHA ACLS 2015 with ADDED CONSIDERATIONS for WPW with A-FIB and RVR



- Rate control strategy
  - QRS Complexes Wide (>120ms). If Delta waves are present or if unable to rule out preexcitation:

Intravenous **procainamide** or **ibutilide** (Corvert) to restore sinus rhythm or slow the ventricular rate is recommended for patients with pre-excited AF and rapid ventricular response who are not hemodynamically compromised .

### Class I, LOE C

# AF RVR – NARROW QRS – stable pt.



### **Consider Reversible Causes:**

### 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation

"A number of acute noncardiac conditions are associated with AF. Management of the underlying condition and correction of contributing factors as first-line treatment is common to all of these scenarios"

# **Consider Reversible Causes:**

- Hypotension/Hypovolemia
- Hypertension
- Hyperthyroidism
- AMI / CAD / Pericarditis
- Electrolyte imbalances
- Hypothermia
- Acute Alcohol / Drug toxicity
- Electrocution
- Pulmonary Embolus
- Recent Chest Surgery

#### Patient: 53 Year old Female

### REVERSIBLE CAUSES CASE STUDY!

#### Chief Complaint: "Weakness and Dizziness x 3 days"

**<u>History of Present Illness</u>**: The patient presents to the ER complaining of feeling weak and unusually tired for the last few days. Today she states she is dizzy, nauseous, and nearly passed out when she stood up. She also states she's had black, tarry stools for the last few days. She denies having any pain; specifically denies chest pain or discomfort, and denies back pain, as well as abdominal pain or cramping.

Past Medical History: Cardiac Risk Factors:		Perforated Ulcer			
		Cigarette smoker, 1.5 – 2 packs/day x 20 years, Family history CAD			
Vital Signs:	BP: 84/56	Pulse: 184, Irregular	Resp Rate: 24	SAO2: 91% room air	

**Physical Exam**: Cool, pale, diaphoretic skin. She is mildly anxious. Alert and oriented to person, place, time and event.

- Pupils PERL, Trachea midline, No JVD,
- Respiratory: clear, all fields; normal chest wall motion, no use of accessory muscles
- Abdomen: soft, non-tender all quadrants
- Extremities: normal sensation, motor function, coordination x 4. No ankle edema. Capillary refill <2 seconds.</li>

#### ECG: See attached copy.

Abnormal Labs:	Hemoglobin: 8.8,	Hematocrit: 26.3	RBCs: 3.50	Troponin: 0.42
	BUN: 44	Creatnine: 1.5	BUN/Creatnin	e Ratio: 29.3

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 Cardiac Risk Factors:
 Cigarette smoker, 1.5 – 2 packs/day x 20 years, Family history CAD

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 BP: 84/56
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### REVERSIBLE CAUSES CASE STUDY!

# HR by ECG: 188





### REVERSIBLE CAUSES CASE STUDY!

PATIENT DISPOSITION: In this case, the patient required 2 Liters of NS; blood pressure increased to 112/71, and her heart rate decreased to the mid 80s. Initially she remained in A-fib, but her heart rate remained below 100. She received two units of whole blood. Her ECG rhythm converted spontaneously to Normal Sinus Rhythm. She was taken to Surgery where a perforated ulcer (gastric erosion) was repaired. Regarding her mild renal failure, the Hospitalist decided to "observe the trend" of her renal function labs. Within two days, her BUN and Creatnine returned to normal. Prior to discharge, and Cardiac Catheterization was performed. It revealed NO Coronary Artery Disease and NORMAL LV function.

- Assess Stroke Risk using CHA<sub>2</sub>DS<sub>2</sub>-VASc score.
- Formulate and implement ANTICOAGULATION STRATEGY, if indicated.
- Conversion to Sinus Rhythm should occur as soon as possible, but only AFTER the patient's Stroke Risk Assessment has been completed, and any indicated Anticoagulation has occurred, and/or thrombus has been ruled out in the Left Atrium and Left Atrial Appendage by Transesophageal Echocardiogram (TEE).
## **Anticoagulation Strategy**

- Based on the patient's CHA<sub>2</sub>DS<sub>2</sub>-VASc score, the following anticoagulation strategy should be implemented:
  - Score = 0, it is reasonable to omit antithrombotic therapy. (Class II a, Level of Evidence: B)
  - Score = 1, no antithrombotic therapy or treatment with an oral anticoagulant or aspirin may be considered. (Class II b, Level of Evidence: C)
  - Score = 2 or more: oral anticoagulation is recommended, as outlined on the next page . . .

CHA<sub>2</sub>DS<sub>2</sub>-VASc score of 2 or greater, or prior stroke, transient ischemic attack (TIA), the following oral anticoagulants are recommended.

<b>CLASS I Recommended Options include:</b>	
Warfarin (INR 2.0 to 3.0)	(Level of Evidence: A)
Dabigatran (Pradaxa)	(Level of Evidence: B)
Rivaroxaban (Xarelto)	(Level of Evidence: B)
Apixaban (Eliquis)	(Level of Evidence: B)

**CLASS I Recommendation** Warfarin Therapy:

 -INR should be determined at least weekly during initiation of antithrombotic therapy
-and at least monthly when anticoagulation (INR in range) is stable

**CLASS I Recommendation** 

For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor: dabigatran [Pradaxa], rivaroxaban [Xarelto], or apixaban [Eliquis] is recommended.

#### **CLASS I Recommendation**

Renal function should be evaluated before initiation of direct thrombin or factor Xa inhibitors and should be reevaluated when clinically indicated and at least annually.

#### **CLASS I Recommendation**

For patients with nonvalvular AF with a CHA<sub>2</sub>DS<sub>2</sub>-VASc score of 2 or greater and who have endstage chronic kidney disease (CKD) (creatinine clearance <15 mL/min) or are on hemodialysis, it is reasonable to prescribe warfarin (INR 2.0 to 3.0) for oral anticoagulation.

#### Statement from AHA/ACC/HRS 2014 AF Guideline:

For patients with CKD, dose modifications of the new agents are available; however, for those with **severe or end-stage CKD, warfarin remains the anticoagulant of choice,** as there are no or very limited data for these patients. Among patients on hemodialysis, warfarin has been used with acceptable risks of hemorrhage

#### **CLASS II b Recommendation**

For patients with **nonvalvular AF** and **moderateto-severe CKD** with  $CHA_2DS_2$ -VASc scores of 2 or greater, treatment with reduced doses of direct thrombin or **factor Xa inhibitors** may be considered (e.g., dabigatran, rivaroxaban, or apixaban), but safety and efficacy have not been established.

**CLASS III Harm** 

The direct thrombin inhibitor dabigatran (**Pradaxa**) **should not be used** in patients with AF and a **mechanical heart valve**.

## Rate Control Strategy; Considerations:

#### CLASS III Harm (CONTRAINDICATION):

Dronedarone (**Multaq**) should not be used to control the ventricular rate in patients with **permanent AF** as it increases the risk of the combined endpoint of stroke, myocardial infarction, systemic embolism, or cardiovascular death.

• For patients with AF who have **mechanical heart valves**, **warfarin** is recommended, and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis

#### **CLASS I Recommendation:**

Cardioversion is recommended when a rapid ventricular response to AF or atrial flutter does not respond promptly to pharmacological therapies and contributes to ongoing myocardial ischemia, hypotension, or HF.





### Patient is STABLE, Ventricular Rate <100:

- Evaluate and manage stroke risk with CHA<sub>2</sub>DS<sub>2</sub>-VASc Score
- Consider REVERSIBLE CAUSES

## Patient is STABLE, Ventricular Rate <100:

• Evaluate stroke risk with CHA<sub>2</sub>DS<sub>2</sub>-VASc Score

- Low Risk (0) may consider no anticoagulation

- Moderate Risk (1) may consider daily Aspirin
- High Risk (2 and above): <u>oral anticoagulation</u> recommended as per 2014 AHA/ACC/HRS Guideline for Management of Atrial Fibrillation. Click here to return to this section

#### **CLASS I Recommendation**:

For patients with AF or atrial flutter of 48 hours' duration or longer, or when the duration of AF is unknown, anticoagulation with warfarin (INR 2.0 to 3.0) is recommended for at least 3 weeks before and 4 weeks after cardioversion, regardless of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score and the method (electrical or pharmacological) used to restore sinus rhythm.

#### **CLASS I Recommendation**:

AF or AFL 48 hours' duration or longer, or when the duration of AF is unknown:

ANTICOAGULATION . . . 3 WEEKS BEFORE & 4 WEEKS AFTER

#### **CLASS I Recommendation**:

AF or AFL 48 hours' duration or longer, or when the duration of AF is unknown:

ANTICOAGULATION (warfarin or Factor Xa inhibitor) 3 WEEKS BEFORE & 4 WEEKS AFTER

#### **CLASS II a Recommendation:**

For patients with AF or atrial flutter of 48 hours' duration or longer or of unknown duration who have not been anticoagulated for the preceding 3 weeks, it is reasonable to perform transesophageal echocardiography before cardioversion and proceed with cardioversion if no left atrial thrombus is identified, including in the left atrial appendage, provided that anticoagulation is achieved before transesophageal echocardiography and maintained after cardioversion for at least 4 weeks. (Level of Evidence: B)

#### **CLASS II a Recommendation:**

For patients with AF or atrial flutter of 48 hours' duration or longer or when duration of AF is unknown, anticoagulation with Factor Xa (dabigatran, rivaroxaban, or apixaban) is reasonable for at least 3 weeks before and 4 weeks after cardioversion.

#### **CLASS II b Recommendation:**

For patients with AF or atrial flutter of **less than 48** hours' duration who are at **low thromboembolic risk,** anticoagulation (intravenous heparin, LMWH, or a new oral anticoagulant) or no antithrombotic therapy may be considered for cardioversion, without the need for postcardioversion oral anticoagulation.

#### CLASS | Recommendation:

Flecainide, dofetilide (Tikosin), propafenone (Rhythmol), and intravenous ibutilide (Corvert) are useful for pharmacological cardioversion of AF or atrial flutter, provided contraindications to the selected drug are absent.

#### **CLASS II a Recommendation:**

Administration of oral amiodarone is a reasonable option for pharmacological cardioversion of AF.

#### **CLASS II a Recommendation:**

Propafenone (Rhythmol) or flecainide "pill-in-thepocket" in addition to a beta blocker or nondihydropyridine calcium channel antagonist is reasonable to terminate AF outside the hospital once this treatment has been observed to be safe in a monitored setting for selected patients.

**CLASS III Recommedation: Harm** 

Dofetilide (Tikosin) therapy should not be initiated out of hospital because of the risk of excessive QT prolongation that can cause torsades de pointes.

# QUESTIONS ???

## (download slides for additional bonus materials) !

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## **BONUS MATERIAL . . . .**

- SPECIAL CONSIDERATIONS from the 2014 AHA/ACC/HRS Guideline for the Management of patients in Atrial Fibrillation
- AF / AFL Emerg Dept Physician's Order Set
- Flowchart: Emergency Mgment of AF / AFL
- Cryotherapy in Pulmonary Vein Isolation (PVI): the St. Joseph's Hospital experience in the "Arctic Front" PVI Clinical Trials.
- Animation of "The Formation of Delta Waves" in Wolff-Parkinson-White



The special considerations in this section have not been presented previously in this program. These considerations are excerpts from the 2014 AHA/ACC/HRS Guideline for the Management of Patients with Atrial Fibrillation and include: Heart Failure, Hypertrophic Cardiomyopathy, Hyperthyroidism, Acute Coronary Syndrome, Pulmonary Disease, Wolff-Parkinson-White, and the **Peri-Operative Management of AF in the Cardiac Surgery Setting.** 



### **HEART FAILURE:**

CLASS III (Harm)

Nondihydropyridine calcium channel antagonists should not be used in patients with decompensated HF as these may lead to further hemodynamic compromise. (Level of Evidence: C)



Hypertrophic Cardiomyopathy

**CLASS I Recommendation:** 

Anticoagulation is indicated in patients with hypertrophic cardiomyopathy (HCM) with AF independent of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score.

#### (Level of Evidence: B)



#### **Hypertrophic Cardiomyopathy**

#### **CLASS II a Recommendation:**

Antiarrhythmic medications can be useful to prevent recurrent AF in patients with HCM. Amiodarone or disopyramide combined with a beta blocker or nondihydropyridine calcium channel antagonists are reasonable for therapy. *(Level of Evidence: C)* 



#### Hyperthyroidism

#### **CLASS I Recommendations:**

Beta blockers are recommended to control ventricular rate in patients with AF complicating thyrotoxicosis unless contraindicated.

In circumstances in which a beta blocker cannot be used, a nondihydropyridine calcium channel antagonist is recommended to control the ventricular rate. *(Level of Evidence: C)* 



AF Complicating Acute Coronary Syndromes CLASS I Recommendation:

Urgent direct-current cardioversion of new-onset AF in the setting of acute coronary syndromes (ACS) is recommended for patients with hemodynamic compromise, ongoing ischemia, or inadequate rate control.

#### (Level of Evidence: C)



AF Complicating Acute Coronary Syndromes

**CLASS I Recommendation:** 

Intravenous beta blockers are recommended to slow a rapid ventricular response to AF in patients with ACS who do not display HF, hemodynamic instability, or bronchospasm.

#### (Level of Evidence: C)



**AF Complicating Acute Coronary Syndromes** 

#### **CLASS I Recommendation:**

Intravenous beta blockers are recommended to slow a rapid ventricular response to AF in patients with ACS who do not display HF, hemodynamic instability, or bronchospasm.

(Level of Evidence: C)


**AF Complicating Acute Coronary Syndromes** 

### **CLASS I Recommendation:**

For patients with ACS and AF with a CHA<sub>2</sub>DS<sub>2</sub>-VASc score of 2 or greater, anticoagulation with warfarin is recommended unless contraindicated.

### (Level of Evidence: C)



**AF Complicating Acute Coronary Syndromes** 

### **CLASS II b Recommendation:**

Administration of amiodarone or digoxin may be considered to slow a rapid ventricular response in patients with ACS and AF associated with severe left ventricular dysfunction and HF or hemodynamic instability.

### (Level of Evidence: C)



### **AF Complicating Acute Coronary Syndromes**

### **CLASS II b Recommendation:**

Administration of nondihydropyridine calcium antagonists might be considered to slow a rapid ventricular response in patients with ACS and AF only in the absence of significant HF or hemodynamic instability.

## (Level of Evidence: C)



### **Pulmonary Disease**

**CLASS I Recommendation:** 

A nondihydropyridine calcium channel antagonist is recommended to control the ventricular rate in patients with AF and chronic obstructive pulmonary disease.

### (Level of Evidence: C)



### **Pulmonary Disease**

### **CLASS I Recommendation:**

Direct-current cardioversion should be attempted in patients with pulmonary disease who become hemodynamically unstable as a consequence of new-onset AF.

### (Level of Evidence: C)



### **Wolff-Parkinson-White**

Catheter ablation of the accessory pathway is recommended in symptomatic patients with pre-excited AF, especially if the accessory pathway has a short refractory period that allows rapid antegrade conduction. *(Level of Evidence: C)* 



### **Perioperative Management of AF in Cardiac Surgery**

#### **CLASS I Recommendations:**

Treating patients who develop AF after cardiac surgery with a beta blocker is recommended unless contraindicated.

(Level of Evidence: A)

A nondihydropyridine calcium channel blocker is recommended when a beta blocker is inadequate to achieve rate control in patients with postoperative AF.

#### (Level of Evidence: B)



### **Perioperative Management of AF in Cardiac Surgery**

#### **CLASS II a Recommendations:**

Preoperative administration of amiodarone reduces the incidence of AF in patients undergoing cardiac surgery and is reasonable as prophylactic therapy for patients at high risk for postoperative AF. *(Level of Evidence: A)* 

It is reasonable to restore sinus rhythm pharmacologically with ibutilide or direct-current cardioversion in patients who develop postoperative AF, as advised for nonsurgical patients. *(Level of Evidence: B)* 



### **Perioperative Management of AF in Cardiac Surgery**

#### **CLASS II a Recommendations, continued:**

It is reasonable to administer antiarrhythmic medications in an attempt to maintain sinus rhythm in patients with recurrent or refractory postoperative AF, as advised for other patients who develop AF. *(Level of Evidence: B)* 

It is reasonable to administer antithrombotic medication in patients who develop postoperative AF, as advised for nonsurgical patients. *(Level of Evidence: B)* 



### **Perioperative Management of AF in Cardiac Surgery**

#### **CLASS II a Recommendations, continued:**

It is reasonable to manage well-tolerated, new-onset postoperative AF with rate control and anticoagulation with cardioversion if AF does not revert spontaneously to sinus rhythm during follow-up.

(Level of Evidence: C)



#### **Perioperative Management of AF in Cardiac Surgery**

#### **CLASS II b Recommendations:**

Prophylactic administration of sotalol may be considered for patients at risk of developing AF after cardiac surgery. (Level of Evidence: B)

Administration of colchicine may be considered for patients postoperatively to reduce AF after cardiac surgery.

(Level of Evidence: B)

Page 1 of 3  Page 1 of 4  Page 1	Emergency Department Atrial Fibrilla	ation / Flutter Physician Orders
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re-checked I orders have been selected based on current evidence-based medicine, and are consistent   ifith 2014 AHA/ACC/HRS guidelines for Atrial Fibrillation Bulleted (•) orders indicate standard hospital   rocedures. To DESELECT any of these orders, draw a line through the entire order and initial it.   LIERGIES:	Date/Time://at:	hours Bayfront Health Dade City
LLERGIES:	Pre-checked 🗹 orders have been selected based on current evi with 2014 AHA/ACC/HRS guidelines for Atrial Fibrillation. procedures. To DESELECT any of these orders, draw a line	idence-based medicine, and are consistent Bulleted (●) orders indicate standard hospital e through the entire order and initial it.
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ER Physician's Order set for Atrial Fibrillation / Atrial Flutter developed by Bayfront Health Dade City

#### Download this model "A-Fib / Flutter ER Physician's Order Set"



Atrial Fibrillation / Atrial Flutter emergency care flowchart developed by Bayfront Health Dade City

#### Download this A-Fib / Flutter Emergency Care Flowchart - BHDC

## Cryotherapy for Pulmonary Vein Isolation.

In this catheter-based procedure, the left atrium is accessed via the venous system and atrial trans-septal puncture. A balloon catheter is advanced to the ostium of each pulmonary vein and is inflated with liquid nitrogen.

The nitrogen is cooled to -70 degrees Fahrenheit, effectively creating a "ring of necrosis" which isolates the pulmonary veins from the left atrium. The aberrant electrical signals originating in the pulmonary veins are unable to cross the necrotic tissue. Dr. Irwin's success rate for keeping patients free of atrial fibrillation after this procedure exceeds 95 percent.

#### MAR-1995

46 yr	Caucasian	Vent. rate 100	BPM	Norm
Male		PR interval 158	ms	Left a
Room:OP Loc:8	Option:25	QT/QTc 312/402 P-R-T axes 52 -12	ms ms 38	Borde

Normal sinus rhythm with occasional Premature supraventricular complexes Left atrial enlargement Borderline ECG

#### CASE STUDY: 46 y/o MALE HAS LEFT ATRIAL HYPERTROPHY in 1995



Page 1 of 1

					APR-2004	ST. JOSEPH'S I	HOSPITA
55 yr Male	Caucasian	Vent. rate PR interval ORS duration	178	BPM ms	**UNEDITED COPY PHYSICIAN INTERI	/ – REPORT IS COMPU	TER GEN
Loc:3	Option:23	QT/QTc P-R-T axes	264/454 * -19	ms 46	Atrial fibrillation with with premature ventri Nonspecific ST abnor Abnormal ECG	a rapid ventricular response cular or aberrantly conduct mality, probably digitali	se cted compl s effect
C/	ASE STUDY: A	PATIENT IS NO	W 55 Y		OLD (9 YEARS SIN		IG LEFT A
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Wayne Ruppert (L) assisting Dr. James Irwin (R) with Pulmonary Vein Isolation during the Arctic Front clinical trials for Atrial Fibrillation Ablation at St. Joseph's Hospital, Tampa, FL in 2007



"The Master at work" -- Dr. James Irwin performing a Pulmonary Vein Isolation procedure during the "Arctic Front" clinical trials at St Joseph's Hospital, Tampa, FL in 2008



Mapping of Pulmonary Vein (electrical) potentials (two screens to left) and use of 3D imaging to correlate electrical signals with left atrial and pulmonary vein anatomy

Wayne Ruppert operating the Medtronic "Arctic Front" Cryoablation control device during the "Cryoballoon Ablation of Pulmonary Veins for Paroxysmal Atrial Fibrillation Clinical Trial" at St Joseph's Hospital Heart Institute in 2008.

The device pictured cools liquid nitrogen in a balloon placed into the patient's pulmonary veins to -70 degrees Fahrenheit.

After this procedure, over 95% of Dr. Irwin's patients remained free of Atrial Fibrillation.



### CAUSES OF ATRIAL FIBRILLATION: - PULMONARY VEIN AUTOMATICITY





### Animated slide sequence:

## "Formation of a Delta Wave in Wolff-Parkinson-White Syndrome"

By: Wayne Ruppert Cardiovascular Coordiator Bayfront Health Dade City

INSTRUCTIONS: Advance rapidly through the next 9 slides. Note the "wave of depolarization" (in blue) with respect to conduction in the AV node and the "bypass tract" (just to the left of the AV node)!

















# WOLFF-PARKINSON-WHITE EKG CHARACTERISTICS


This presentation has been prepared by: Wayne W Ruppert, CVT, CCCC, NREMT-P For the **Society of Cardiovascular Patient Care's 19th Annual Congress** May 27, 2016 Miami, Florida

Please direct all correspondence to: <u>Wayne.ruppert@bayfronthealth.com</u>