“Arrhythmias in 15 Minutes or Less”

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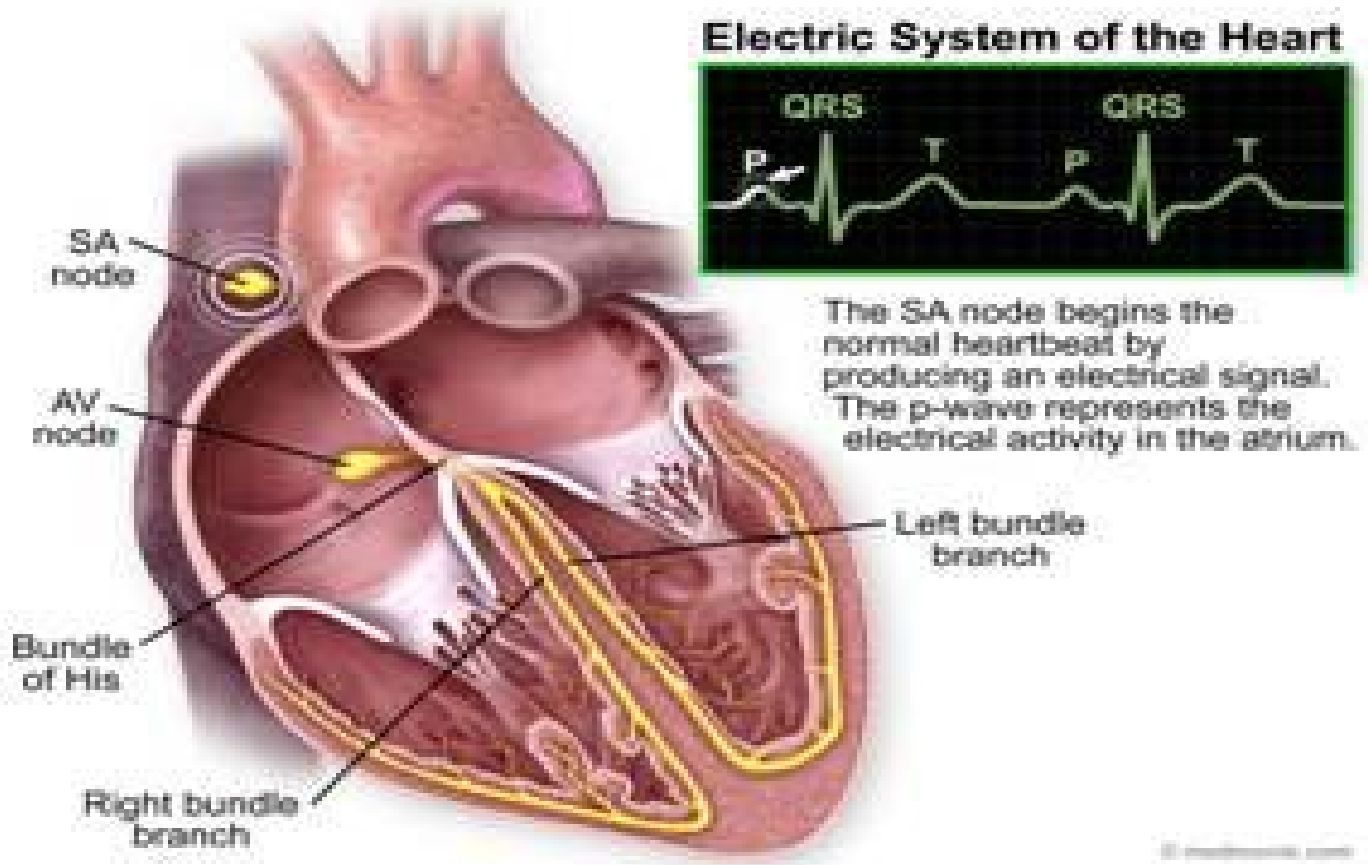
Objectives

- Discuss/ Identify SVT: Supraventricular Tachycardia
- Discuss/ Identify Atrial Fibrillation
- Discuss/ Identify Atrila Flutter

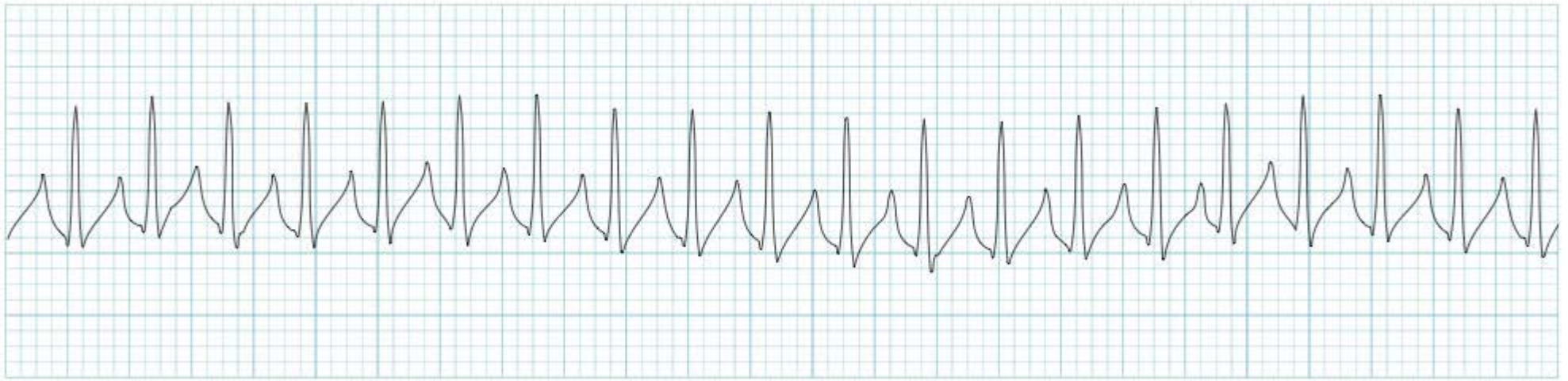
Electrical System of the Heart



SVT: Supraventricular Tachycardia

- The term ***supraventricular tachycardia (SVT)***, though often used synonymously with *AV nodal re-entry tachycardia (AVNRT),* can be used to **refer to any tachydysrhythmia arising from above the level of the Bundle of His.**
- Different types of SVT arise from or are propagated by the atria or AV node, typically producing a ***narrow-complex tachycardia*** **(unless aberrant conduction is present).**
- ***Paroxysmal SVT*** **(PSVT) describes an SVT with abrupt onset and offset** — characteristically seen with re-entrant tachycardias involving the AV node such as AVNRT or atrioventricular re-entry tachycardia (AVRT).

SVT



SVT

- **SVTs** can be classified based on **site of origin** (atria or AV node) or **regularity** (regular or irregular) with **ventricular rates often > 150 BPM**
- **Atrial & regular**……sinus tachycardia, **atrial flutter**, atrial tachycardia, inappropriate sinus tachycardia, and sinus node re entrant tachycardia
- **Atrial & Irregular**……**atrial fibrillation, atrial flutter with variable block, and** multifocal atrial tachycardia
- **AV Node & regular**: Atrioventricular reentrant tachycardia (AVRT) and AV nodal reentrant tachycardia (AVNRT)

SVT Treatment

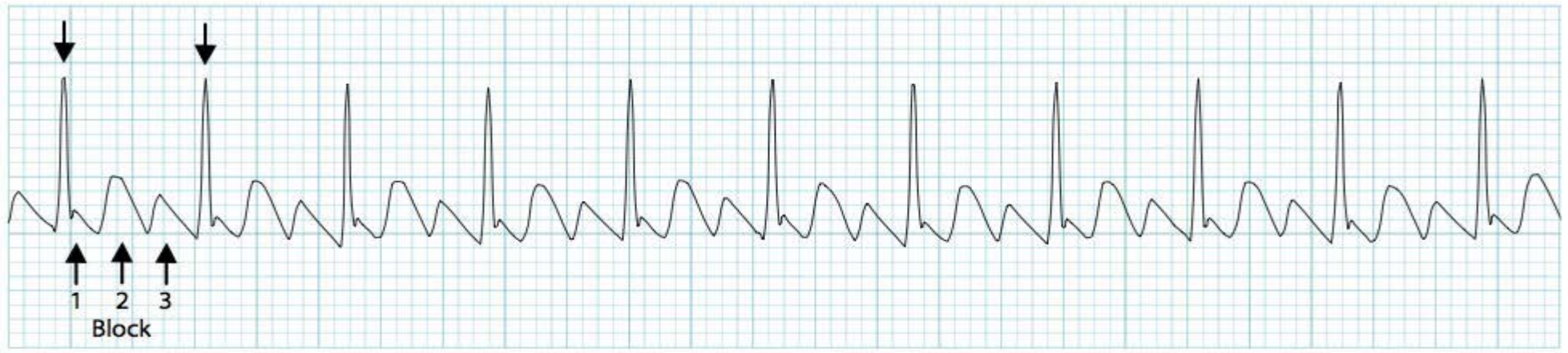
- Emergent: ACLS Standard of Care; Synchronized Cardioversion; **Adenosine** 6 mg IVP, N/S flush followed by 12 mg IVP

- IV **Beta blockers, Diltiazem or Verapamil** in acute care, transitioning to oral therapy in long-term
- Consideration may be given to anti-arrhythmic therapy, ie, **Amiodarone or Sotalol**
- Catheter ablation therapy

Atrial Flutter

- Atrial flutter is a type of supraventricular tachycardia caused by a re-entry circuit within the right atrium.
- The length of the re-entry circuit corresponds to the size of the right atrium, resulting in a fairly predictable **atrial rate of around 300 bpm (range 200-400).**
- Ventricular rate is determined by the AV conduction ratio ("degree of AV block").
- The **commonest AV ratio is 2:1, resulting in a ventricular rate of ~150 bpm.**
- Higher-degree AV blocks can occur — usually due to medications or underlying heart disease — **resulting in lower rates of ventricular conduction, e.g. 3:1 or 4:1 block.**

Atrial Flutter



Atrial Flutter

- Narrow complex tachycardia

- Regular atrial activity at ~300 bpm
- **Flutter waves ("saw-tooth" pattern)** best seen in leads II, III, aVF — may be more easily spotted by turning the ECG upside down!
- Flutter waves in V1 may resemble P waves
- Loss of the isoelectric baseline

Atrial Fibrillation

- Atrial Fibrillation (AF) is the **most common sustained arrhythmia.**
- The incidence and prevalence of AF is increasing.

- Lifetime risk over the age of 40 years is ~25%.
- Complications of AF include *hemodynamic instability, cardiomyopathy, cardiac failure, and embolic events such as stroke.*
- Characterized by disorganized atrial electrical activity and contraction.

Atrial Fibrillation

Atrial Fibrillation

- **Ashman's Phenomenon** – presences of aberrantly conducted beats, usually of RBBB morphology, due a long refractory period as determined by the preceding R-R interval.
- The ventricular response and thus ventricular rate in AF is dependent on several factors including vagal tone, other pacemaker foci, AV node function, refractory period, and medications.
- Commonly *AF is associated with a ventricular rate ~ 110 – 160.*
- AF is often described as having *'rapid ventricular response' once the ventricular rate is > 100 bpm.*
- *'Slow' AF is a term often used to describe AF with a ventricular rate < 60 bpm.*
- Causes of 'slow' AF include hypothermia, digoxin toxicity, medications, and sinus node dysfunction.

Classification of Atrial Fibrillation

- **First episode** – initial detection of AF regardless of symptoms or duration
- **Recurrent AF** – More than 2 episodes of AF
- **Paroxysmal AF** – Self terminating episode < 7 days
- **Persistent AF** – Not self terminating, duration > 7 days
- **Long-standing persistent AF** – > 1 year
- **Permanent (Accepted) AF** – Duration > 1 yr in which rhythm control interventions are not pursued or are unsuccessful

Management of Atrial Fibrillation and Atrial Flutter

$CHADS_2$		CHA_2DS_2-VASc	
Risk factors	Points	Risk factors	Points
CHF	1	CHF/LVEF ≤ 40%	1
HTN	1	HTN	1
Age≥ 75	1	Age≥ 75	2
DM	1	DM	1
Stroke/TIA/embolism	2	Stroke/TIA/embolism	2
	Max 6	Vascular disease (prior MI, PAD, or aortic plaque)	1
		Age 65-74 years	1
		Sex category (Female)	1
			Max 9

- Atrial fibrillation is associated with risk of **embolic stroke**.
- Guideline recommendations for stroke prevention and anticoagulation also include atrial flutter due to the high likelihood of these patients developing AF.
- Anticoagulation guidelines are **based on risk of stroke vs. risk of bleeding.**
- Stroke risk stratification requires either an assessment of risk factors or application of a risk score e.g. $CHADS_2$ or CHA_2DS_2VASc

Management of Atrial Fibrillation and Atrial Flutter

- **Anticoagulants include**: Warfarin, Dagibatran, Apixiban , and Rivaroxaban
- **"Rhythm versus Rate control"**
- **Rate control:** with Beta Blockers, and nondihydropyridine Calcium channel blockers
- **Rhythm control**: Amiodarone, Flecainide, Sotalol, Dofetilide, Propafenone and Dronedarone
- **Direct –Current cardioversion**
- **Catheter Ablation therapy**