1	
2	Overview
- 🗀	Atria
	 Thin-walled, low-pressure chambers Receive blood from the systemic circulation and lungs
	 Continuous flow of blood from the superior and inferior vena cavae into the atria
	- "Atrial kick"
3	Overview
	The sinoatrial (SA) node, atrioventricular (AV) junction, and ventricular conduction system normally possess the property of automaticity
	Atrial dysrhythmias reflect abnormal electrical impulse formation and conduction in the atria
4	Overview
	Atrial dysrhythmias may occur because of: Altered automaticity Reentry
	Altered automaticity is a disorder in impulse <u>formation</u>
	Reentry is a disorder in impulse <u>conduction</u>
5	Atrial Dysrhythmias
	 Most atrial dysrhythmias are not life-threatening Some are associated with extremely fast ventricular rates An excessively rapid heart rate may compromise cardiac output
6	Premature Complexes
	Premature beats may be produced by the atria, AV junction, or the ventricles
	 Premature beats appear <u>early</u>, that is, they occur before the next expected beat
7	Premature Complexes
	Premature beats are identified by their site of origin
	 Premature atrial complexes (PACs) Premature junctional complexes (PJCs)
	Premature ventricular complexes (PVCs)
8	Premature Atrial Complexes (PACs)
	PACs are identified by: Early (premature) P waves
	 Positive (upright) P waves (in lead II) that differ in shape from sinus P waves
	 The early P wave may or may not be followed by a QRS complex
9 🔲	Premature Atrial Complexes (PACs)
10	Premature Atrial Complexes (PACs)
	 PACs associated with a wide QRS complex are called "aberrantly conducted" PACs, indicating conduction through the ventricles in abnormal
11	Premature Atrial Complexes (PACs)
	A "noncompensatory" (incomplete) pause often follows a PAC
	 Represents the delay during which the SA node resets its rhythm for the next beat
	A "compensatory" pause often follows premature ventricular complexes (PVCs)

12 Compensatory/Noncompensatory Pause

- To determine whether a pause following a premature complex is compensatory or noncompensatory:
 - Measure the distance between three normal beats
 - Compare that distance between three beats, one of which includes the premature complex
- 13 Compensatory/Noncompensatory Pause
- 14 Compensatory/Noncompensatory Pause
 - The pause is termed "noncompensatory" (incomplete) if the normal beat following the premature complex occurs <u>before</u> it was expected
 - When the distance is NOT the same
 - The pause is "compensatory" (complete) if the normal beat following the premature complex occurs when expected
 - When the distance is the same
- 15 Nonconducted PACs
 - A PAC may occur very prematurely and close to the T wave of the preceding beat
 - Only a P wave may be seen with no QRS after it (appearing as a pause)
 - This type of PAC is called a "nonconducted" or "blocked" PAC
 - P wave occurred too early (during depolarization of the ventricles) to be conducted
- 16 Nonconducted PACs
- 17 PACs Patterns
 - Pairs (coupled): two sequential PACs
 - · Runs or bursts
 - Three or more sequential PACs are called "paroxysmal atrial tachycardia" (PAT) or "paroxysmal supraventricular tachycardia" (PSVT)
 - Atrial bigeminy: every other beat is a PAC
 - Atrial trigeminy: every third beat is a PAC
 - Atrial quadrigeminy: every fourth beat is a PAC
- 18 PACs Causes
 - Emotional stressCongestive heart failure
 - Mvocardial ischemia or iniurv
 - Myocardial ischemia or injury
 Mental and physical fatigue
 - Atrial enlargement
 - Digitalis toxicity
 - Hypokalemia
 - Hypomagnesemia
 - Hyperthyroidism
 - Excessive intake of caffeine, tobacco, or alcohol
- 19 PACs Clinical Significance
 - In persons with healthy hearts, occasional PACs are not clinically significant
 - If PACs are frequent, the patient may complain of a "skip" or occasional "palpitations"
- 20 PACs Intervention
 - Occasional PACs usually do not require treatment
 - · Frequent PACs may initiate episodes of atrial fibrillation, atrial flutter, or PSVT
 - Frequent PACs are treated by correcting the underlying cause:
 - Stress reduction
 - Reduced consumption of caffeine-containing beverages
 - Treatment of congestive heart failure
 - Correction of electrolyte imbalance

Wandering Atrial Pacemaker · Multiformed atrial rhythm - Updated term for the rhythm formerly known as wandering atrial pacemaker · Size, shape, and direction of P waves vary Wandering Atrial Pacemaker - ECG Characteristics Wandering Atrial Pacemaker 23 Wandering Atrial Pacemaker - Causes • May be observed in normal, healthy hearts (particularly in athletes) and during sleep May also occur with some types of organic heart disease and with digitalis toxicity Wandering Atrial Pacemaker - Clinical Significance/Intervention • Usually produces no signs and symptoms unless associated with a bradycardic rate • If the rhythm occurs because of digitalis toxicity, the drug should be withheld Supraventricular Tachycardia (SVT) • The term supraventricular tachycardia (SVT) may be used in two ways: - All tachydysrhythmias that originate above the bifurcation of the bundle of His Sinus tachycardia Atrial tachycardia Atrial flutter Atrial fibrillation Junctional tachycardia - Dysrhythmias with a rapid ventricular rate (tachycardia) and a narrow-QRS complex but with an uncertain specific origin (atrial or 27 Paroxysmal Supraventricular Tachycardia (PSVT) • "Paroxysmal supraventricular tachycardia" is a term used to describe SVT that starts and ends suddenly Paroxysmal Supraventricular Tachycardia (PSVT) 28 Three primary types of PSVT: Atrial tachycardia Atrioventricular nodal reentrant tachycardia (AVNRT) - AV reentrant tachycardia (AVRT) Classification of SVT 29 • Supraventricular tachycardias can be classified into those that are AV nodal "passive" and those that are AV nodal "active" AV nodal passive SVT - AV node does not play a part in the maintenance of the tachycardia - Serves only to passively conduct the supraventricular rhythm into the ventricles 30

- **Atrial Tachycardia**
- "Atrial tachycardia" describes three or more sequential PACs occurring at a rate of more than 100/min
- Atrial tachycardia that starts or ends suddenly is called "paroxysmal atrial tachycardia" (PAT)
- **Atrial Tachycardia**
 - · Atrial tachycardia is a series of rapid beats from an atrial ectopic focus, often precipitated by a PAC
 - This rapid atrial rate overrides the SA node and becomes the pacemaker

32 🔲	Atrial Tachycardia – ECG Characteristics
33 🔲	Atrial Tachycardia
34	Preexcitation Syndrome
	 Rhythms that originate from above the ventricles but in which the impulse travels via a pathway other than the AV node and bundle of His
	- The supraventricular impulse excites the ventricles earlier than normal
35 🔲	Preexcitation Syndrome
	In patients with preexcitation syndrome, strands of myocardial tissue between the atria and ventricles persist as working myocardial tissue
	 Called an "accessory pathway"
	Bypass tract
	 When one end of an accessory pathway is attached to normal conductive tissue
36	Preexcitation Syndrome
(Three major forms of preexcitation syndrome Differentiated by their accessory pathways or bypass tracts Wolff-Parkinson-White (WPW) syndrome Lown-Ganong-Levine (LGL) syndrome Unnamed syndrome involving Mahaim fibers
37	Preexcitation Syndrome
	Wolff-Parkinson-White (WPW) syndrome
	 Accessory pathway is called the "Kent bundle"
	Connects the atria directly to the ventricles, completely bypassing the normal conduction system
	 Most common type of preexcitation syndrome
38	Wolff-Parkinson-White Syndrome – ECG Characteristics
39 🔲	Delta Wave
	Delta waves are produced with accessory pathways that insert directly into ventricular muscle
	 Delta wave is the initial slurred deflection at the beginning of the QRS complex
	 Results from initial activation of QRS by conduction over the accessory pathway
40	Wolff-Parkinson-White Syndrome
	• Lead V3

- Typical WPW pattern showing:
 Short PR interval
 Delta wave
 Wide QRS complex

 - Secondary ST and T wave changes

41 WPW - Incidence

- More common in males than in females
- Approximately two thirds of individuals with WPW have no associated heart disease
- Occurs in approximately 4 out of 100,000 people
- One of the most common causes of tachydysrhythmias in infants and children
- Symptoms associated with preexcitation often do not appear until young adulthood

42 🔲	WPW - Clinical Significance
	Individuals with preexcitation syndrome are predisposed to tachydysrhythmias
	 Loss of the protective blocking mechanism provided by the AV node
	 Accessory pathway provides a mechanism for reentry
43 🔲	WPW - Clinical Significance
	Signs and symptoms associated with rapid ventricular rates may include: Palpitations Anxiety Weakness Dizziness Chest pain Shortness of breath Shock
44	Atrial Flutter
** []	Atrial flutter is an ectopic atrial rhythm in which an irritable site depolarizes regularly at an extremely rapid rate
45 🔲	Atrial Flutter
	 The extremely rapid atrial rate results in waveforms that resemble the teeth of a saw, or a picket fence – "Flutter" waves Flutter waves are best observed in leads II, III, aVF, and V₁
46	Atrial Flutter
	The AV node protects the ventricles from the extremely fast atrial rates by blocking some impulses before they reach the ventricles
	 If the AV node blocks the impulses at a regular rate, the resulting ventricular rhythm will be regular
	 If the AV node blocks impulses at an irregular rate, the resulting ventricular rhythm will be irregular
47 🔲	Atrial Flutter – ECG Characteristics
48	Atrial Flutter
49 🔲	Atrial Flutter – Causes
	Atrial flutter is usually a paroxysmal rhythm precipitated by a PAC
	 May last for seconds to hours and occasionally lasts 24 hours or more
	Chronic atrial flutter is unusual
	- The rhythm usually reverts to sinus rhythm or atrial fibrillation, either spontaneously or with treatment
50	Atrial Flutter – Causes
	 May occur in conditions such as: Pulmonary embolism Chronic ventilatory failure Alcohol intoxication Ischemic heart disease Hypoxia Digitalis or quinidine toxicity Rarely occurs in patients without cardiac disease
51	Atrial Flutter – Clinical Significance

Severity of signs and symptoms vary depending on:
 Ventricular rate
 Duration of the dysrhythmia
 Patient's cardiovascular status

52 Atrial Flutter – Intervention

- Vagal maneuvers may help differentiate atrial flutter from other dysrhythmias
- If rapid ventricular rate, control ventricular response
- If serious signs and symptoms, synchronized cardioversion

Atrial Fibrillation

- . In atrial fibrillation, the atria are depolarized at a rate of 400 to 600 beats/min
- Cause the muscles of the atria to quiver (fibrillate)
- · Results in:
 - Ineffectual atrial contraction
 - Subsequent decrease in cardiac output
 - Loss of atrial kick

Atrial Fibrillation

- Because of the quivering of the atrial muscle, and because there is no uniform wave of depolarization in atrial fibrillation, there is no P
 - Instead, the baseline appears erratic (wavy)
 - · Wavy deflections are termed "fibrillatory" waves

Atrial Fibrillation (Afib) 55

- Atrial depolarization occurs very irregularly
 - Ventricular response (rhythm) is usually very irregular
 - · Described as "irregularly irregular"
- · "Controlled" atrial fibrillation
 - Ventricular rate is less than 100 beats/min
- "Uncontrolled" atrial fibrillation
 - Ventricular rate is more than 100 beats/min

Atrial Fibrillation - ECG Characteristics 56

Atrial Fibrillation

Atrial Fibrillation - Causes 58

- · Rheumatic heart disease
 - Coronary artery disease
 - Hypertension
 - Mitral or tricuspid valve disease
 - Congestive heart failure
 - Pericarditis
- · Pulmonary embolism
- Cardiomyopathy 2
 - Hypoxia
 - Drugs or intoxicants
 - Alcohol
 - Carbon monoxide
 - · Acute or chronic pulmonary disease
 - Enhanced vagal tone
 - Enhanced sympathetic tone
 - Hypokalemia
 - Hyperthyroidism

Atrial Fibrillation - Clinical Significance

- Patients experiencing atrial fibrillation may develop intra-atrial emboli
 - Atria are not contracting
 - Blood stagnates in atrial chambers
 - Predisposes the patient to systemic emboli, particularly stroke

Atrial Fibrillation - Clinical Significance

- Severity of signs and symptoms vary depending on:
 - Ventricular rate
 - Duration of the dysrhythmia
 - Patient's cardiovascular status

Atrial Fibrillation - Intervention

- In the stable patient with atrial fibrillation associated with a rapid ventricular rate, treatment is first directed toward controlling the In the stable patient with atrial in ventricular response.

 If cardiac function is normal:

 — Calcium channel blockers

 — Beta-blockers

 If cardiac function is impaired:

 — Digoxin

 — Amiodarone

62 Atrial Fibrillation – Intervention

• If the patient experiences serious signs and symptoms, synchronized cardioversion is recommended