

Palpitation

TUCOM

Dep. of Medicine

3rd year

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Palpitation

Learning objectives:

1. Define palpitation
2. Enumerate the common causes of palpitation
3. Clarify the clinical approach to patient with palpitation
4. Review the investigations of patient with palpitation
5. Summarize the normal ECG findings
6. Review the important ECG findings in patient with cardiac arrhythmias
7. Outline the treatment of patient with palpitation

Palpitation: is an unexpected awareness of the heart beating in the chest. It may be rapid, forceful or irregular, and described as thumping, pounding, fluttering, jumping, racing or skipping. The patient may be able to mimic the rhythm by tapping it out.

Causes: Common causes include:

1- Cardiac arrhythmias: Sinus tachycardia or arrhythmia, Premature atrial contractions (extrasystoles), Supraventricular tachycardia, Atrial fibrillation, Atrial flutter, Premature ventricular contractions (extrasystoles), Ventricular tachycardias. Bradyarrhythmias: severe sinus bradycardia, sinus pauses, second and third-degree atrioventricular block. Anomalies in the functioning and/or programming of pacemakers and ICDs.

- 2- **Structural heart diseases:** Mitral valve prolapse, Severe mitral regurgitation, Severe aortic regurgitation, Congenital heart diseases with significant shunt, Cardiomegaly and/or heart failure of various aetiologies, Hyperthrophic cardiomyopathy, Mechanical prosthetic valves.
- 3- **Psychosomatic disorders:** Anxiety, Panic attacks, Depression, Somatization disorders.
- 4- **Systemic causes:** Hyperthyroidism, Hypoglycaemia, Postmenopausal syndrome, Fever, Anaemia, Pregnancy, Hypovolaemia, Orthostatic hypotension, Pheochromocytoma, Arteriovenous fistula.
- 5- **Strenuous exercise**

6- Drugs: Bronchodilators as theophylline and beta agonists, Vasodilators, Decongestants, Anticholinergics, Hydralazine, Recent withdrawal of b-blockers, Weight reductions drugs.

7- Substance abuse: e.g., Cocaine, Caffeine, Nicotine, Amphetamines.

8- Alcohol

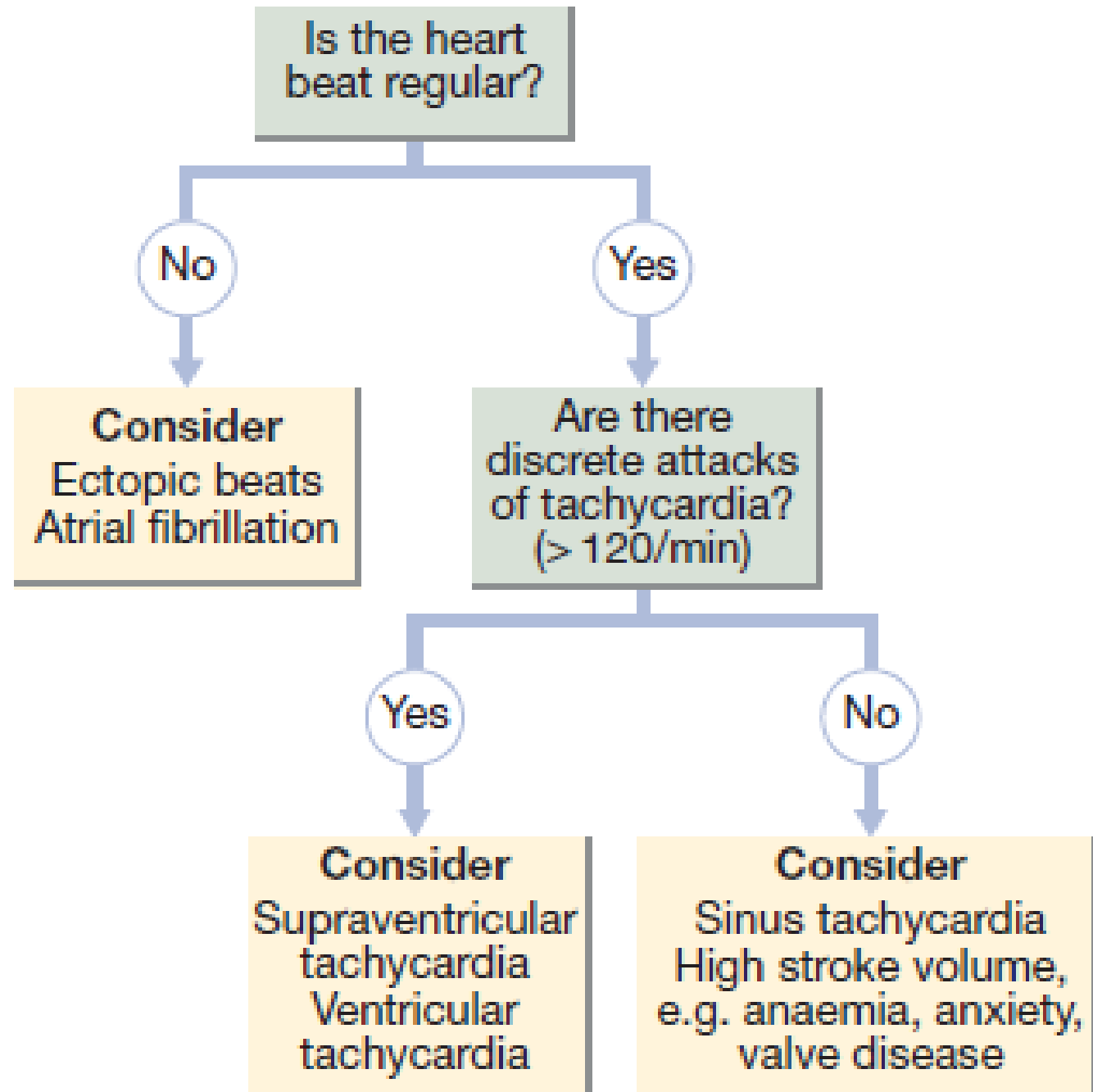
Initial clinical evaluation

1- History:

- Ectopic beats (extrasystoles): Some patients describe the experience as a 'flip' or a 'jolt' in the chest and others may describe 'missed beats', sometimes followed by a particularly strong heart beat. The ectopic beat produces a small stroke volume and an impalpable impulse due to incomplete left ventricular filling. The subsequent compensatory pause leads to ventricular overfilling and a forceful contraction with the next beat.
- Episodes of a pounding, forceful and relatively fast (90-120/min) heart beat are a common manifestation of anxiety or due to hyperdynamic circulation, such as anaemia, pregnancy and thyrotoxicosis, and can occur in some forms of valve disease such as aortic regurgitation.

- Discrete bouts of a very rapid and regular (over 120/min) heart beat are more likely to be due to a paroxysmal supraventricular or ventricular tachycardia.
- Supraventricular tachycardia produces sudden paroxysms of rapid, regular palpitation which can sometimes be terminated with breathing manoeuvres or carotid sinus pressure. Polyuria, mainly due to the release of atrial natriuretic peptide, is sometimes a feature.
- Ventricular tachycardia can produce similar symptoms but is more often associated with presyncope or syncope, and tends to affect patients with cardiomyopathy or previous myocardial infarction.
- In contrast, episodes of atrial fibrillation typically present with irregular and usually rapid palpitation.

**A simple
approach to
the diagnosis
of palpitation.**



2- Physical examination:

To determine if there are cardiac or other abnormalities present that might predispose the patient to palpitations.

- Cardiac examination may reveal murmurs, extra sounds, or cardiac enlargement. Mitral valve prolapse, which is commonly associated with palpitations, is suggested by a midsystolic click.
- The physician should look for evidence of hyperthyroidism (e.g., nervousness, heat intolerance, weight loss despite normal or increased appetite, sweating, palpitations and tremor)
- Drug use, or other serious illnesses.

How to evaluate palpitation

- Is the palpitation continuous or intermittent?
- Is the heart beat regular or irregular?
- What is the approximate heart rate?
- Do symptoms occur in discrete attacks? Is the onset abrupt? How do attacks terminate?
- Are there any associated symptoms? Chest pain, lightheadedness, polyuria (a feature of supraventricular tachycardia).
- Are there any precipitating factors, such as exercise or alcohol excess?
- Is there a history of structural heart disease, such as coronary artery disease or valvular heart disease?

Investigations:

1- Electrocardiography (ECG):

- May be able to confirm the diagnosis of arrhythmia at the time of recording ECG, like premature ventricular contraction, AF, SVT, VT.
- ECG may show features of previous myocardial infarction, left or right ventricular hypertrophy, atrial enlargement, atrioventricular block, short PR interval and delta waves (Wolff-Parkinson-White syndrome), or prolonged QT interval.

2- Exercise electrocardiography: can be used to make the diagnosis when exertion is known to induce the arrhythmia

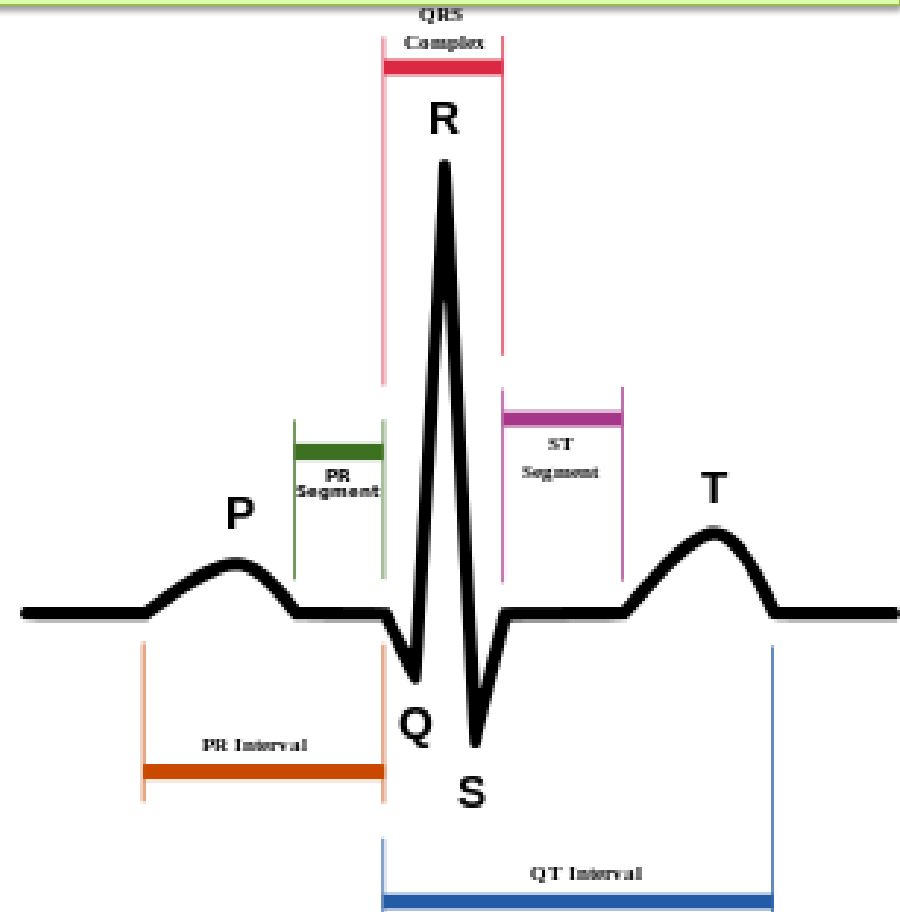
3- Continuous ECG monitoring:

- Holter monitor is a simple ECG monitoring device that is worn continuously to record data for 24 or 48 hours. The patient must records any symptoms that occur during the monitoring.
- Telephonic monitoring, through which the patient can transmit an electrocardiographic tracing during a sensed episode.
- Loop recordings (external or implantable), which can capture the electrocardiographic event for later review.
- Mobile cardiac outpatient telemetry.

ECG Basics

Characteristics of normal sinus rhythm:

- Regular rhythm at a rate of 60-100 bpm for an adult.
- Each QRS complex is preceded by a normal P wave (Smooth contour).
- Normal P wave axis: P waves should be upright in leads I and II, inverted in aVR.



ECG paper

Voltage (vertical line): 10

mm = 1 mV

Duration (horizontal line):

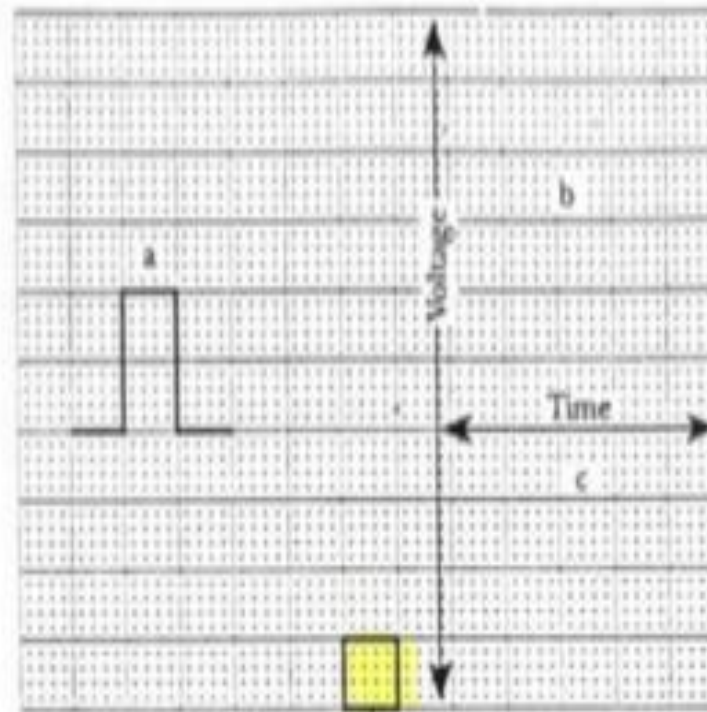
Each large (5 mm)

square = 0.2 s

Each small (1 mm)

square = 0.04 s

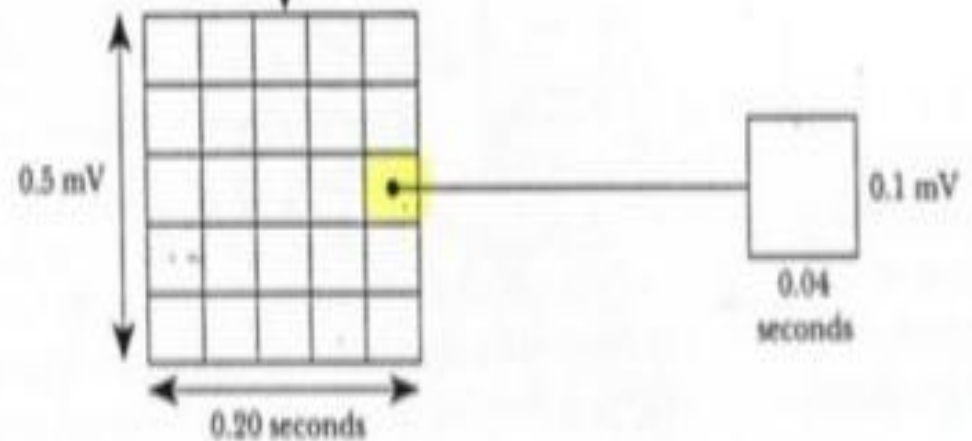
Paper speed: 25 mm per second



a Standardisation mark (1 mV)

b Vertical axis = voltage

c Horizontal axis = time in seconds



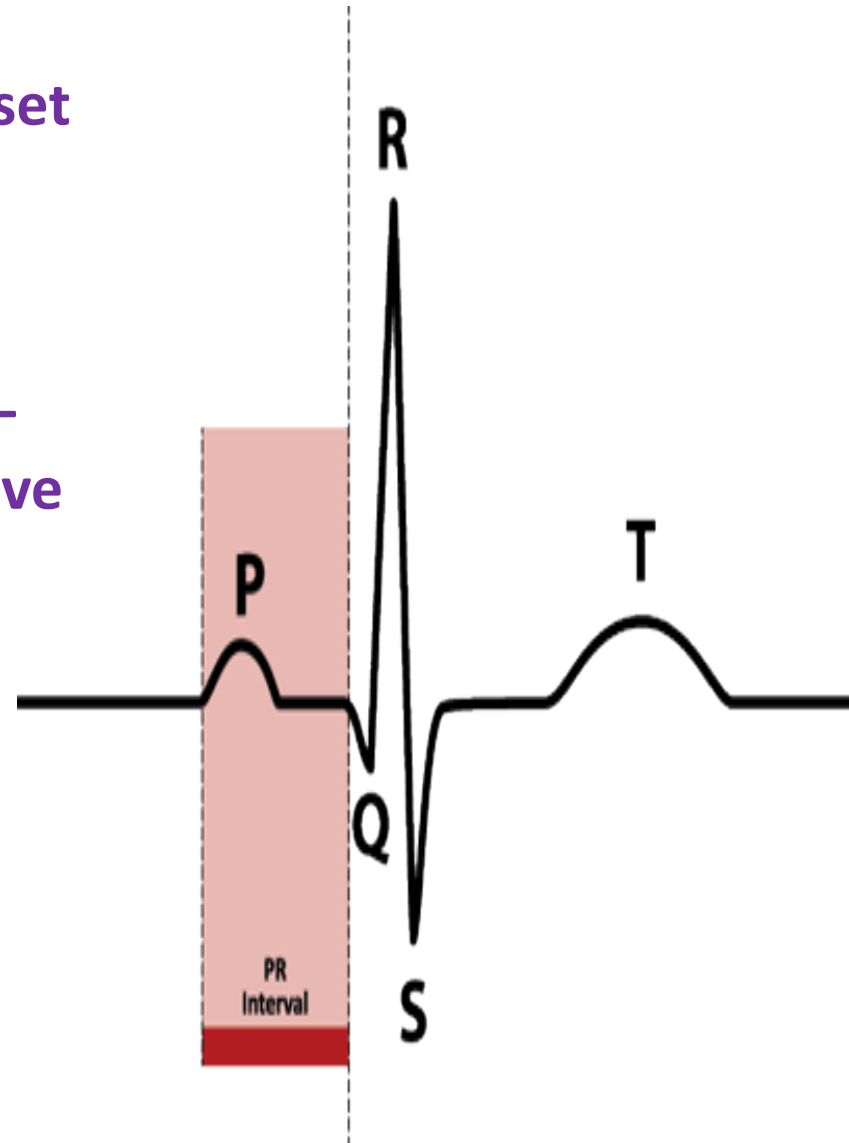
The P wave: is the first positive deflection on the ECG. It represents atrial depolarisation. Morphology: Smooth contour. P waves should be upright in leads I and II, inverted in aVR. Duration < 120 ms. Amplitude < 2.5 mm.

The PR interval: is the time from the onset of the P wave to the start of the QRS complex. It reflects conduction through the AV node.

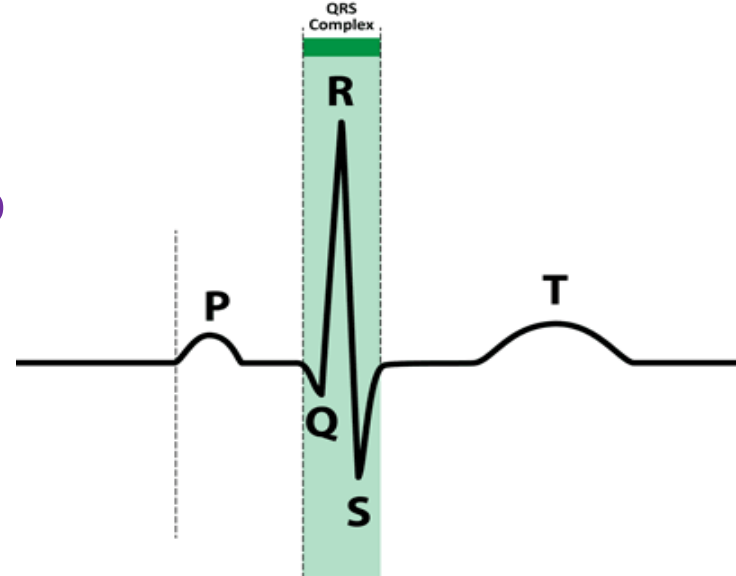
The normal PR interval is between 120 – 200 ms (0.12- 0.2 s) duration (three to five small squares).

If the PR interval is > 200 ms (> 0.2 s)= prolonged: indicate first degree heart block

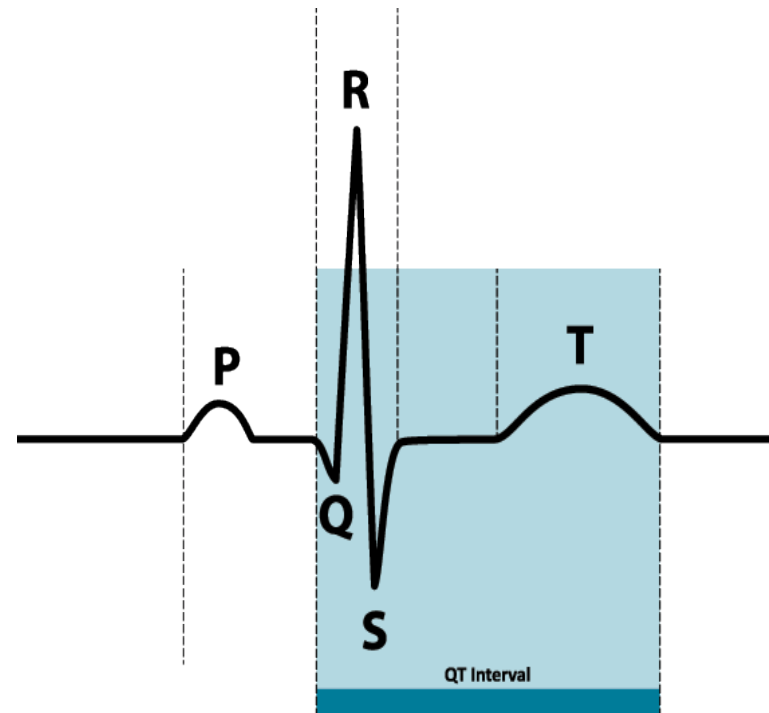
PR interval < 120 ms (< 0.12)= short: indicate WPW syndrome



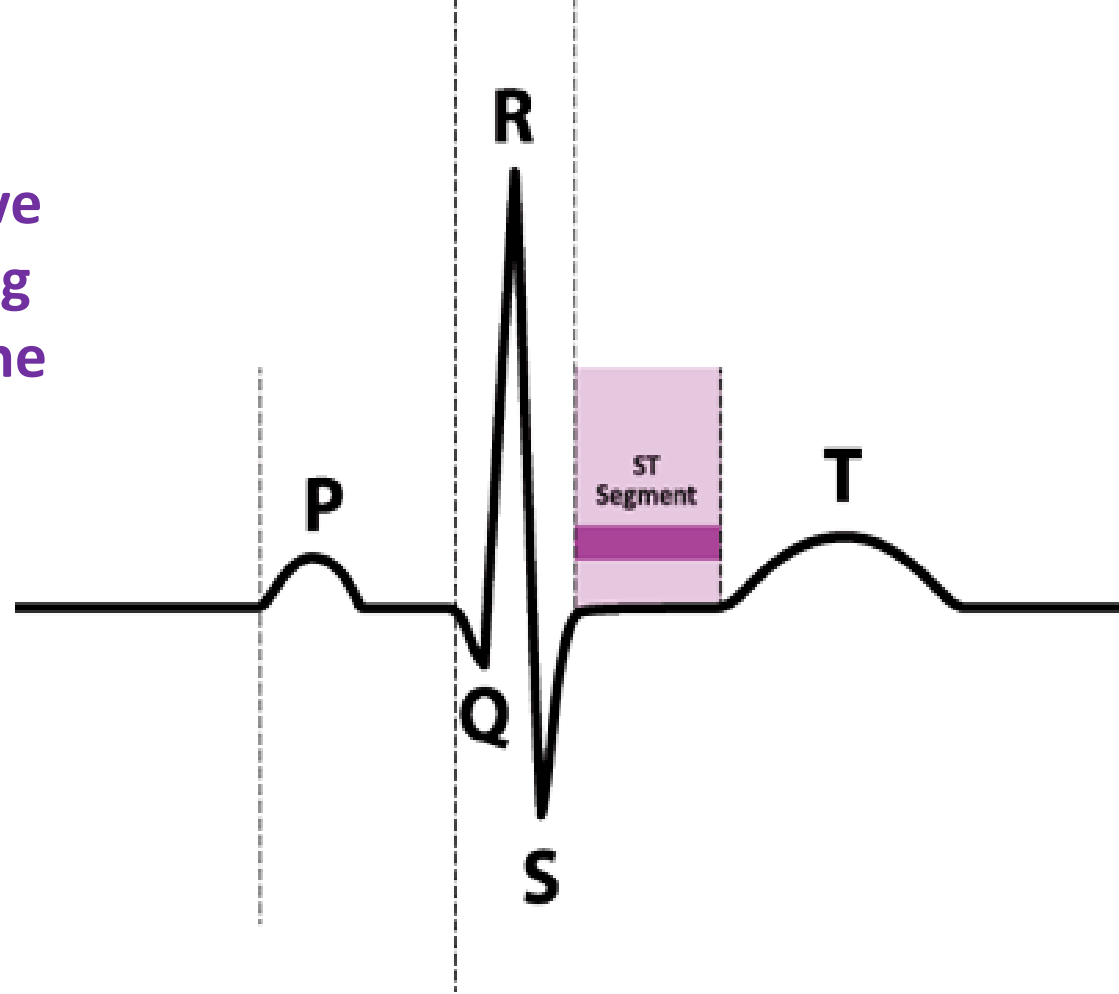
The QRS complex: indicates ventricular depolarization. The QRS interval is measured from the end of the PR interval to the end of the S wave. Normal QRS complex duration is 80-100 ms (0.08- 0.10 s) 2- 2.5 small squares. Narrow complexes= (QRS < 100 ms) and Broad or wide complexes= (QRS > 100 ms)



The QT interval: is the time from the start of the Q wave to the end of the T wave. It represents the time taken for ventricular depolarisation and repolarisation. Normal corrected QT interval duration= 350- 440 ms. QTc is prolonged if > 440 ms like long QT syndrome. QTc is short if < 350 ms Like hypocalcemia.



The ST segment: is the flat, isoelectric section of the ECG between the end of the S wave (the J point) and the beginning of the T wave. It represents the interval between ventricular depolarization and repolarization.



The T wave: is the positive deflection after each QRS complex. It represents ventricular repolarisation. Upright in all leads except aVR and V1. Amplitude < 5 mm in limb leads and < 15 mm in precordial leads.

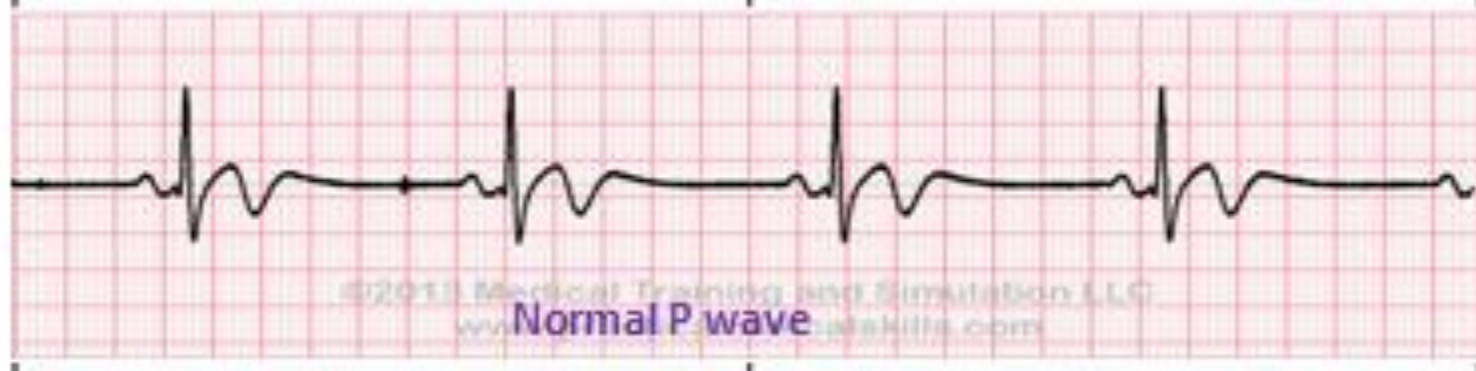
Normal Sinus Rhythm



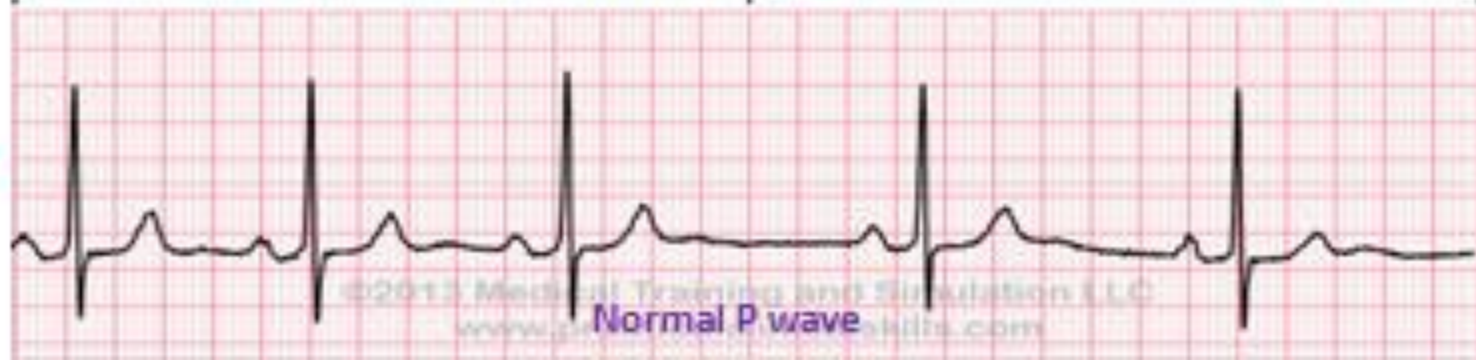
Sinus Tachycardia



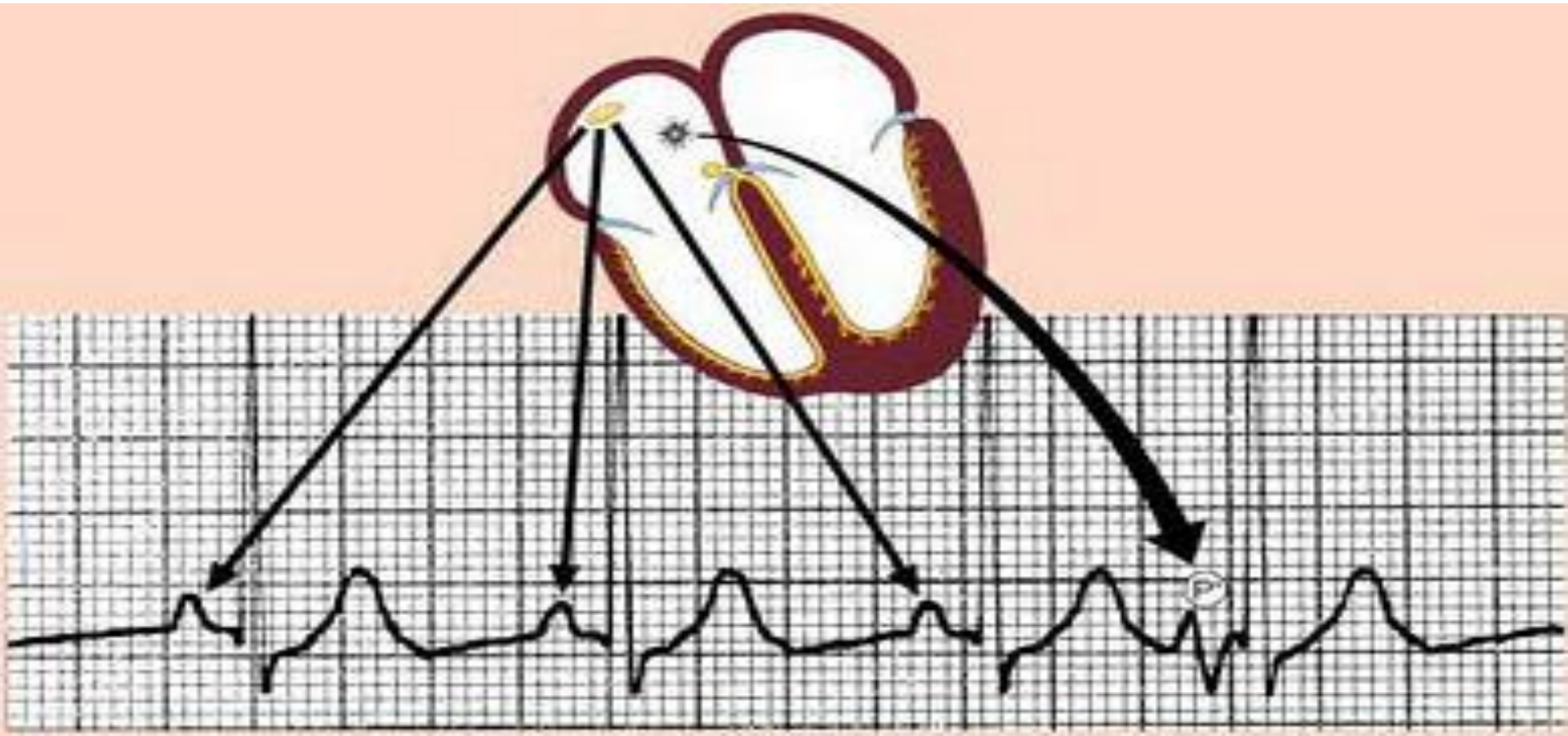
Sinus Bradycardia



Sinus Arrhythmia

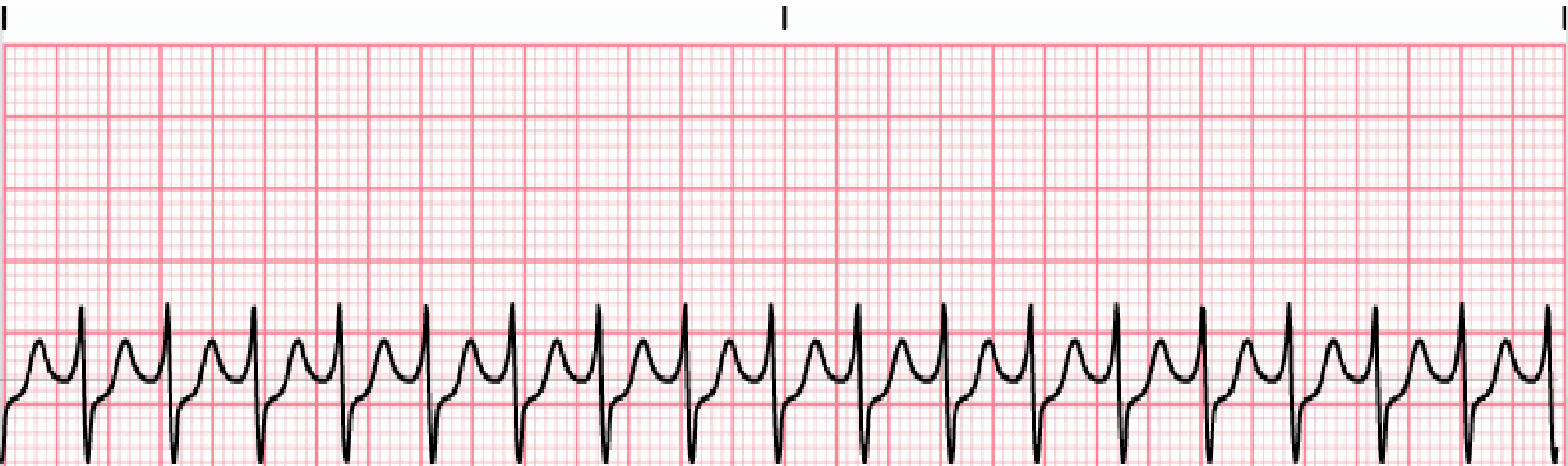


Premature atrial complex or ectopic (non-sinus) P wave is followed by a QRS complex. The ectopic P has a different morphology, inverted or may be hidden in the preceding T wave. inverted P wave. PAC arriving early in the cardiac cycle followed by post-extrasystolic pause.



Supraventricular tachycardia (SVT):

ECG Features: Regular tachycardia >150-280 bpm. P waves are absent, or present as inverted small waves inside the QRS complexes or T waves. QRS complexes usually narrow (< 110 ms).

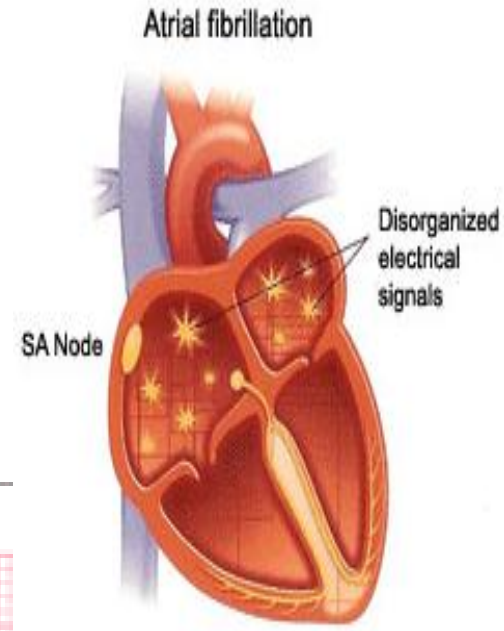


Supraventricular tachycardia

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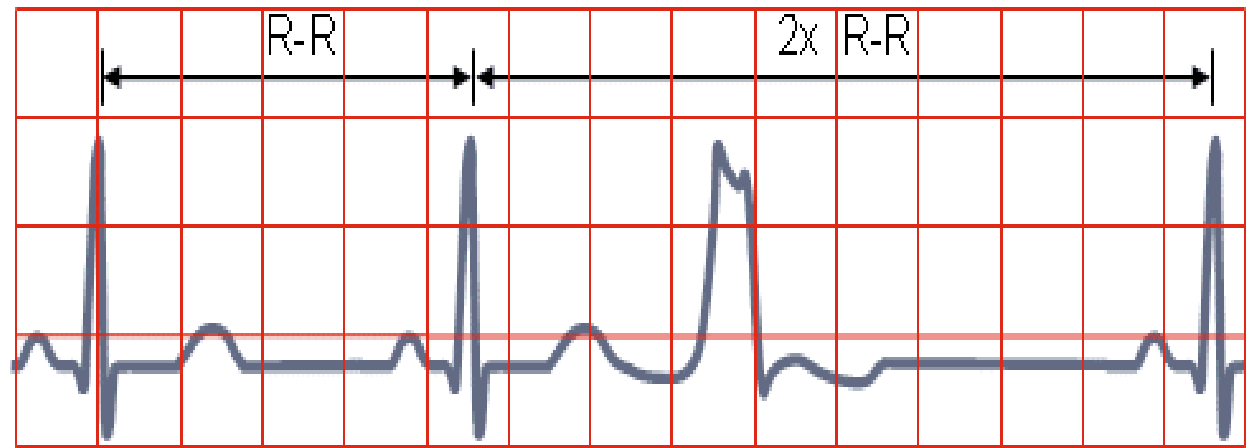
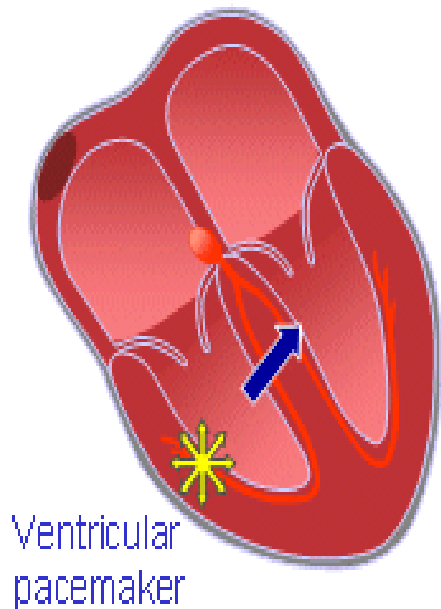
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Atrial fibrillation (AF) ECG Features: Irregularly irregular ectopic rhythm. No P waves. Absence of an isoelectric baseline, small fibrillatory waves may be present. Variable ventricular rate. Narrow QRS complexes.



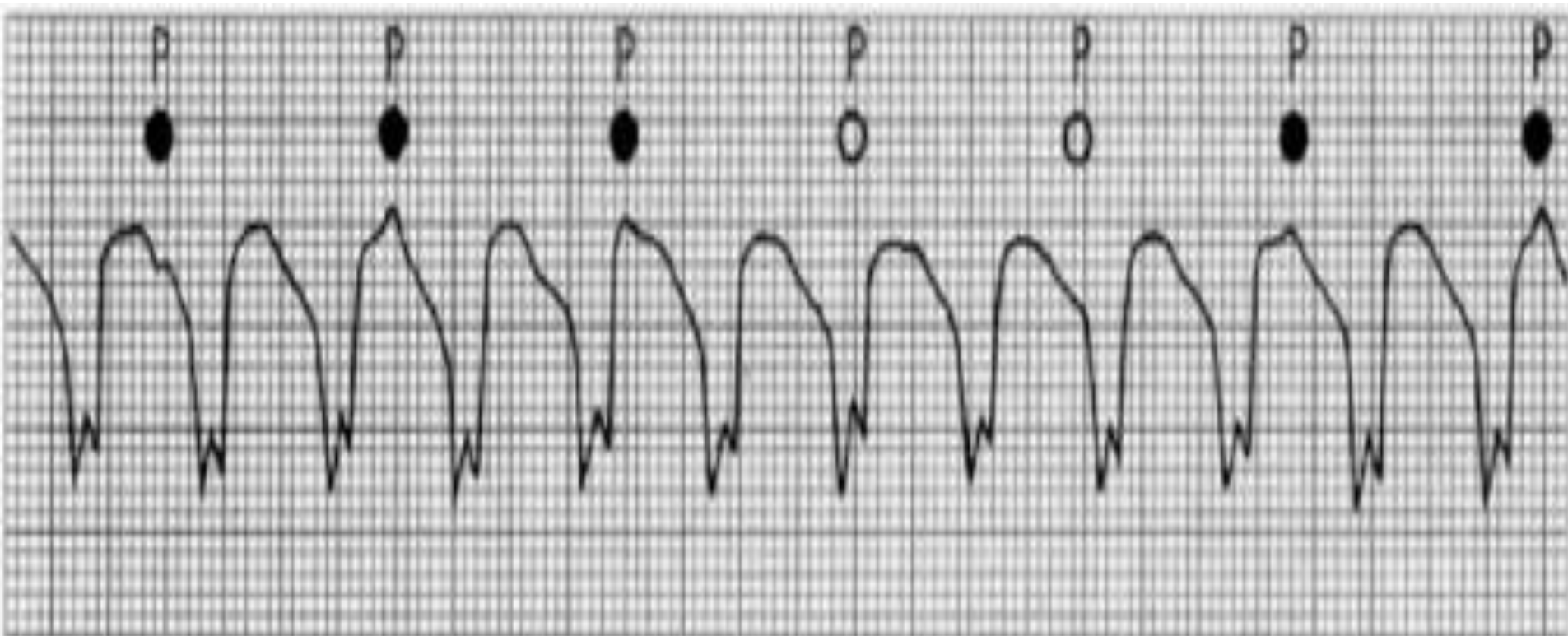
Premature ventricular complex (PVC): A premature beat arising from an ectopic focus within the ventricles.

ECG Features: Broad QRS complex (≥ 120 ms) with abnormal morphology (bizarre shape). Premature: i.e. occurs earlier than would be expected for the next sinus impulse. Usually followed by a compensatory pause. The ST segment and T wave are directed opposite to the main vector of the QRS complex



Ventricular tachycardia (VT) features:

1. History of myocardial infarction
2. Very broad QRS complexes (> 140 ms), regular tachycardia (> 100 bpm).
3. AV dissociation: independent atrial and ventricular activity. P and QRS complexes at different rates (pathognomonic).



Treatment:

- Most patients with palpitations do not have serious arrhythmias or underlying structural heart disease.
- Abstinence from alcohol, tobacco, or eliciting drugs. Alternative drug should be considered when possible.
- Psychiatric causes of palpitations may benefit from cognitive or pharmacotherapies.
- Atrial or ventricular premature contractions can be treated with beta-blocker therapy if sufficiently troubling to the patient.
- If a specific arrhythmia is found, the appropriate therapy may be antiarrhythmic drugs, ablation, or even an implantable defibrillator.
- Once serious causes for the symptom have been excluded, the patient should be reassured that the palpitations will not adversely affected prognosis.

Thanks