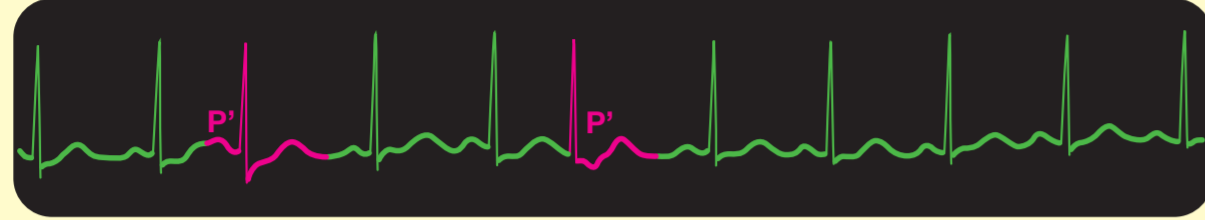
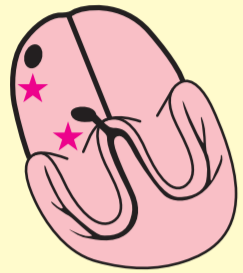


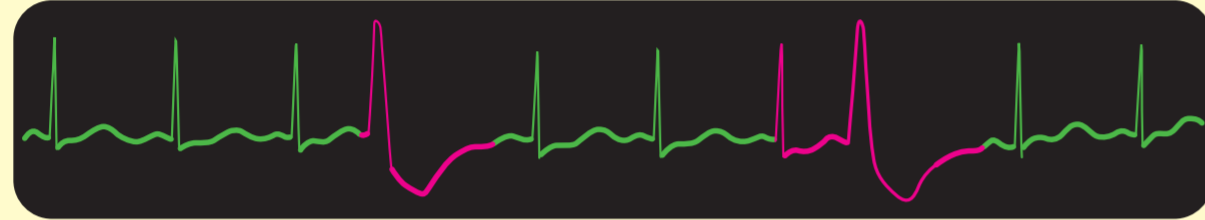
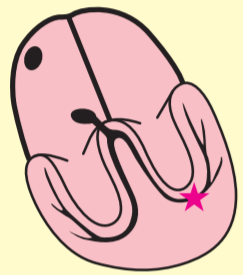
# Typical Arrhythmia Waveforms

## Premature Supraventricular Contractions (Premature Atrial Contractions (PAC))



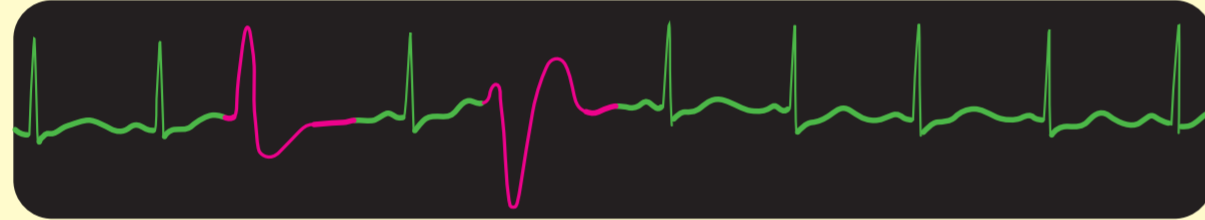
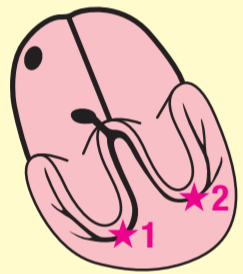
- Narrow QRS (excluding aberrant ventricular conduction)
- Ectopic focus higher than His-bundle
- Non-compensatory pause

## Premature Ventricular Contractions (PVC)



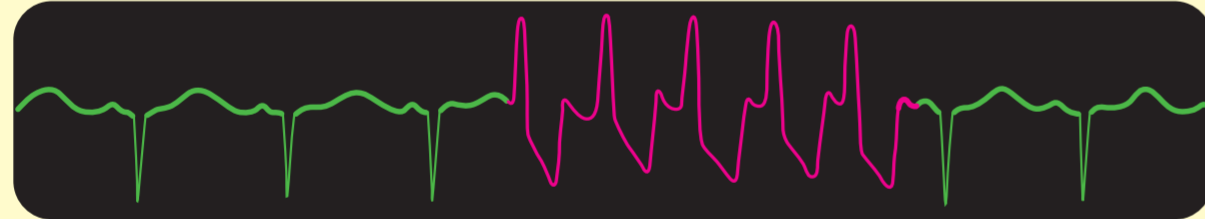
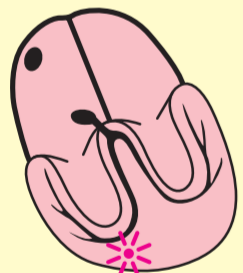
- Premature contractions
- Bizarre and wide QRS complexes
- Full compensatory pause
- Frequent PVCs are serious

## Multi-focal PVC



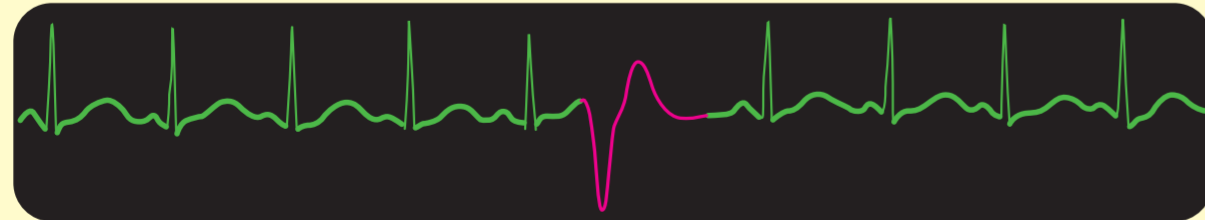
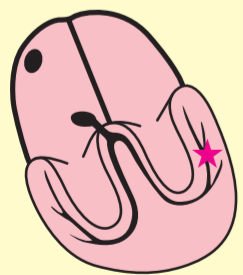
- Multi form PVCs
- Bizarre and wide QRS complexes
- May progress to ventricular fibrillation (VF)

## Short run PVC



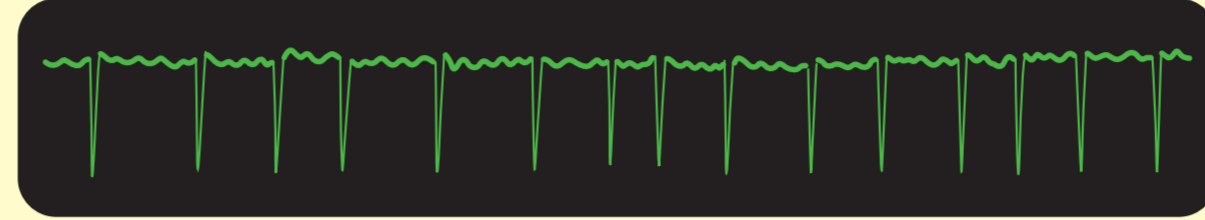
- Consecutive PVCs
- May progress to ventricular tachycardia or ventricular fibrillation

## R-on-T PVC



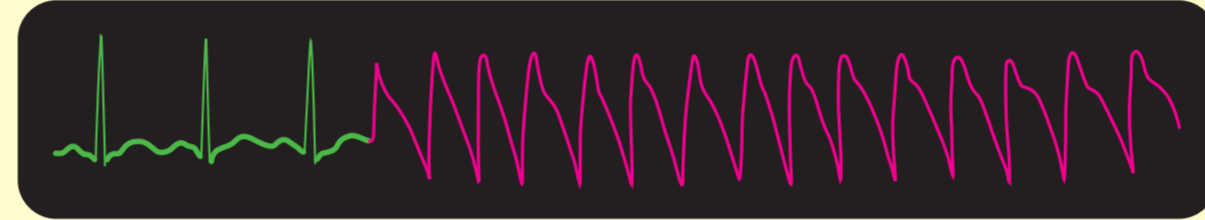
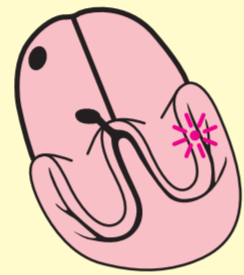
- PVC on summit of T-wave
- Bizarre and wide QRS complexes
- May progress to ventricular fibrillation

## Atrial Fibrillation (AF)



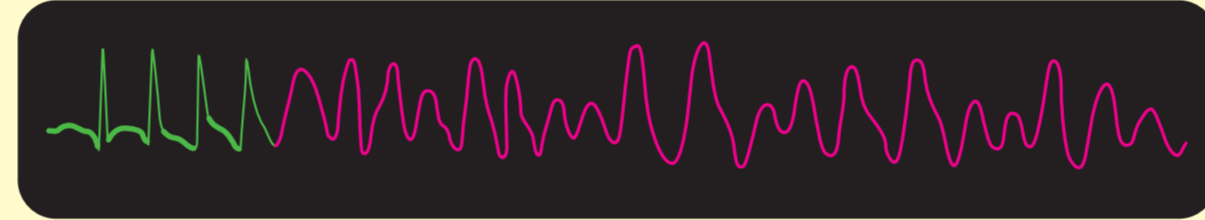
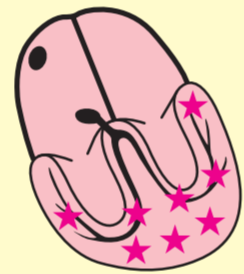
- Slight ripples on the baseline
- Irregular R-R intervals
- Inverted QRS complexes
- Non-compensatory pause

## Ventricular Tachycardia (VT)



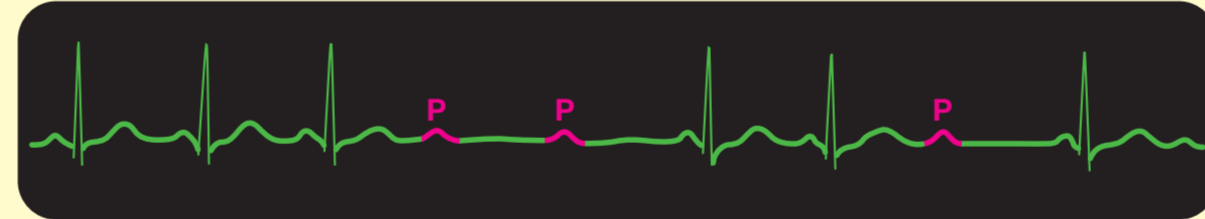
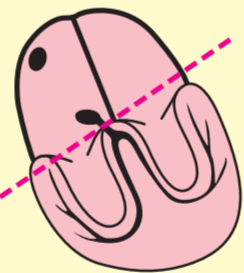
- Fast pulse rate greater than 100 bpm
- 3 or more irregular beats
- Needs emergency treatment and countershock
- May progress to ventricular fibrillation

## Ventricular Fibrillation (VF)



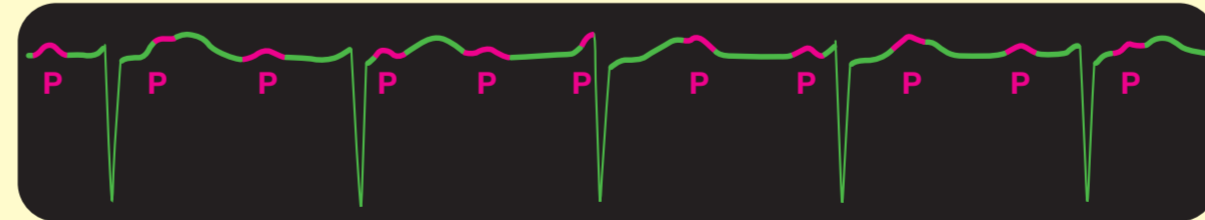
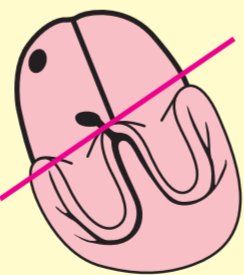
- No discernable P-waves, R-waves, P-R rhythm or QRS complexes
- Needs emergency treatment and countershock

## Second-degree atrioventricular (AV) block, Mobitz type II



- Sudden absence of QRS complexes (P-waves observed)
- May progress to cardiac arrest
- Possibility of Adams-Stokes syndrome
- Occasionally needs pacing

## Third-degree (complete) atrioventricular (AV) block

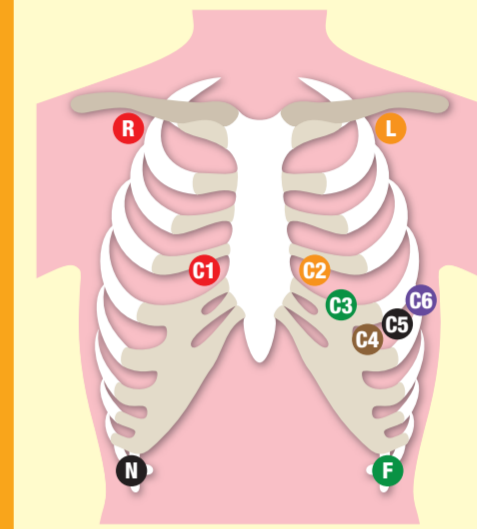


- Independent development of P-waves and QRS complexes
- Possibility of bradycardia
- Possibility of Adams-Stokes syndrome
- Needs pacing

## Diagnostic ECG Electrode Placement

### IEC

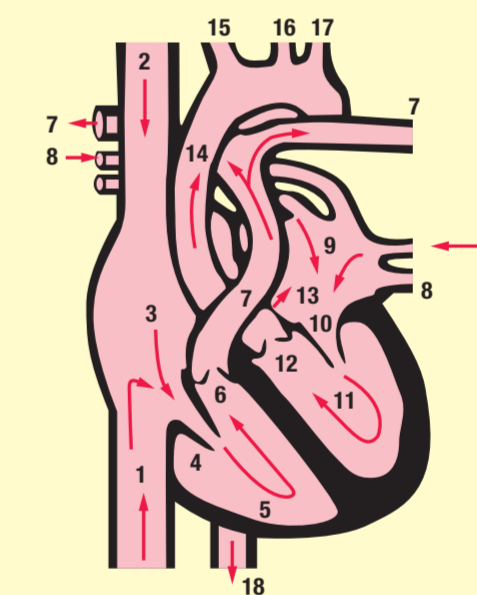
R and L electrodes should be placed just below the right and left clavicle.  
N and F electrodes should be placed on the lower edge of the rib cage, or at the level of the umbilicus at the mid-clavicular line.



### Lead Electrode Placement

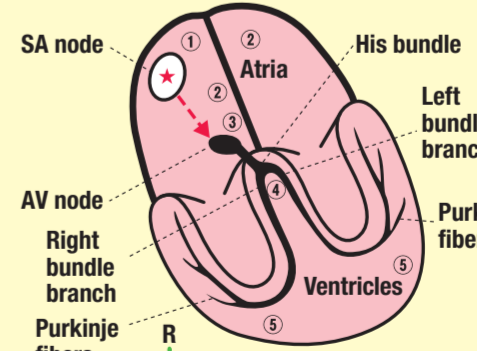
- C1** Fourth intercostal space at the right border of the sternum
- C2** Fourth intercostal space at the left border of the sternum
- C3** Midway between locations C2 and C4
- C4** At the mid-clavicular line in the fifth intercostal space
- C5** At the anterior axillary line on the same horizontal level as C4
- C6** At the mid-axillary line on the same horizontal level as C4 and C5

## Heart Anatomy

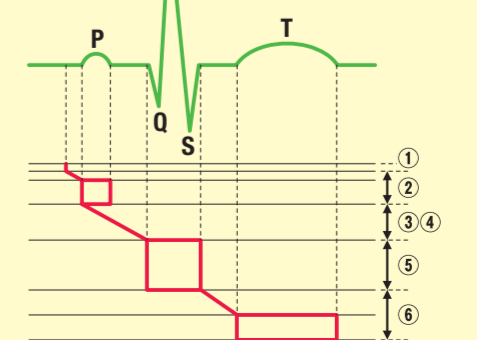


1. Inferior vena cava
2. Superior vena cava
3. Right atrium
4. Tricuspid valve
5. Right ventricle
6. Pulmonary valve
7. Pulmonary artery
8. Pulmonary vein
9. Left atrium
10. Mitral valve
11. Left ventricle
12. Aortic valve
13. Coronary artery
14. Aorta
15. Brachiocephalic artery
16. Left common carotid artery
17. Left subclavian artery
18. Descending aorta

## Cardiac Conduction System



- ① The sinoatrial (SA) node generates a wave of electrical excitation.
- ② The excitation travels through the internodal pathways to the atria and the atrial muscles contract. This is recorded as the P-wave.
- ③ The excitation travels to the atrioventricular (AV) node.
- ④ The excitation then travels through the bundle of His and down through the right and left bundle branches.
- ⑤ The excitation terminates at the Purkinje fibers in the ventricles and the ventricular muscles contract. This is the depolarization and is recorded as the QRS complex.
- ⑥ The ventricular muscles relax. This is the repolarization and is recorded as the T-wave.



Electrocardiographs

Defibrillators

Bedside monitors

Nihon Kohden products which detect arrhythmia



cardiofax



cardiolife



Vismo



Life Scope TR