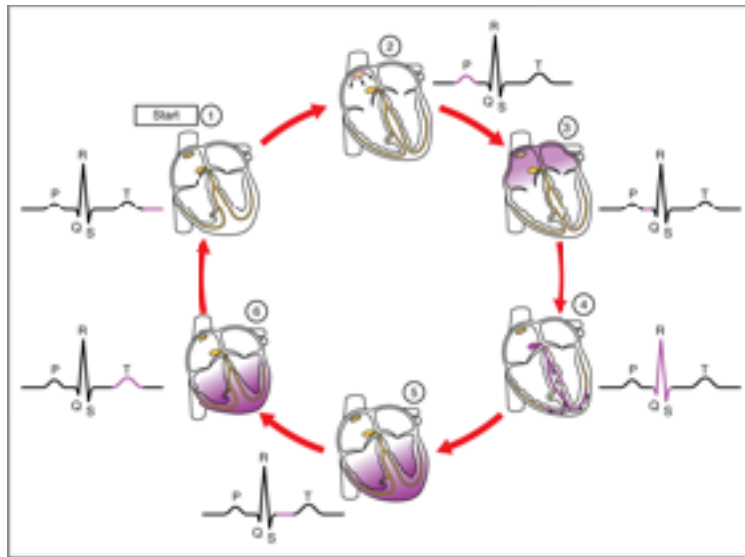


ECG Workshop

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1. The electrical cycle and mechanical cycle of the heart are intimately linked.



2. Precordial Lead Placement

- V1 and V2 are placed on the right and left side of sternum at the fourth intercostal space.
- Palpate the suprasternal notch
- Palpate down the manubrium until you feel a horizontal ridge (Angle of Louis)
- Articulates with the second rib. Below the second rib is the second intercostal space.
- V1 (right side) and V2 (left side) locations straddle the sternum at 4th intercostal space. No eye-balling.
- V4 is placed in the 5th intercostal space in the mid-clavicular line.
- V5 is placed in a direct line with V4 at the anterior axillary line (front of the armpit).
- V6 is placed in alignment with V4 & V5 at the mid-axillary line (middle of the armpit).
- V3 is placed between V2 and V4.

3. Patient Positioning

- Supine
- Comfortable
- Generally no pillows
- Barrier between the patient and the side rails (sheet, blanket, pillows or rail pad).

4. Types of Artifact — Electrical, Wandering Baseline, Muscle

- Turn off lights, mobile phones off, moving away from walls and equipment, verify AC filter is ON
- Lose sensors--better skin prep, may need to abrade skin
- Have patient take deep breath, let half out and hold while acquiring ECG
- Cables moving
- Have patient lie still and stop talking
- Verify baseline filter is ON
- Warm, relaxed patient (blanket)
- Arms at patient's side fully supported
- Pain control is necessary
- Move electrode to avoid culprit muscles

5. Lead Reversal

- Lead switches are a common mistake when ECGs are made and can lead to wrong diagnoses.
- Left-right arm reversals lead to a negative complex and negative p wave in lead I
- Arm-foot switches lead to very small signal in leads II or III
- Chest lead reversals lead to inappropriate R wave progression (increase-decrease-increase)
- Any right axis or small signal in an extremity lead should be reason enough to check lead positioning

6. ECG Analysis

- QRS complex tachycardic, bradycardic or normal
- Rhythm regular or irregular
- QRS complex wide or narrow
- ST Segments
- Symptoms & Vital Signs

Type of Rhythm	Differential Diagnoses
Narrow-complex regular rhythm	Sinus tachycardia Supraventricular tachycardia Atrial flutter
Narrow-complex irregular rhythm	Atrial fibrillation Atrial flutter with variable block Multifocal atrial tachycardia
Wide-complex Regular Rhythm	Ventricular tachycardia Sinus tachycardia with aberrant conduction SVT with aberrant conduction Atrial flutter with aberrant conduction
Wide-complex Irregular Rhythm	Atrial fibrillation with aberrant conduction (for example bundle branch block) Atrial flutter with variable block and aberrant conduction Multifocal atrial tachycardia with aberrant conduction Atrial fibrillation with WPW Polymorphic ventricular tachycardia / Torsades de Pointes
Wide QRS	Hypothermia Hyperkalaemia WPW Aberrant intraventricular conduction (for example bundle branch block) Ventricular ectopy Paced beats Drugs, particularly those with sodium-channel blocking effects
Prominent T Wave	Acute myocardial ischemia (i.e. hyperacute STEMI) Hyperkalaemia Acute pericarditis LVH Benign early repolarization Bundle branch block (LBBB / RBBB) Preexcitation syndromes
ST Segment Elevatoin	Acute myocardial infarction Coronary vasospasm (Prinzmetal's angina) Pericarditis and myocarditis Benign early repolarisation Left bundle branch block Left ventricular hypertrophy Ventricular aneurysm Brugada syndrome Ventricular paced rhythm Raised intracranial pressure