A Practical Guide To ECGs
Objectives

- What is an ECG
- Indications
- Patient Preparation
- Lead Placement
- Consequences of getting it wrong
- ECG - PQRST
What is an ECG

▪ An ECG
  ▪ Represent the heart's electrical activity recorded from electrodes on the body surface.
  ▪ Records changes in magnitude and direction of the electrical activity
  ▪ Detects electrical current generated by depolarisation and repolarisation of the atria and ventricles
Indications

- Chest pain / discomfort – atypical presentations / pressure
- SOB – be mindful of new exertional dyspnoea
- Light-headedness
- Palpitations — SCD – arrhythmias, prolong QT, HCM, Brugada
- Syncope / near syncope
- Hypertension
- Murmurs
- Upper abdominal pain
- Any suspected drug overdose / metabolic derangement
Indications

- Pain/discomfort often associated with cardiac ischemia are
  - Jaw
  - Neck
  - Shoulder
  - Left arm
  - Back pain
Indications

- Patients with signs & symptoms of ACS
  - SOB
- Diaphoresis & Dizziness
- Nausea & vomiting
- Feeling of impending doom
## Patient Preparation

<table>
<thead>
<tr>
<th>Principle</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain procedure to patient</td>
<td>Allay anxiety, ensures concurrence &amp; relaxation</td>
</tr>
<tr>
<td>Place patient in a supine or semi – Fowler’s position with arms on the side, relaxing the shoulders &amp; uncrossing the legs</td>
<td>Minimises artefact from muscle tremor</td>
</tr>
</tbody>
</table>
## Patient Preparation

<table>
<thead>
<tr>
<th>Principle</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skin preparation:</strong></td>
<td>Maximum adhesion of the electrodes reduces potential interference on the ECG tracing</td>
</tr>
<tr>
<td>• Clean and dry if moist /diaphoretic</td>
<td></td>
</tr>
<tr>
<td>• Shave chest hair if necessary</td>
<td></td>
</tr>
<tr>
<td>• Rub alcohol prep pad to remove oils</td>
<td></td>
</tr>
<tr>
<td>• Exfoliation may be required</td>
<td></td>
</tr>
<tr>
<td><strong>Electrode Application:</strong></td>
<td>Maximises adhesion &amp; minimises artefact</td>
</tr>
<tr>
<td>• Electrode gel must be moist</td>
<td></td>
</tr>
<tr>
<td>• Do not place electrodes where there is a lot of muscle movement</td>
<td></td>
</tr>
</tbody>
</table>
Lead Placement
Lead Placement
ECG faxed to AHG

- All ECGs must be correctly labelled with patient’s identification and relevant clinical details especially:
  - Pt’s name & surname
  - DOB
  - Date & time of recording
  - Name of referrer
  - Name of institution
  - Reason for ECG (Indication)
Consequences of getting it wrong

- Errors in lead placement can create:
  - Artefacts,
  - Mimic pathologies,
  - Hinder proper ECG interpretation

- Improper positioning of praecordial leads may result in a pseudo infarction pattern

- Unstable baseline is due to artefact
Consequences of getting it wrong

- Can alter the ECG appearance dramatically resulting in:
  - Unnecessary investigations
  - Admissions to hospital
  - Treatment

- Lead misplacement can result
  - Harm to the patient if essential treatment is withheld
  - Incorrect treatment is delivered solely on the basis of ECG findings
Approx. 20% of ECGs faxed to AHG are difficult to interpret
Poor Quality ECG faxed to AHG for Interpretation
AVR is positive indicating crossed limb leads

AVR should be predominantly negative
Maximum Diagnostic Value

▪ ECGs must be recorded correctly paying attention to:
  ▪ Patient preparation
  ▪ Electrode positioning

▪ It is a diagnostic tool that is used in conjunction with:
  ▪ Patient’s history
  ▪ Observations
  ▪ Appearance

Remember ! The patient is the gold standard not the recording.
Normal Values (SR)
- Normal heart rate: > 60 beats per min, < 100 beats per min
- PR interval = 0.12 - 0.20 seconds
- QRS complex = 0.08 - 0.12 seconds
- ST interval = rate related
- QT interval = rate related
Every 3 seconds (15 large boxes) is marked by a vertical line.
In Summary

- We discussed
- What is an ECG
- Indications
- Patient Preparation
- Lead Placement
- Consequences of getting it wrong
- ECG - PQRST
References

Questions

A Big Thank You!