ECG's in Primary Health

Andrew Watson
Nurse Educator - ADU, NSH
August, 2017

Objectives

- Understand when to take an ECG
- Articulate correct placement of leads
- Understand the importance of lead placement
- Capturing a clear ECG

SCENARIO

- Ray is a 56 year old who lives and works on Waiheke Island. He works as a Oenologist, and enjoys the subtle art of ensuring he improves on his craft.

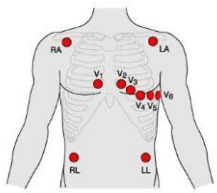

- Ray presents to your clinic at 1600hrs, claiming he doesn't feel well. He is clutching his chest.
  What assessments will you do? Talk with your neighbour

What did you come up with?

- Vitals - including bilateral BP
- Visual assessment
  - Skin colour
  - Diaphoresis
  - Position
  - How does he appear walking in?
- Touch
  - Warmth
  - Pulse - quality, regularity,
    - Is it thread, bounding, ??
- Pain assessment
  - COLDSPA, PQRST, OLDCART, etc.
- Risk factors
  - Smoking, age, activity level, stress levels, BP, cholesterol, diet etc

Taking an ECG

- Where do leads get placed?

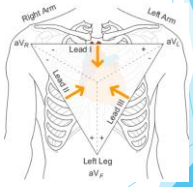


Why position is important

Ensures consistency of ECG's

Guarantees key parts of the heart are viewed

Missed MI's.



What might impact on ECG clarity or accuracy?

- Time for another discussion
- 2 minutes

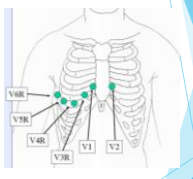
ECG Considerations

- Position of leads
- Interference from electrical devices
- Tremors / muscle twitching
- Diaphoresis
- Hairy chests
- Breasts
- Limb leads away from bony prominences

Right sided ECG

If Right sided MI is suspected

- Bradycardia
- Hypotension
- Gray
- Diaphoresis
- Inferior infarct on standard 12-lead

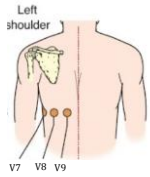


Posterior ECG

For suspected Posterior infarct

Continues 5th intercostal space

V7 - Posterior axilla
V8 - Mid scapula
V9 - near the spine



What to look at when you have taken the ECG

- Check for baseline wander
  - Could lead to difficulty identifying MI/ACS

- Check the direction of AVR -
  - It is normally inverted
  - Check lead positions.

Key Points

- Ensure correct lead placement
  - Trim hairy chests
  - V leads over the breast, in a straight line
  - Limb leads as far out on the limbs as possible
  - Avoid bony prominences
- Remove interference
  - Unplug electric beds
  - Remove cell phones
  - Lie the patient as flat as possible

ECG's in Primary Health

Andrew Watson
Nurse Educator - ADU, NSH
August, 2017

Objectives

- Interpreting an ECG
- What to be aware of - **Red Flags**
- What actions you should take

SCENARIO

- Ray is a 56 year old who lives and works on Waiheke Island. He works as a Oenologist, and enjoys the subtle art of ensuring he improves on his craft.


- Ray presents to your clinic at 1600hrs, claiming he doesn't feel well. He is clutching his chest.
  What assessments will you do? Talk with your neighbour

What did you come up with?

- ECG
- Vitals - including bilateral BP
- Visual assessment
  - Skin colour
  - Diaphoresis
  - Position
  - How does he appear walking in?
- Touch
  - Warmth
  - Pulse - quality, regularity,
    - Is it thread, bounding, ??
- Pain assessment
  - COLDSPA, PQRST, OLDCART, etc.
- Risk factors
  - Smoking, age, activity level, stress levels, BP, cholesterol, diet etc

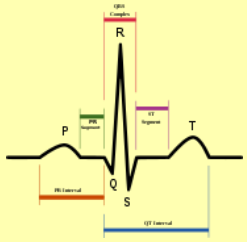
ECG Interpretation

- What do we look for?
- How do we interpret it?

Aspects of the ECG

- Start with the Rhythm Strip!
- P - wave - SA Node firing
- PR Interval - signal is delayed at AV Node
- QRS Complex - movement of electrical activity down Bundle branches and into Purkinje fibres 
- ST Segment - the section between depolarization and repolarization
- T-wave - repolarization- where the ventricles relax and refill 

Bringing it together….



- PR Interval
- QRS Complex
- ST Segment

Aspects of the ECG

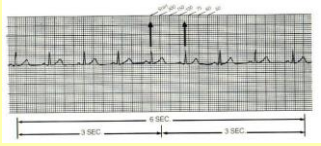
- Determine:

Rhythm (sinus, atrial, junctional, ventricular, regular, irregular)

Rate (Brady, Normal, Tachy)

Anything immediately or potentially life-threatening in Rhythm
Lethal arrhythmias?
Multi ectopics?

Determining rate



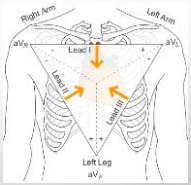
- Find a specific R wave that falls on a heavy black line
- Count off 300, 150, 100, 75, 60, 43, 35, 30, 20
- Where the next R wave falls, determine the heart rate
- **3 second strip, count R wave and multiply by 20**
- **6 second strip, count R wave and multiply be 10**

ASPECTS OF THE ECG

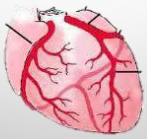
- MOVING TO THE LEADS
  - START WITH THE CHEST LEADS (CORDIAL LEADS, V LEADS)
- V1-V4
  - REPRESENT ANTERIOR ASPECT
    - LEFT ANTERIOR DESCENDING ARTERY
- V5 & V6
  - REPRESENT LATERAL ASPECT
    - CIRCUMFLEX ARTERY

ASPECTS OF THE ECG

- NOW THE LIMB LEADS
- I, II AND III
- AVR, AVL, AVF – AUGMENTED VIEWS
- LATERAL LEADS
  - LEAD I AND AVL
- INFERIOR LEADS
  - LEAD II, LEAD III AND AVF
- AVR
  - COUNTS FOR 7/8THS OF VERY LITTLE ☹



ARTERIES OF THE HEART



The families of leads

I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral

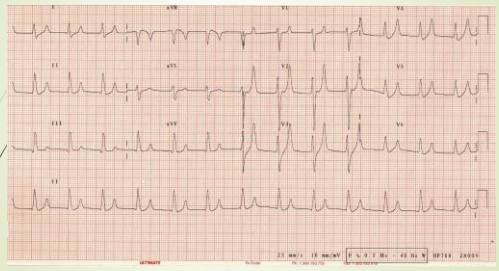
What are we looking for?

- ST Segment Changes
- ST Elevation indicates MI (STEMI)
  - >1mm in limb leads
  - >2mm in chest leads
  - In 2 or more contiguous leads
- ST Depression (reciprocal depression or stand alone)
- T-wave inversion

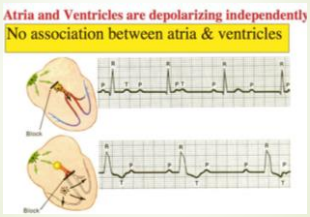
RED FLAGS

- AVR is positive:
  - Check lead placements – AVR should always appear inverted
- Widespread ST Elevation
  - Could be an indication of pericarditis, myocarditis or endocarditis
- Peaked T-waves
  - Indication of Hyperkalaemia and will need URGENT correction
- Q-wave
  - Indication of old injury
- Heart Blocks
  - What do you do?

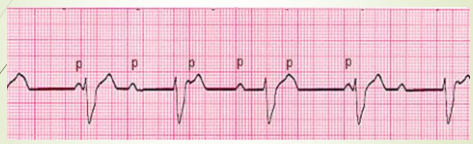
Peaked T – waves



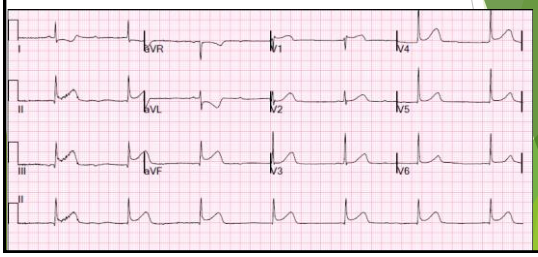
3rd Degree Heart Block



3rd Degree Heart Block cont'd…



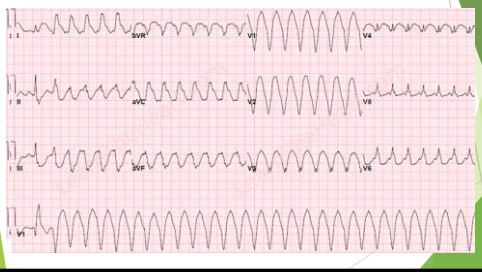
Now, lets get back to Ray – who's ECG is below



What actions would you take?

- Discuss with a colleague

How would you interpret this ECG?



Key Points

- Start with rhythm strip analysis
  - Rule out life-threatening arrhythmias first
- Check V leads then limb leads
- Check for Red Flags
  - ST elevation - Emergency
  - Complete Heart Block / 3rd degree - Emergency
- VT / VF
  - Where's your defibrillator?