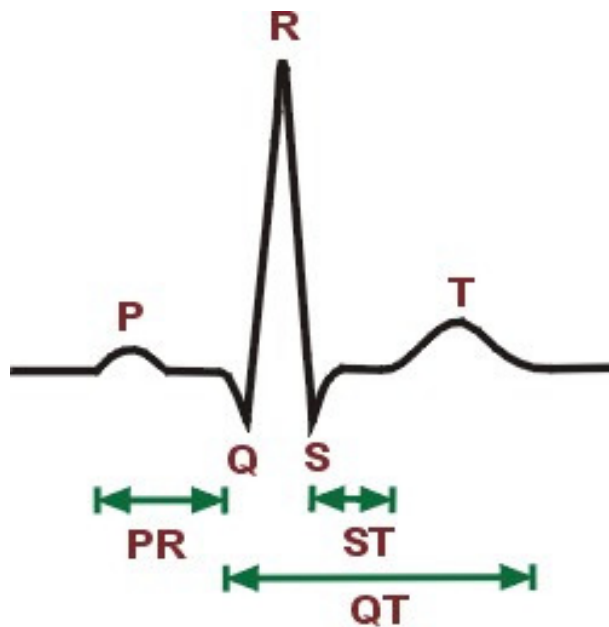


**SAMSONPLAB ACADEMY
LIMITED: TEL. 07940433068
ECG with Dr. SAMSON**

NORMAL QRS COMPLEXES:



ECG LEADS

- **Limb Leads**

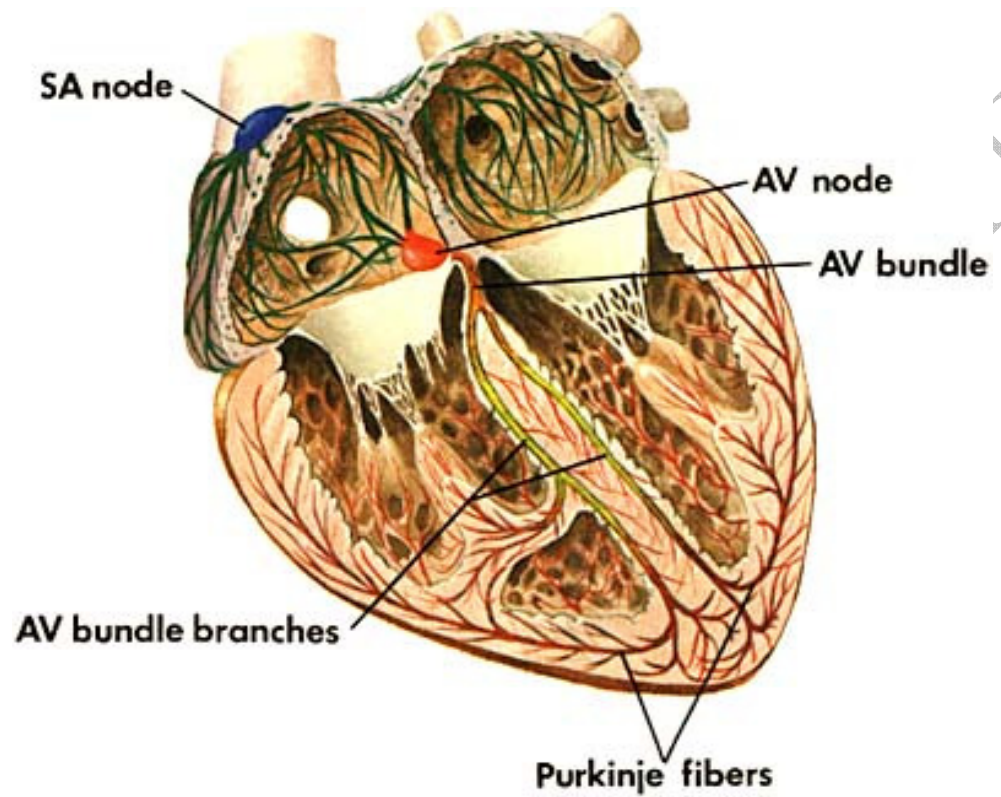
- I
- II
- III
- AVR
- AVL
- AVF

- **Chest Leads**

- V₁
- V₂
- V₃
- V₄
- V₅
- V₆

1. RHYTHM.

If similar P-wave before each QRS complex and regular = normal sinus rhythm



Automaticity Foci

• <u>Level</u>	<u>Rate</u>
– Atria	60-80/min
– AV Junction	40-60
– Ventricles	20-40

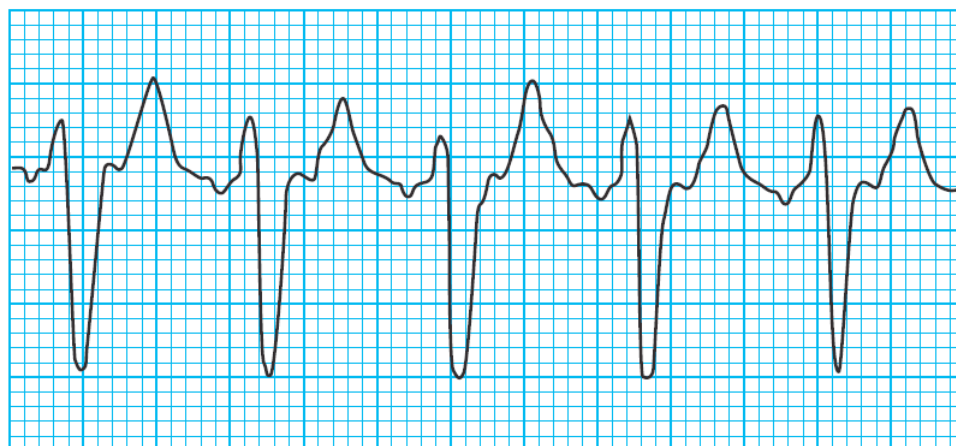
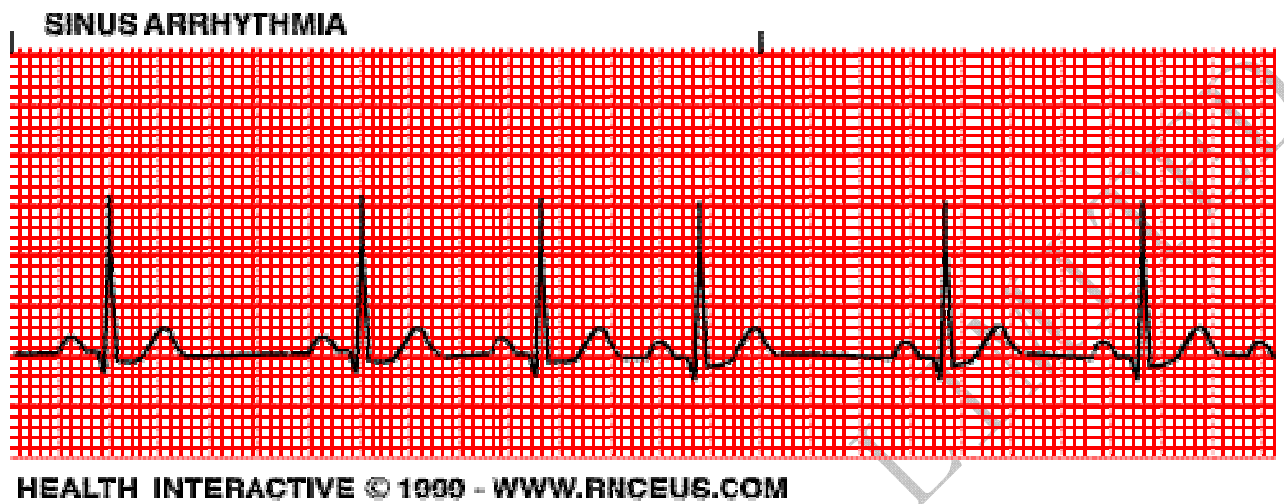


If sinus rhythm & irregular :

i. Extra systole

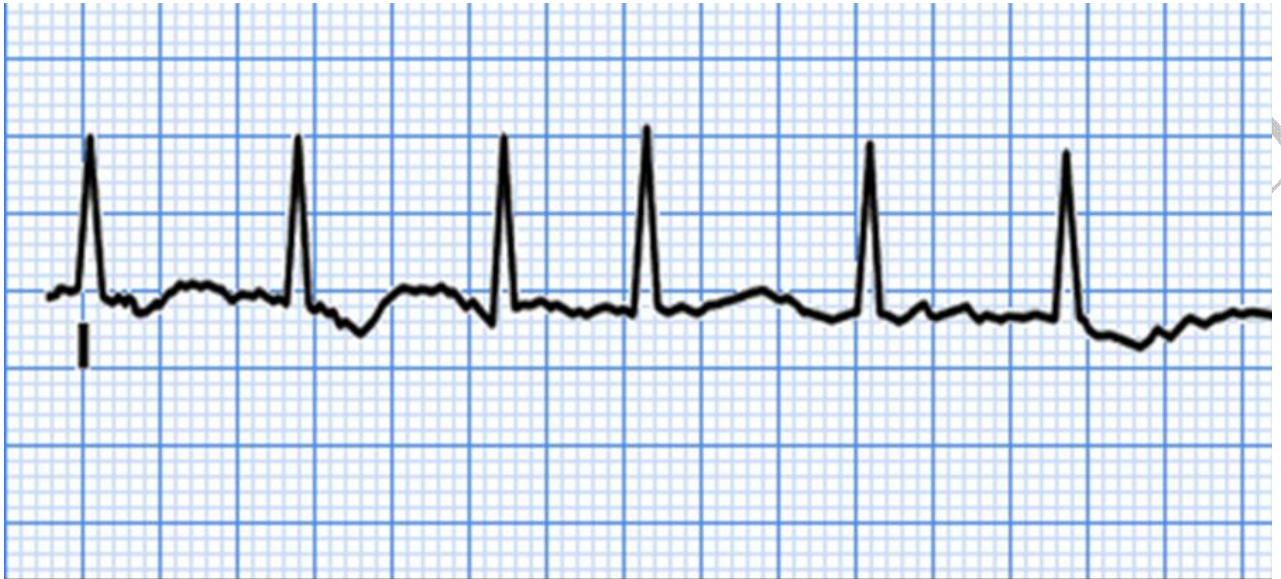


ii. Sinus arrhythmia



Atrial tachycardia with 2:1 block (note the inverted P waves)

- If no P-wave
 - i. Atrial Fibrillation (AF)



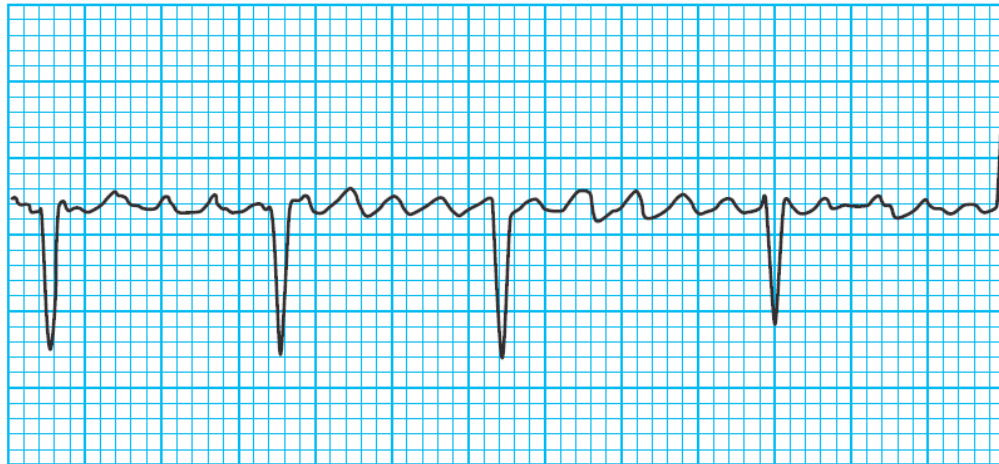
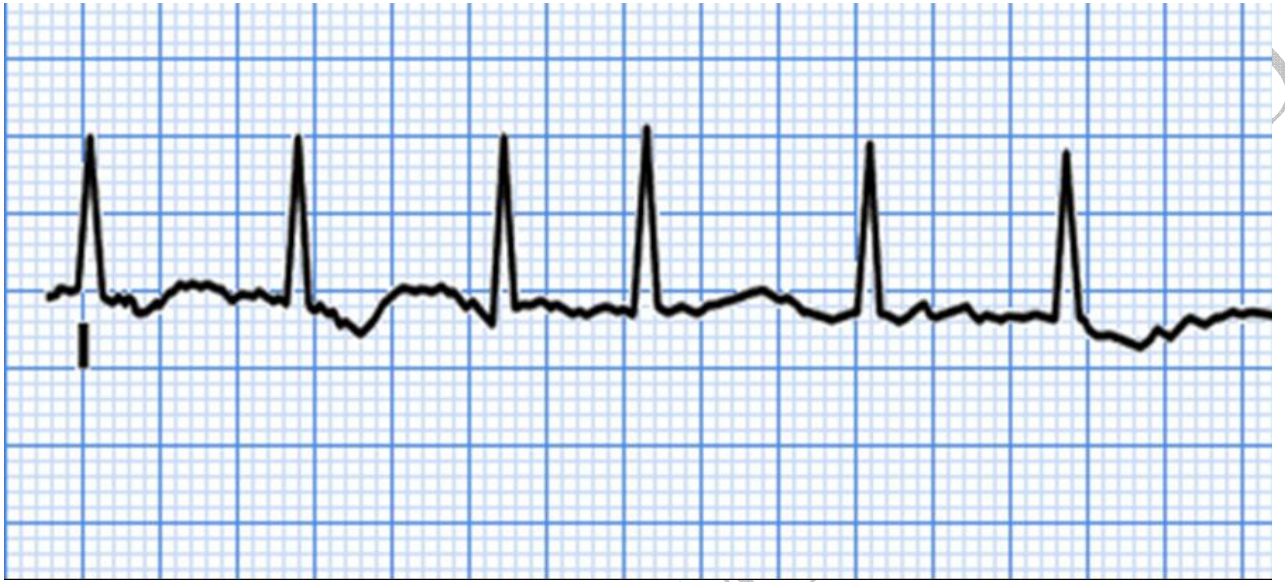
ii. Junctional rhythm from AV node.

2. REGULARITY

- Regular—if the distance between each complex is the same.



- Irregular—if the distance between each complex is different
 - i. AF (variably irregular)



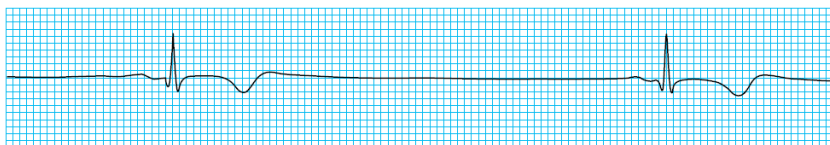
Atrial fibrillation waves seen in lead V1

- ii. Extra-systole(regular rhythm except for 1 complex)



3. RATE (normal 60-100)

- $300/\text{number of big squares between R-R}$



Severe sinus bradycard

HR > 100 TACHYCARDIA

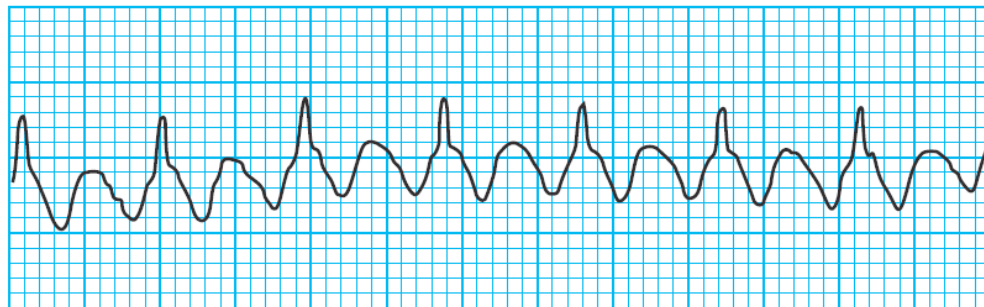


Sinus tachycardia

- If HR rate = 150



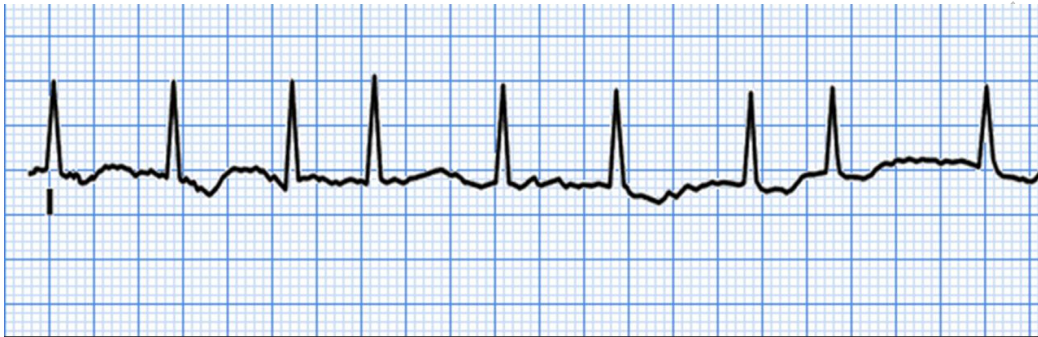
Atrial flutter is usually the result of a single re-entrant circuit in the right atrium (top); atrial flutter showing obvious flutter waves (bottom)



Rhythm strip in atrial flutter (rate 150 beats/min)

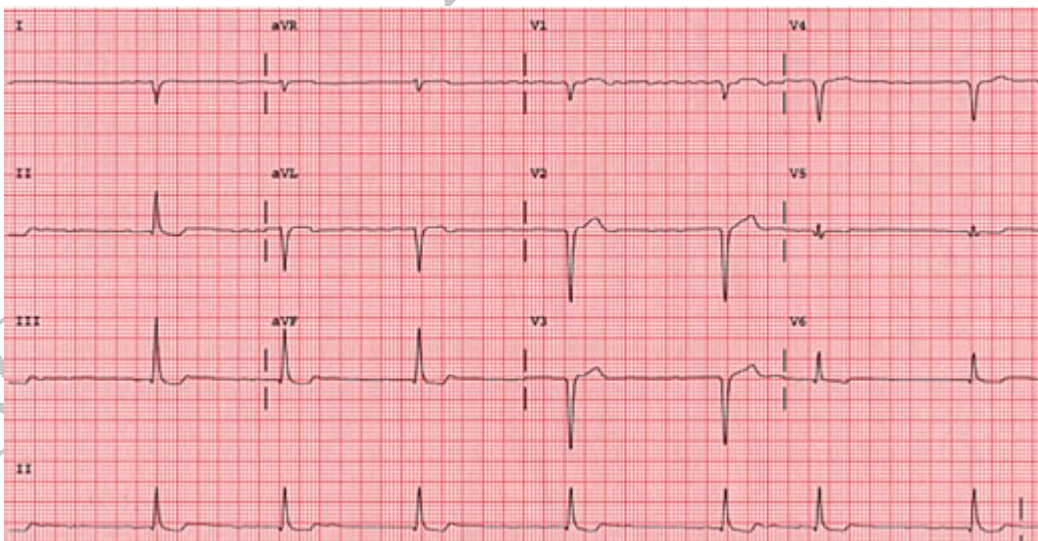
Ask your self is it Atrial flutter? (i.e. rate is 300/min with 2:1 block)

- If Irregular rhythm then rate = No. of QRS complexes within 30 big square X 10

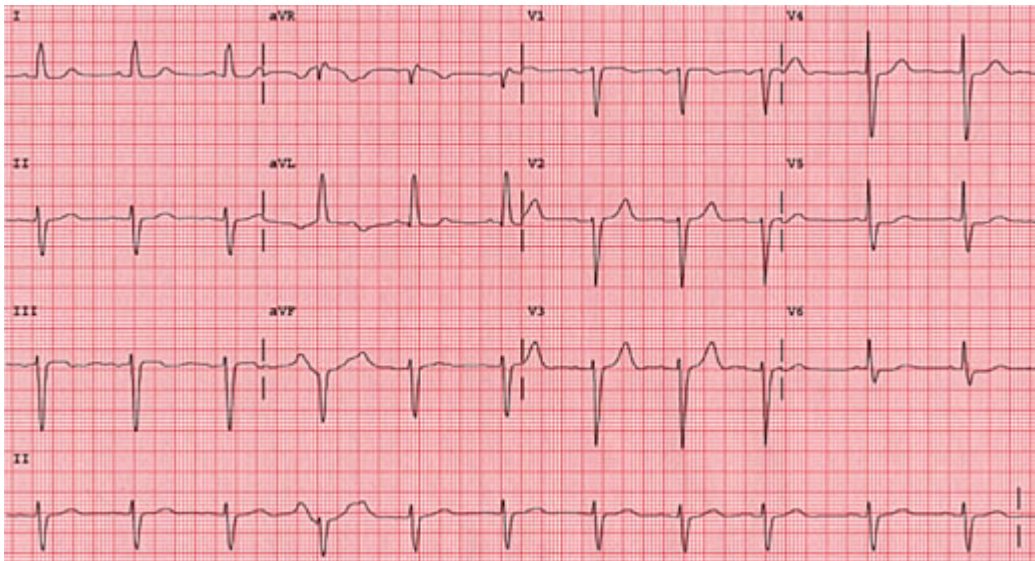


4. AXIS

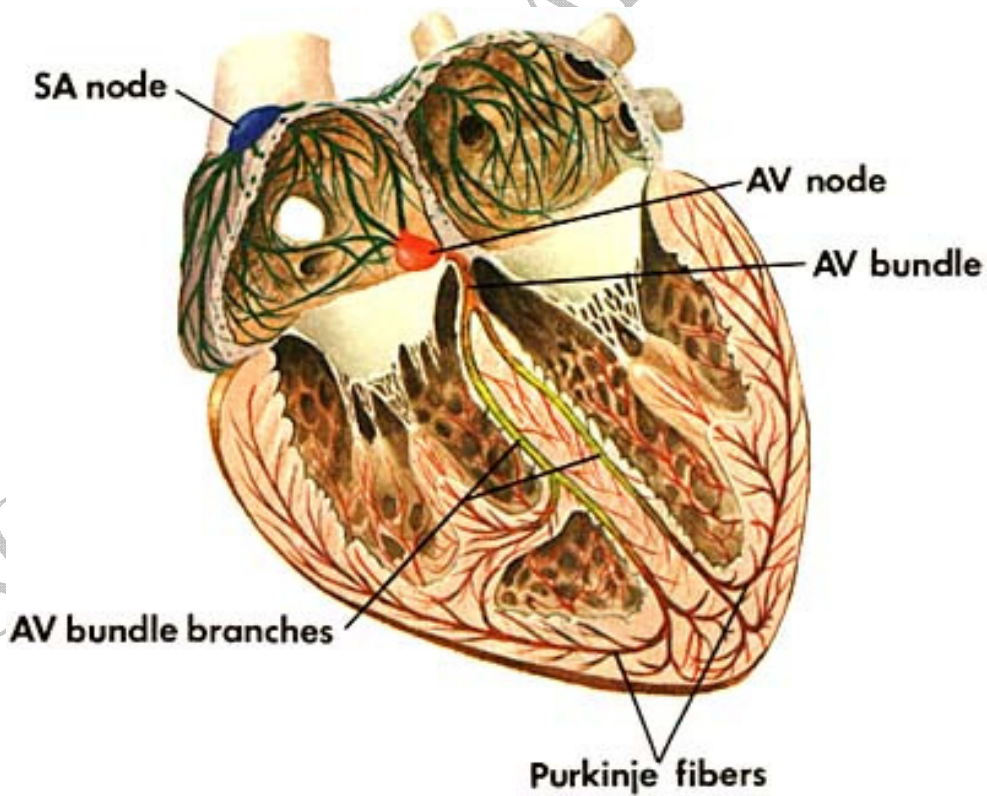
- Tallest R-wave II = Normal
- III or aVF = Right Axis Deviation (RAD)



- I or aVL with equidistant R & S in II or Negative = Left Axis Deviation (LAD)

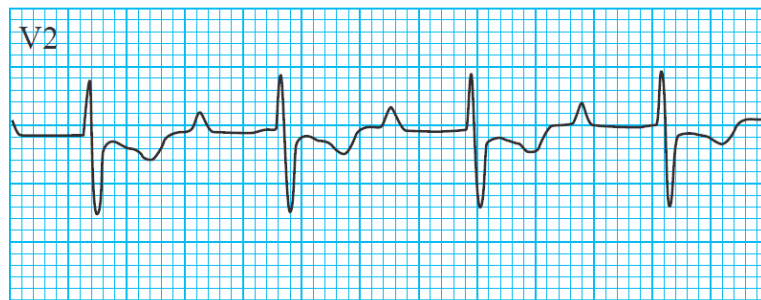


5. P-R interval (normal = $<200\text{ms}$ or 5 small boxes)



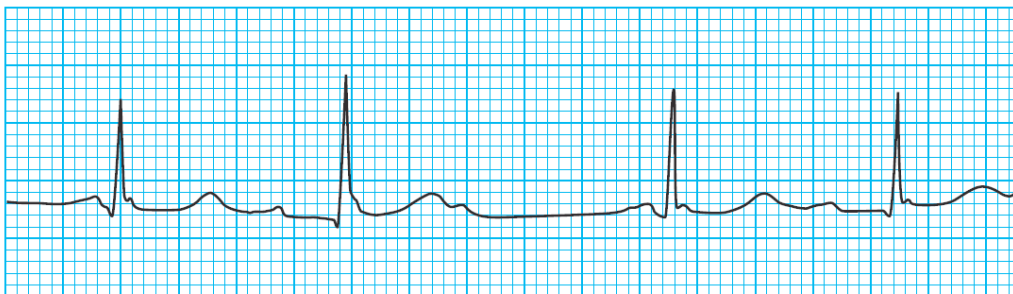
- $>200\text{ms}$ = 1st Heart Block



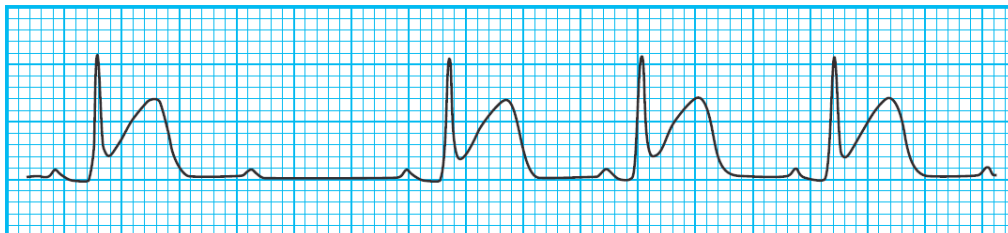


First degree
heart
(atrioventricular)
block

- If certain QRS complex missing then 2nd Heart Block



Mobitz type I block (Wenckebach phenomenon)



Mobitz type II block—a complication of an inferior myocardial infarction. The PR interval is identical before and after the P wave that is not conducted

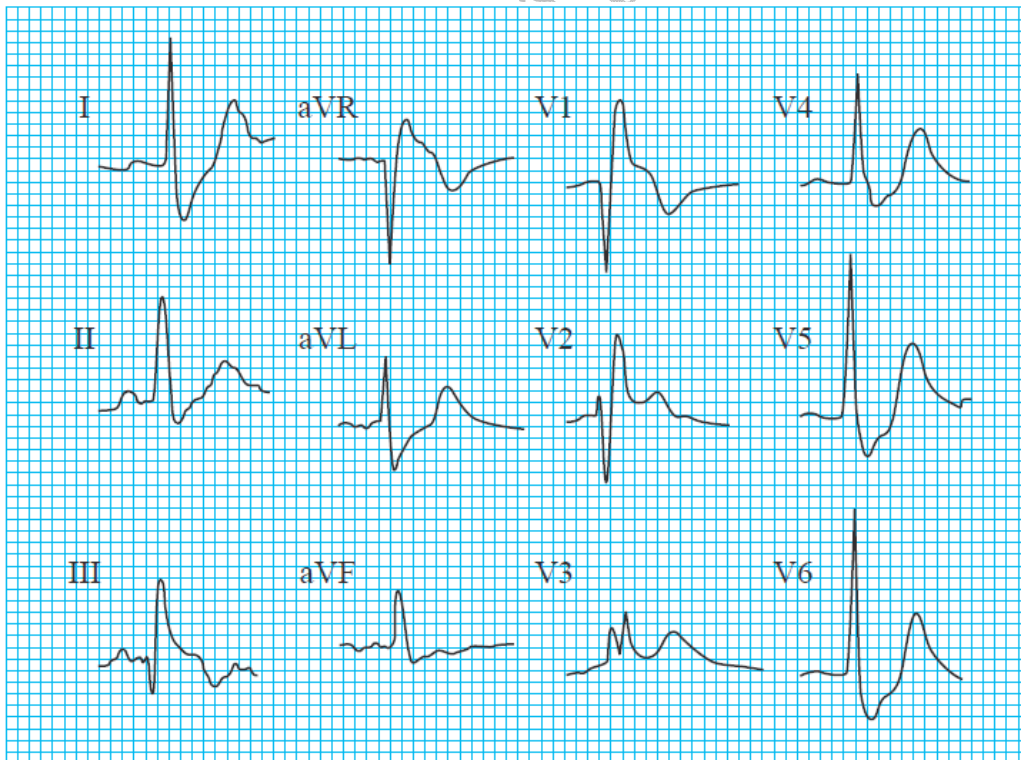
if Heart Rate <40 likely complete heart block.
There is complete dissociation of the between P waves and QRS complexes.



Third degree heart block. A pacemaker in the bundle of His produces a narrow QRS complex (top), whereas more distal pacemakers tend to produce broader complexes (bottom). Arrows show P waves

- If $<0.12s$ = Supra Ventricular Tachycardia (SVT), Wolf Parkinson White (WPW) syndrome or Accessory pathway.

6. Q-wave. Normal = less than one quarter of the height of R wave.



S1, Q3, T3 pattern and right bundle branch block in patient with pulmonary embolus

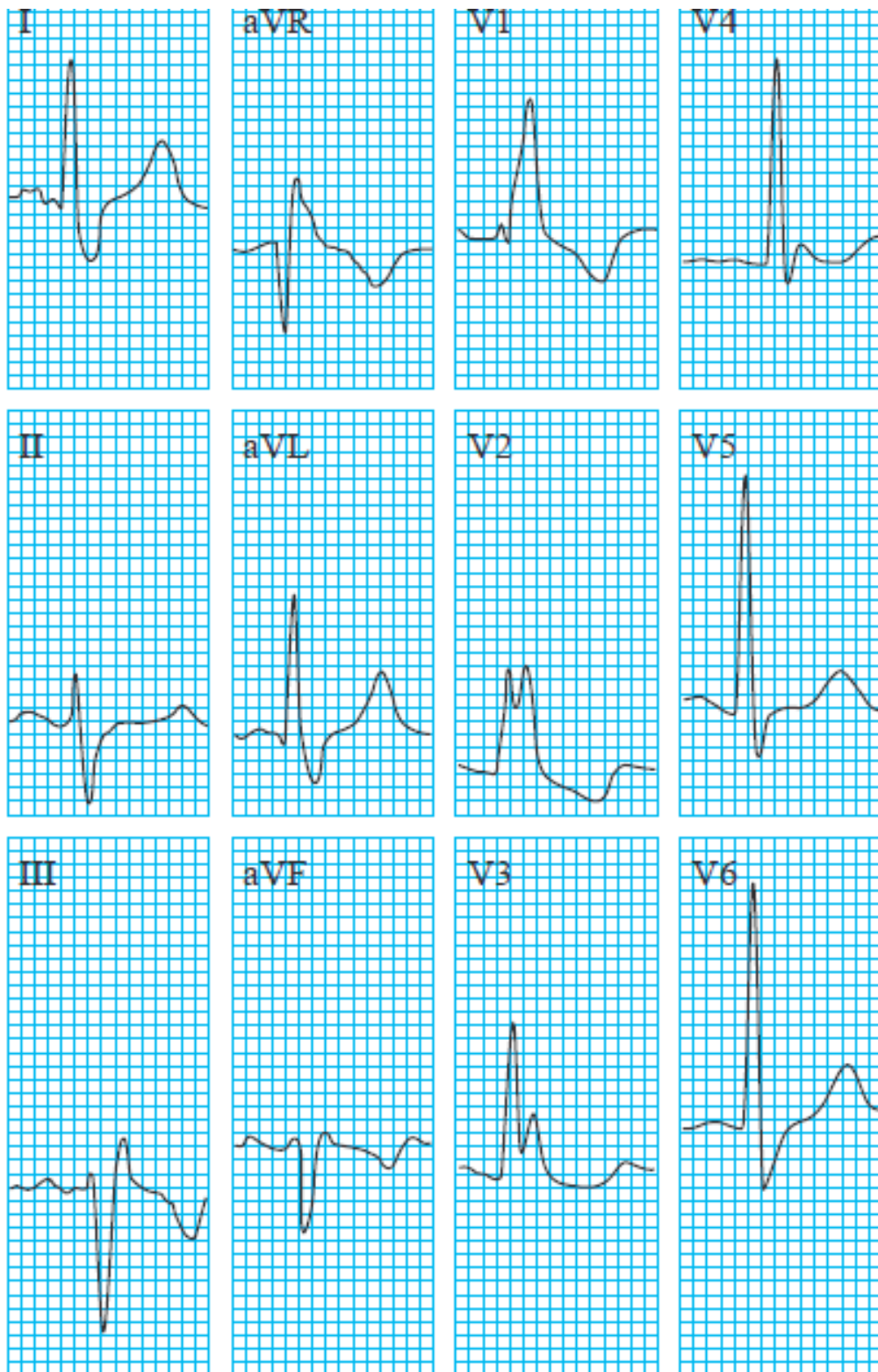
7. QRS normal $0.12sec = 3$ small boxes $= 120ms$

8. BUNDLE BRANCH BLOCK (BBB) – V1*

- QRS must be wide i.e. $>0.12s$ or >3 small boxes

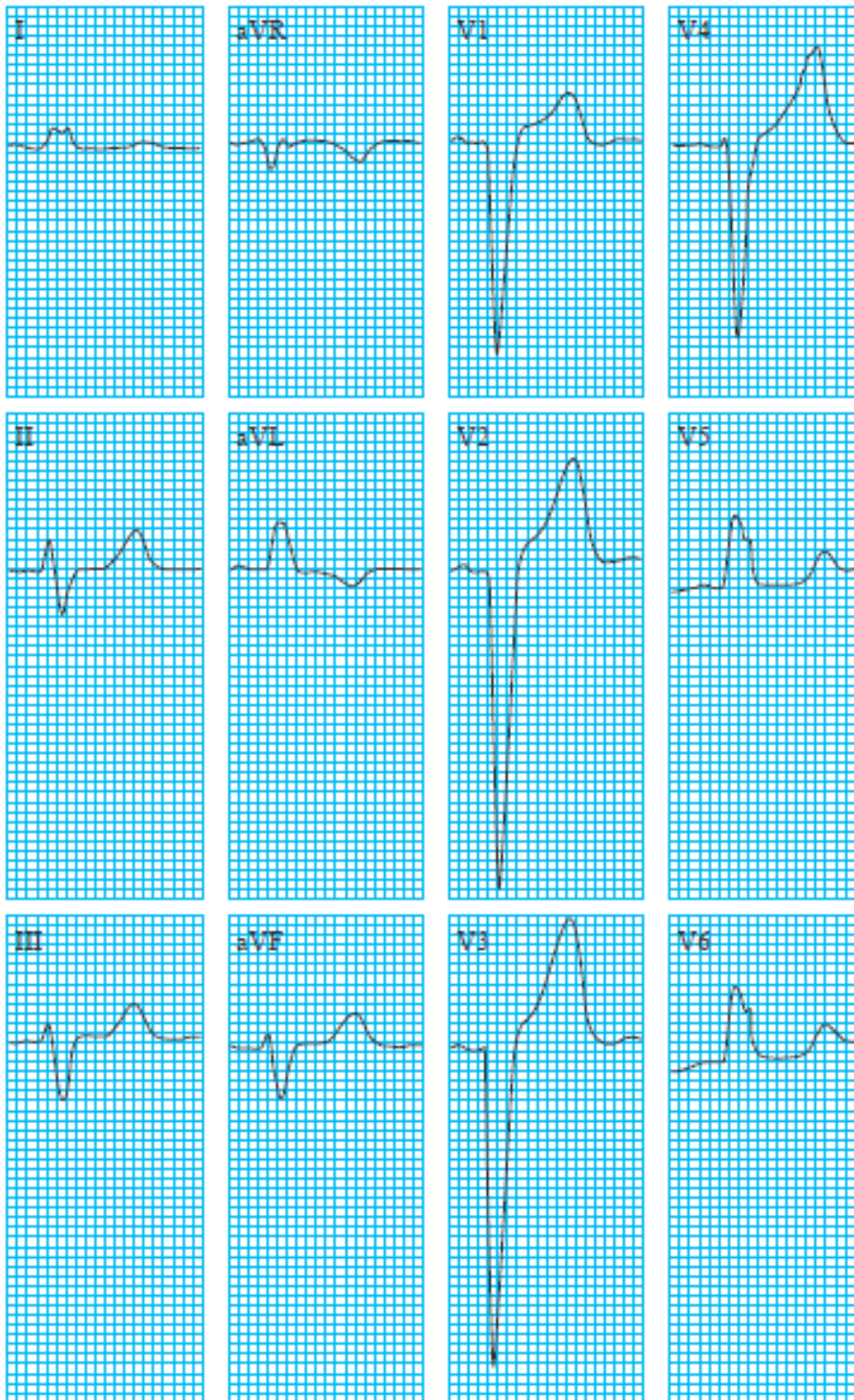
- If QRS

i. Positive = RBBB



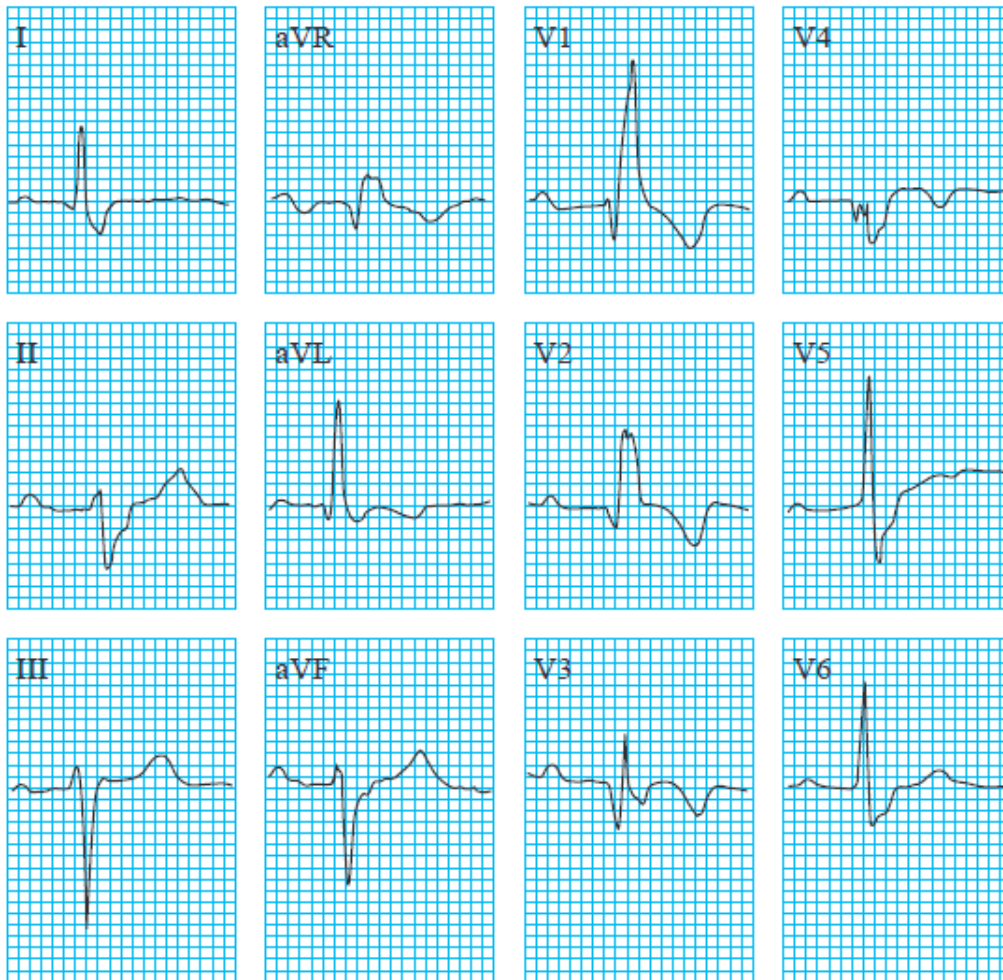
Right bundle branch block

ii. Negative = LBBB



Left bundle branch block

- RBBB + LAD + first degree heart block = Trifascicular block



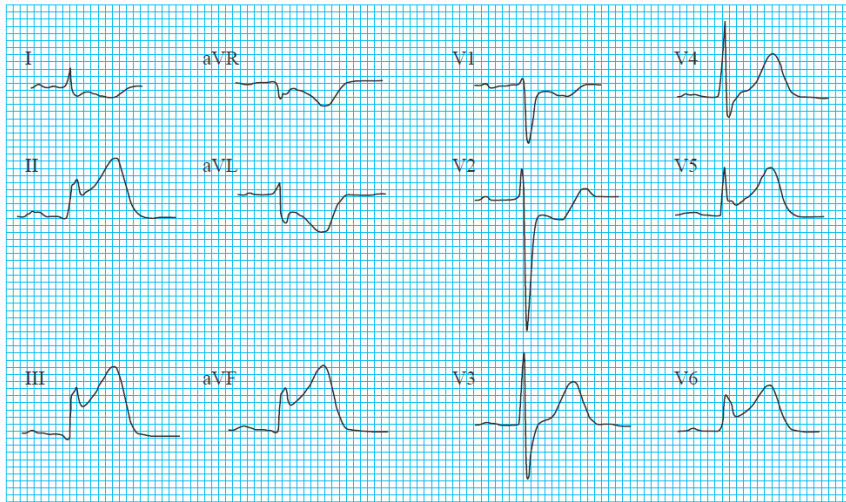
Trifascicular block (right bundle branch block, left anterior hemiblock, and first degree heart block)

- RBBB + LAD = Bifascicular (i.e. R + posterior branch affected)
- New LBBB plus chest pain= MI

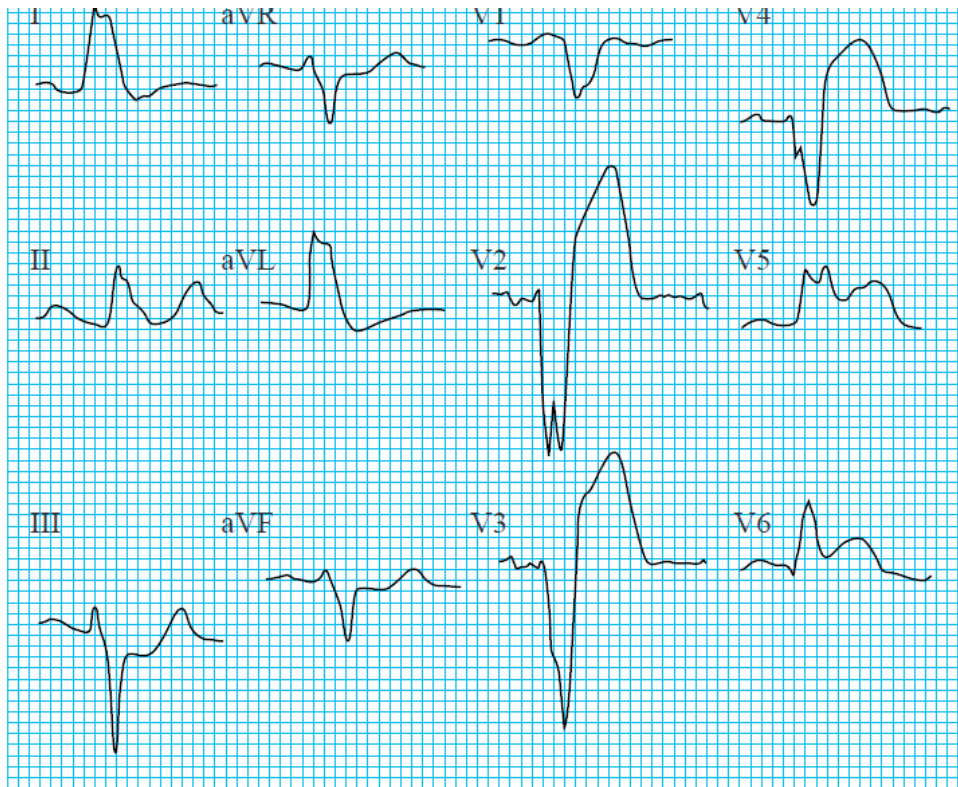
- If LBBB = No further interpretation of an ECG

9. ISCHAEMIA

- Q Wave = Old /Evolving MI
- Elevated ST = acute MI or Pericarditis(wide spread ST elevation)

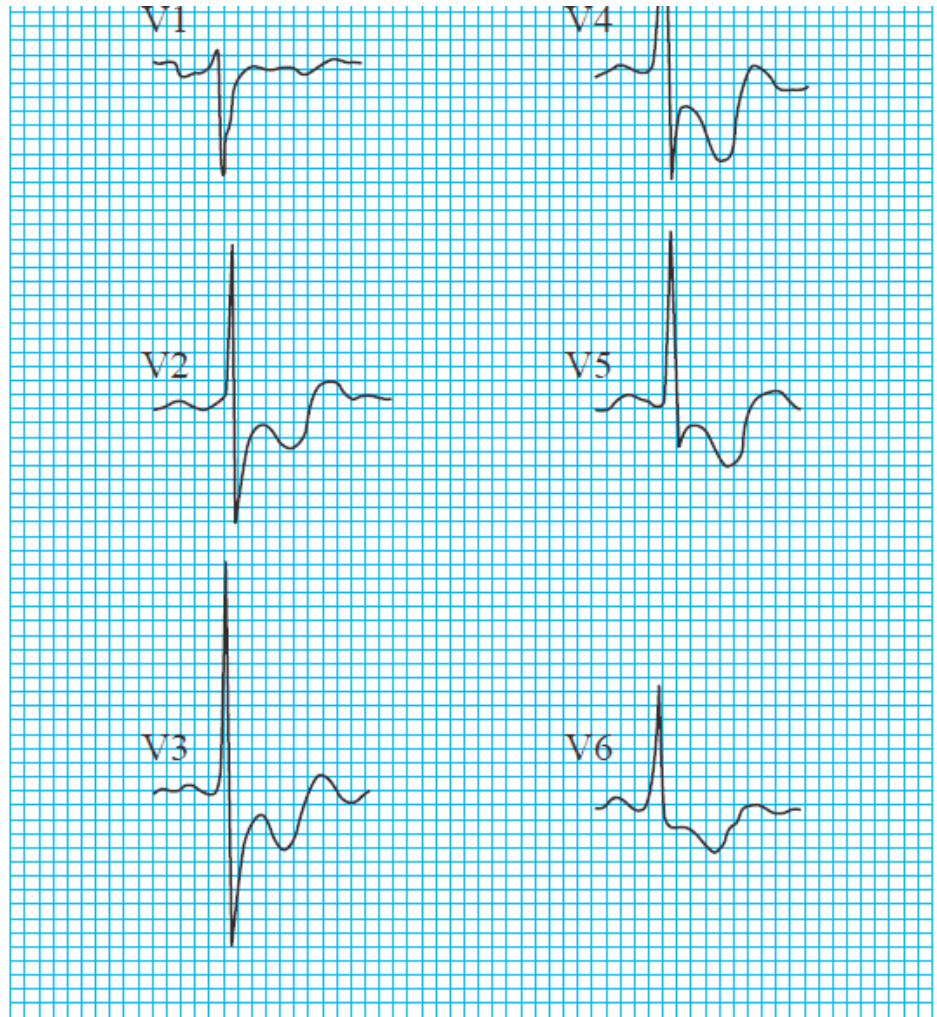


An inferolateral myc
reciprocal changes in



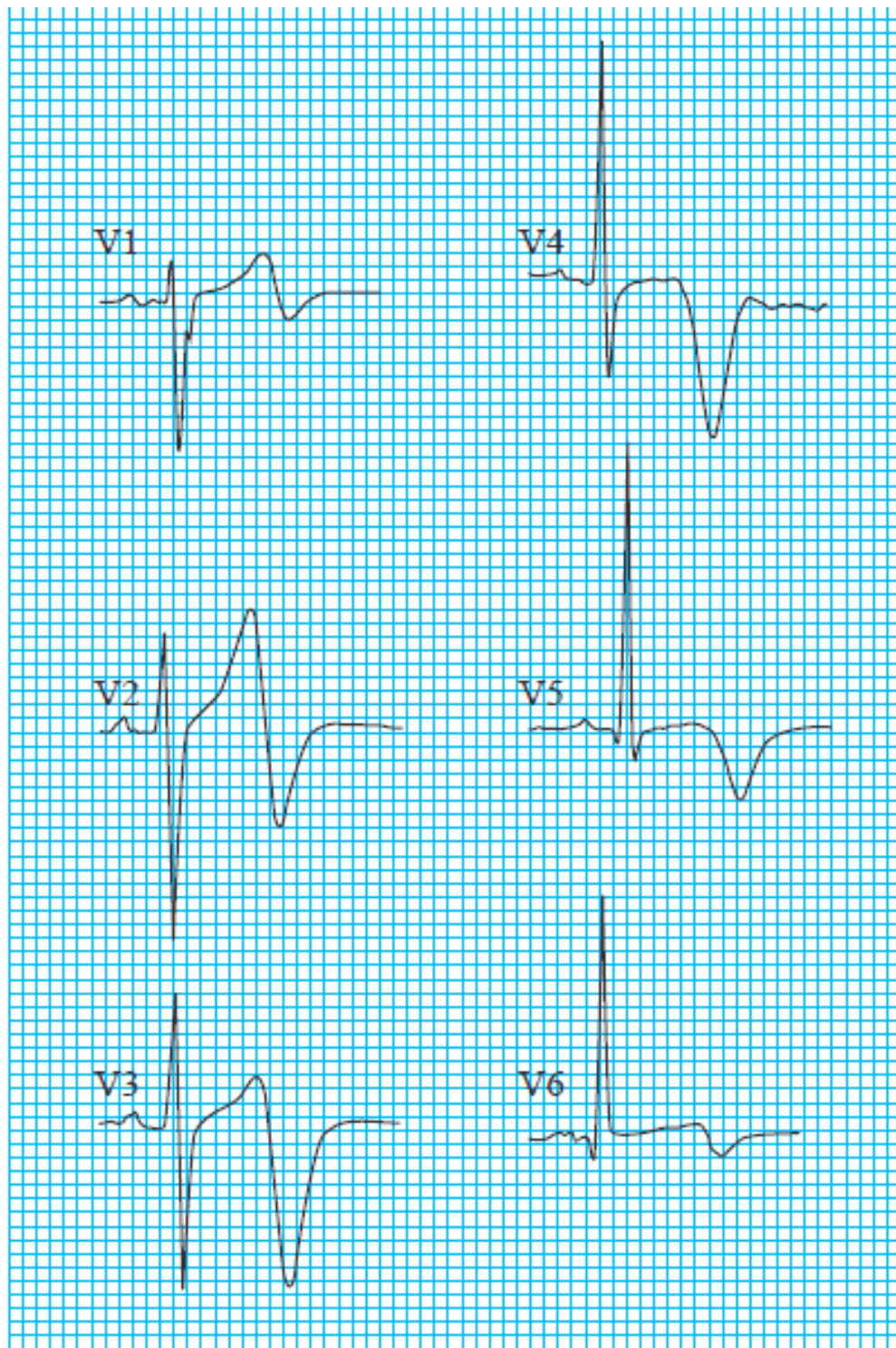
Acute myocardial infarction and left bundle branch block. Note that the ST segments are elevated in leads V5 and V6 (inappropriate concordance) and grossly elevated (> 5 mm) in leads V2, V3, and V4; note also the ST segment

- ST depression
 - i. Digoxin toxicity
 - ii. Ischaemia



Widespread ST segment depression in patient with unstable angina

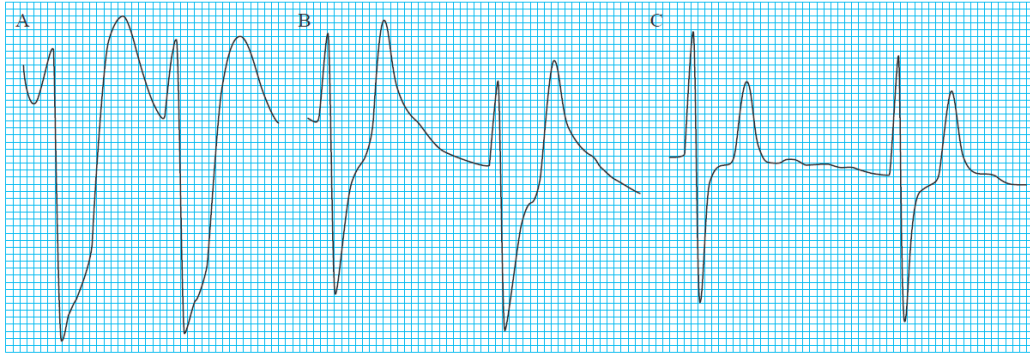
- **T-wave inversion**
 - i. Acute ischaemia



Biphasic T waves in man aged 26 with unstable angina

- ii. Old infarct (*only if exists with Q-wave*)

- **Tall T-wave = HYPERKALAEMIA**



Serial changes in patient with renal failure receiving treatment for hyperkalaemia. As potassium concentration drops, the electrocardiogram changes: 9.3 mmol/l, very broad QRS complexes (A); 7.9 mmol/l, wide QRS complexes with peaked T waves and absent P waves (B); 7.2 mmol/l, QRS complex continues to narrow and T waves diminish in size (C)

10. Walls:

aVF, II and III = inferior MI,

I, AVL, V5, V6 = lateral MI

V1-V6, aVL, I = anterior lateral MI

V1-V4 = Anterior MI

V1-V2 = septal MI

11. HYPERTROPHY (USE CHEST LEADS)

2. $R + S \geq 35\text{mm}$ = Left Ventricular Hypertrophy (LVH)

3. Tallest R in (V4 or V5) plus deepest S (V1 or V2)

4. Peaked P-wave = P. Pulmonale = ↑ Right atria (R atrial strain)

5. Toothed (biphasic) P-wave = P Mitrale = ↑ Left atria (Left atrial strain)

6. Dizziness, syncope, fainting on exercise = aortic stenosis

7. New LBBB plus chest pain = acute MI until proven otherwise (*check previous ECG & compare the two*)

8. If murmur or new AF = ECHO

9. If dizziness on exercise = ECHO

10. LAD is associated with LBBB & LVH

11. Common cause of P Mitrale = Mitral Stenosis

12. If LAD & No LVH or LBBB or RBBB → think of *L anterior hemiblock*

13. WPW

1. if wide QRS is in V1 → then the *accessory pathway is on the left side)*

2. if wide QRS in V6 → then the *accessory pathway is on the Right*