

# ABNORMALITIES OF R WAVE PROGRESSION

DR. NAJEEB LECTURE NOTES

BY FATIMA HAIDER

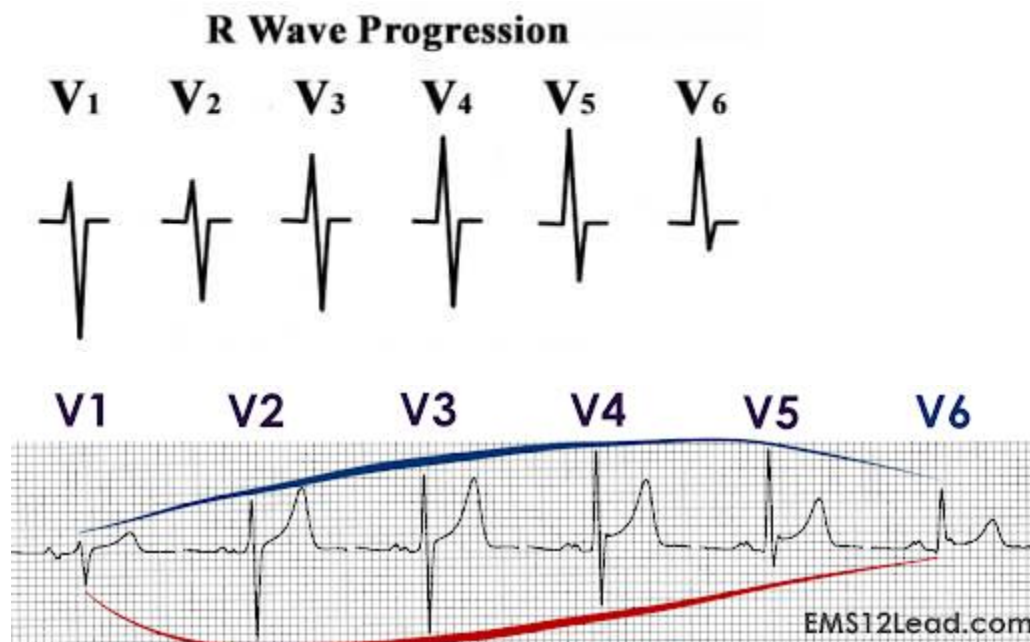
KGMC

<http://koracademy.com/>

## NORMAL R WAVE PROGRESSION

From  $v_1$  to  $v_5$ , QRS complex dominantly shows negative deflection in right sided chest leads and positive deflection in left sided chest leads.

From  $v_1$  to  $v_5$ , R wave deflection is seen to increase positively and this phenomenon is called R wave progression. At  $v_6$  electrode, the depolarizing currents are attenuated by lung tissue so the R wave in  $v_6$  is relatively less tall as compared to  $v_5$ .



## **ACCENTUATED R WAVE PROGRESSION**

In accentuated R wave progression, height from  $v_1$  to  $v_5$  increases more than normal. On right side negative deflection is deeper than normal while on left side positive deflection is taller than normal.

Accentuated R wave progression might indicate:

1. Left ventricular hypertrophy
2. Left bundle branch block
3. Right ventricular myocardial infarction

In left ventricular hypertrophy powerful vectors move from right to left and hence result into accentuated R wave progression.

Due to left bundle branch block, left ventricle will not depolarize normally. The depolarizing current in right ventricle is normal. As left ventricle cannot undergo depolarization through bundle branch and Purkinje fibers, so depolarizing current in left ventricle comes from the current through the right ventricle. Thus depolarization in left ventricle is delayed and out of phase with the right ventricular depolarization. As they are out of phase so the delayed QRS forces will be towards left (as they cannot be neutralized by right ventricular vectors).

If myocardial infarction occurs in right ventricle, left ventricular vector will not be neutralized and hence resultant vector will be more powerful towards left and will lead to accentuated R wave progression.

## **REVERSED R WAVE PROGRESSION**

In reversed R wave progression,  $v_1$  and  $v_2$  are taller R waves while  $v_5$  and  $v_6$  are smaller R waves.

In reverse R wave progression, amplitude of R wave progressively decrease.

It may be due to:

1. Right ventricular hypertrophy  
In severe hypertrophy, it cancels left ventricular vector and total ventricular depolarization vector shifts to the right.
2. Right bundle branch block  
Right ventricular vector becomes out of phase with the left ventricular vector and it can be recorded separately. Due to this separate vector on right side, wave is taller.
3. Posterior myocardial infarction  
Forces on left side reduces and are unable to cancel right ventricular depolarizing vector. So the net vector shifts to the right side.



## **POOR R WAVE PROGRESSION**

In poor R wave progression, R wave does not progress normally.

It may be due to

1. Loss of anterior depolarizing currents e.g. due to Anterior Myocardial infarction
2. Left ventricular hypertrophy
3. Right ventricular hypertrophy

In poor R wave progression mainly defected  $v_3$  and  $v_4$  patterns are observed.

Depending on degree of hypertrophy, left ventricular hypertrophy can either cause accentuated R wave progression or poor R wave progression.

Similarly Depending on degree of hypertrophy, right ventricular hypertrophy can either cause reversed R wave progression or poor R wave progression.

