
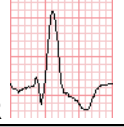
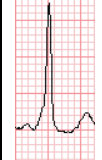


Rhythm analysis			
	Ventricular (QRS)	Atrial (P)	Notes
Rhythm	Normally regular	Normally regular	
Rate	60-100	60-100	Normally are the same
PR interval	0.12 -0.2s should be of constant duration for all beats		If abnormal record if none or prolonged or if progressively increases
P:QRS relationship	Normally 1:1 (if QRSs dropped - record as number of Ps to numbers of QRSs before pattern repeats e.g. 4:3, 2:1)		Normally a P wave precedes each QRS
QRS width	≤ 0.1s (2.5 small squares)		If wide - does QRS pattern represent RBBB or LBBB or other?
Morphological analysis			
Cardiac axis	Normal between -30° and +90° L axis <-30°: R axis >+90°		
	Limb	Chest	Notes
P waves	≤2.5mm high ≤0.12s duration Upright except aVR Usually dome shaped	≤2.5mm high ≤0.12s duration Upright except may be biphasic in V1 Usually dome shaped	Biphasic V1 indicates L atrial abnormality if the negative component makes the wave wide
Q waves	If present should be <1/4 of the height of following R wave <0.04s (<1 small square) wide Deep wide Q waves are normal in aVR and may be normal in III	If present should be <1/4 of the height of following R wave and <0.04s (<1 small square) wide	If Q waves are present which are normal record as "non-pathological" If Q waves are present that are abnormal record them as "Abnormal Qs in ..." If unsure record as "Q waves in...?significance"
R/S waves	aVL <13mm high aVF <20mm high	No R >27mm No S >30mm No R+S > 40mm At least 1 R >8mm R wave progression V1-V5 (V6 may be smaller than V5)	If no abnormality record "no tall R or RS". Recording abnormal: examples "R >27mm in V3-6" "S >30 in V2" "R+S >40 V3+V2"
ST segment	Isoelectric ±1mm	Isoelectric ±1mm	If uncertain record "?elevation in.." or "?depression in .."
T waves	Usually >1/8 th and <2/3 rd the preceding R wave Usually upright except aVR	Usually >1/8 th and <2/3 rd the preceding R wave Usually upright V1 may be inverted	May be upright, flat or inverted Usually upright except aVR (V1 may be inverted) T wave changes are often non-specific
QT interval	0.36-0.44s (NB Corrected = $QT/\sqrt{R-R}$ in seconds)		

Criteria for LBBB (Left Bundle Branch Block)					
QRS duration	>0.1 s (wide QRS)			If present, cannot usually diagnose abnormalities of ST or T e.g. MI	
No secondary R in V1	"M" pattern in V5-V6				
No Q in V5, V6, I or aVL					
Criteria for RBBB (Right Bundle Branch Block)					
QRS duration	>0.1 s (wide QRS)			e.g. rsR	
Secondary R wave in V1 – rsr, rSr, RSr or RSR	"M" pattern in right leads (V1 – secondary R wave)				
Criteria for pre-excitation - Wolf-Parkinson-White (WPW) Syndrome					
PR interval	<0.12 sec			Slurred initial part of the QRS (delta wave)	
QRS duration	>0.1 sec (wide QRS)			Secondary ST & T changes Pre-excitation prevents further analysis of ECG	
Criteria for left and right atrial hypertrophy					
L atrial hypertrophy	V1 Broad biphasic P wave		Lead II Notched wide P wave (P-mitrale)		
R atrial hypertrophy	V1 Initial positive deflection increased		Lead II tall peaked P wave (P-pulmonale)		
Criteria for acute MI					
ST elevation	0-2 hrs	T wave inversion	3-8 hrs	Q waves	3-8 hours
Criteria for an old MI					
Abnormally deep Q waves (>1/4 of R wave) or Abnormally wide Q (>0.04s) or QS complexes				In any lead except aVR and III	
Criteria for Left ventricular hypertrophy					
R wave in chest leads	>27 mm		The more criteria that are met the more likely that LVH is present		
Tallest R + deepest S	>40 mm				
Deepest S in chest leads	>30 mm				
R in aVL	>13 mm				
R in aVF	>20 mm				
ST depression and T inversion in LV leads - do not use alone to diagnose LVH					
Criteria for right ventricular hypertrophy					
Right axis deviation	and		T wave inversion may occur in V2 and V3 indicating RV strain		
Dominant R wave in V1	and				
QRS duration normal	and				
No evidence anterolateral MI					