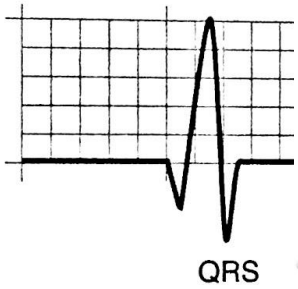
Q wave

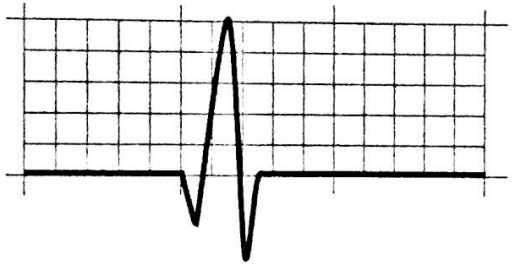
/kjuː weɪv/ noun.

1. Any negative deflection that precedes an R wave

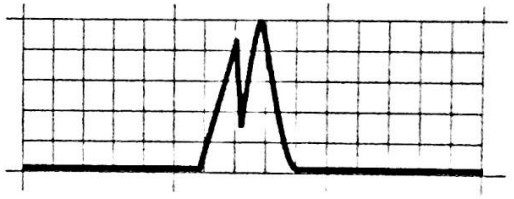
WAIT, WAT



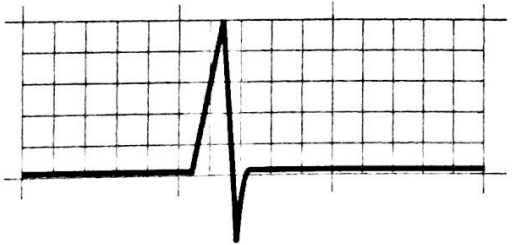
1. **If** the first deflection is **downward** it is a Q wave
2. The first upward deflection is **always** the R wave
3. The first downward deflection following the first upward deflection is the S wave



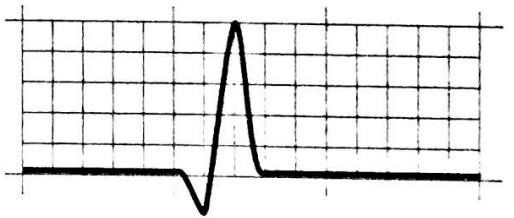
QRS



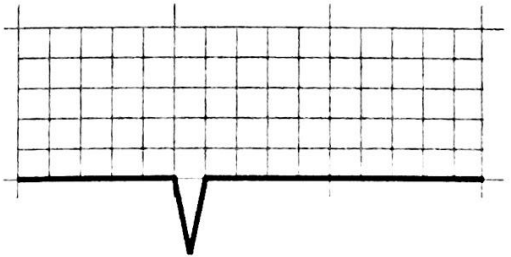
RSR[1]



RS



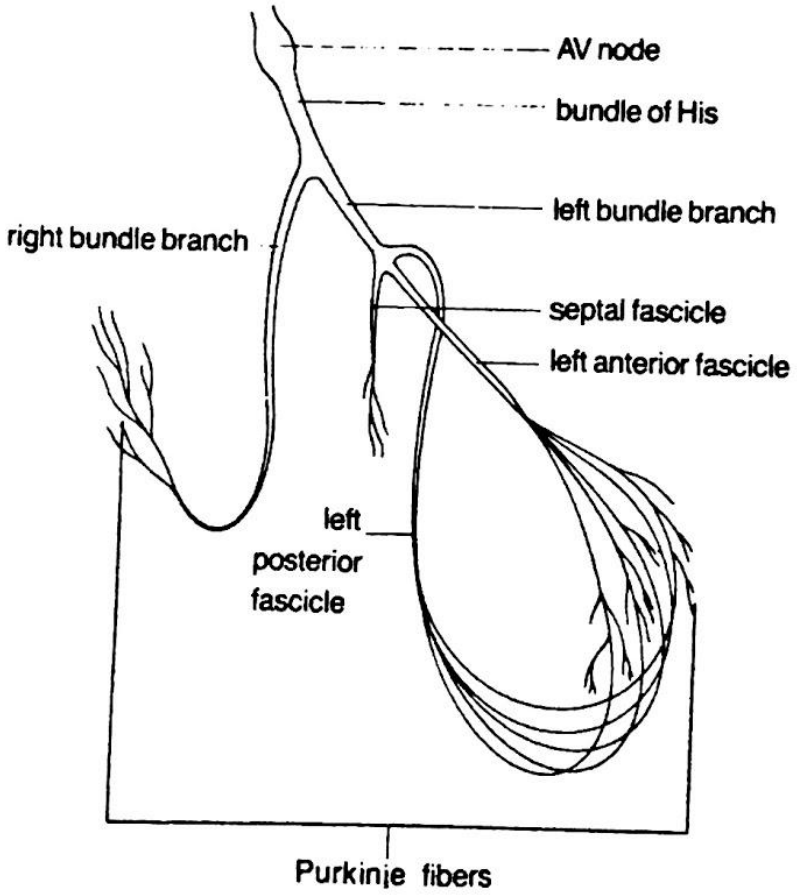
QR



QS

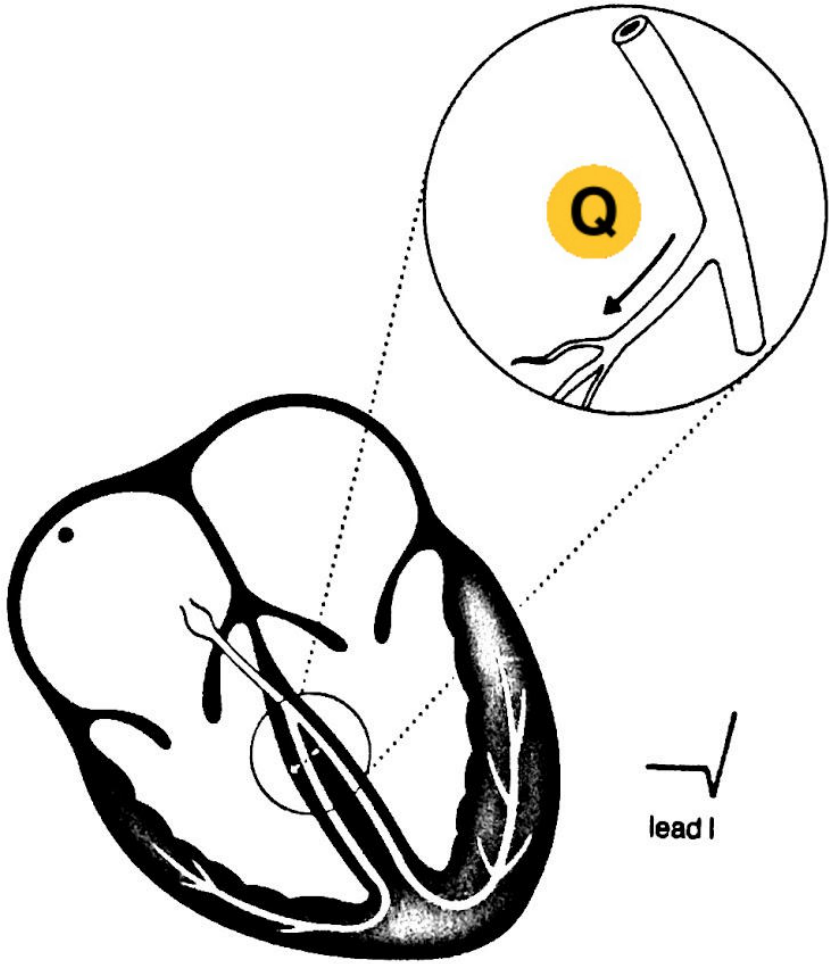
WHY DO Q WAVES HAPPEN

- The Q wave represents the normal left-to-right depolarisation of the interventricular septum



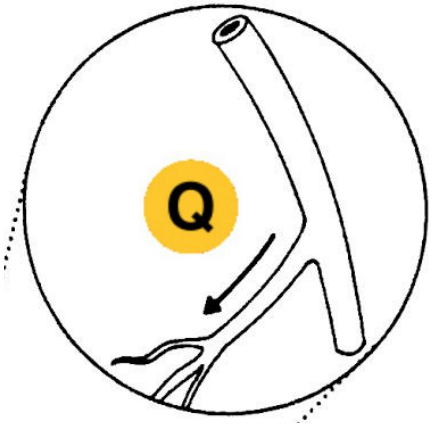
ANATOMY

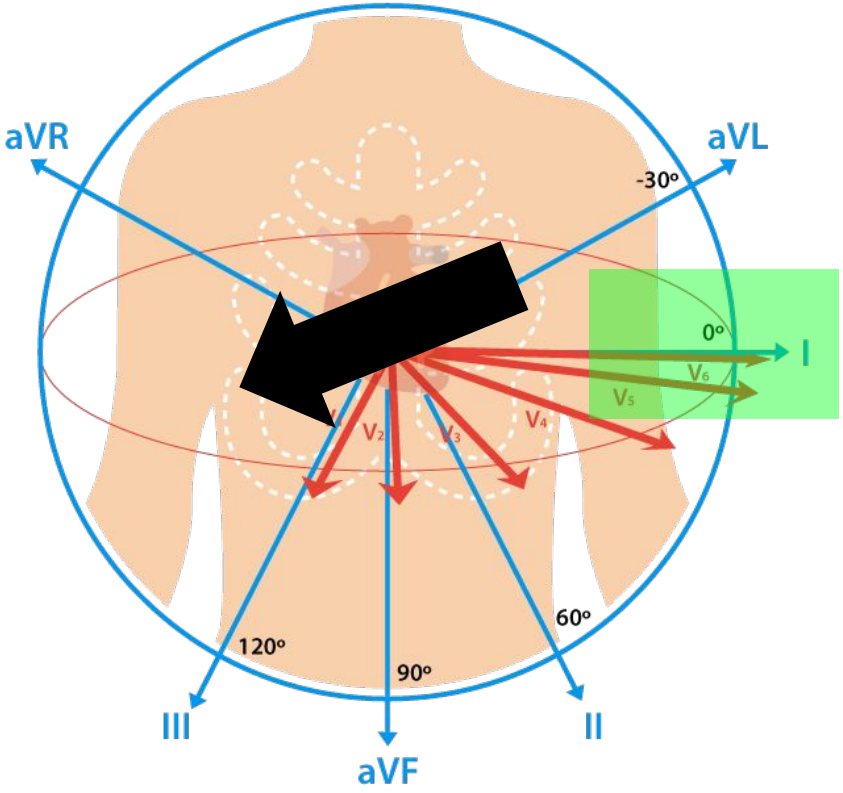
these are the fascicles of the LBB



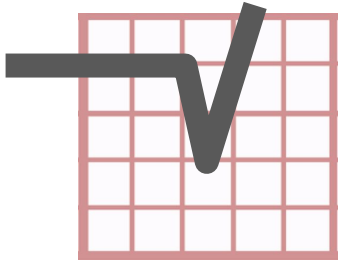
THIS IS WHAT MAKES THE Q

SEPTAL DEPOLARIZATION



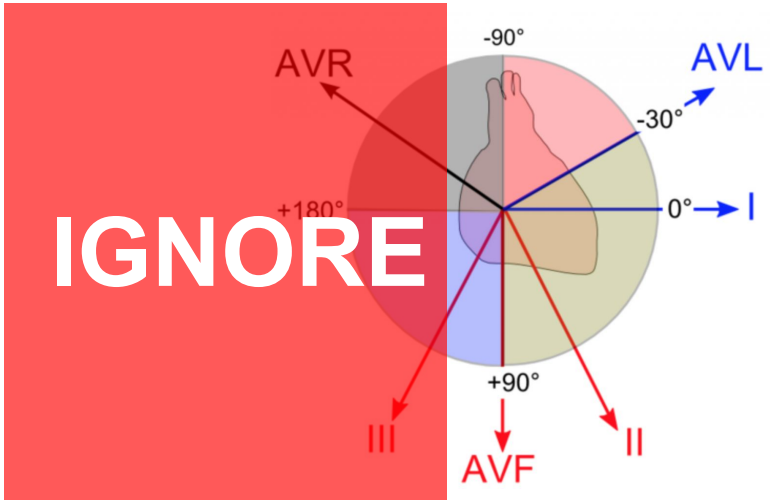


I
V5
V6



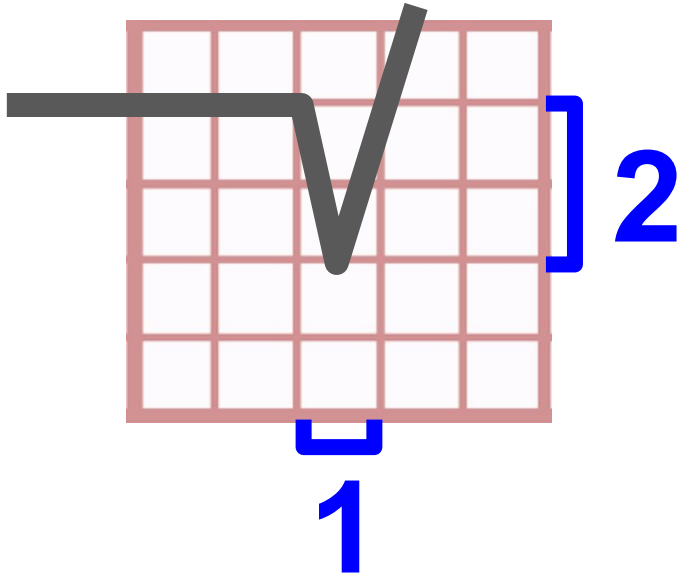
THE FIRST RULE OF Q WAVES

1. **Do not** look for them in III or aVR



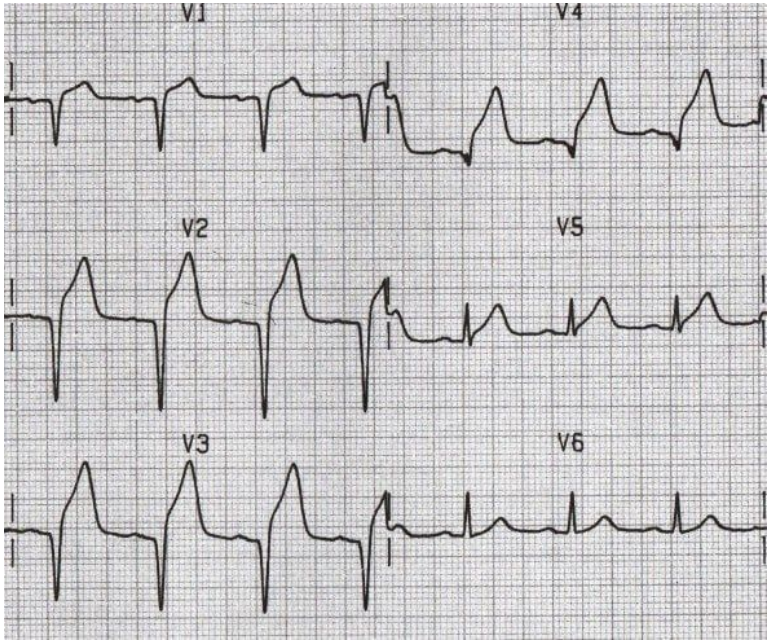
THE SECOND.

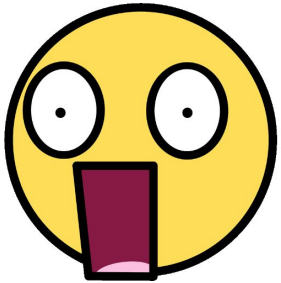
2. **Small Q waves** in most leads are OK.
   Anything bigger than 1x2 mm is **abnormal**.
   (or, >25% of R wave)

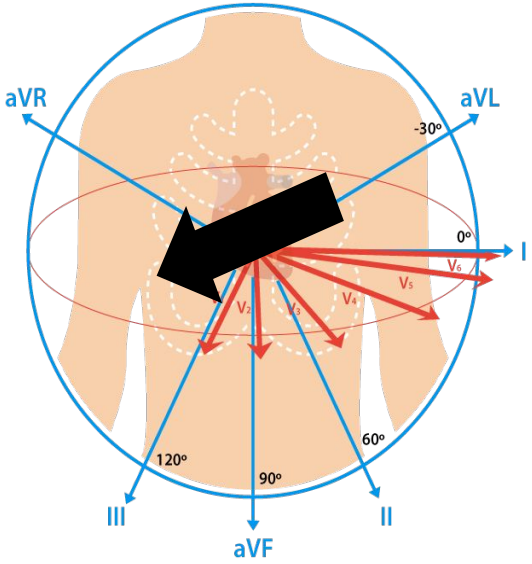


THE THIRD.

3. Q waves are **never normal** in V1-3.



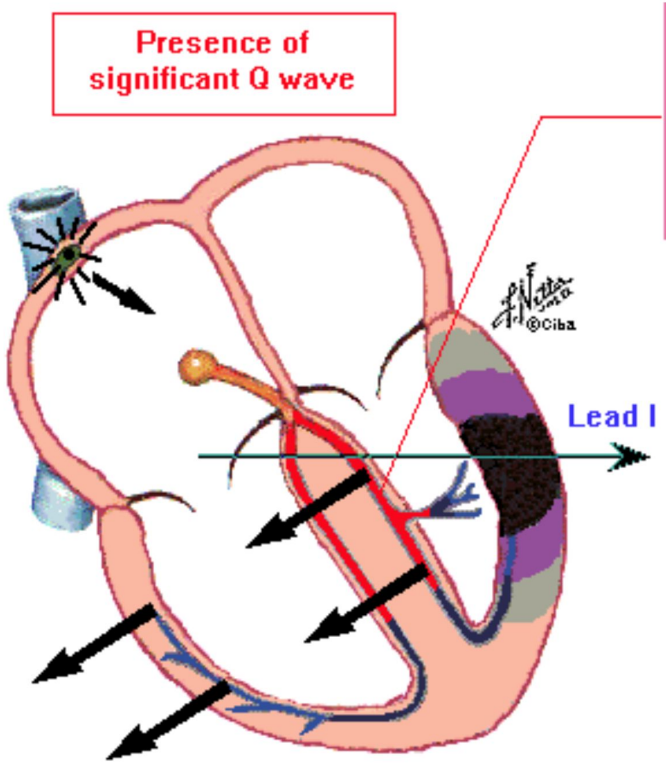




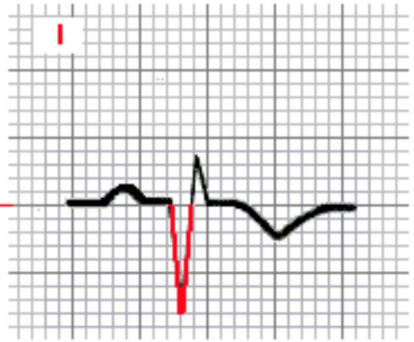
WHAT DO ABNORMAL Q's MEAN

- Think: what might affect **septal** conductivity
  - Myocardial infarction (new or old)
  - Cardiomyopathies (HCM, infiltrative)
  - Extreme rotation of the heart (newborns!)
  - LBBB or WPW

INFARCTS CREATE PATHOLOGIC Q WAVES



In myocardial infarction, dead muscle tissue produces no action potential, and electrocardiograph "looks through" infarcted area to pick up electrical forces from opposite side of heart, which are directed away from lead I

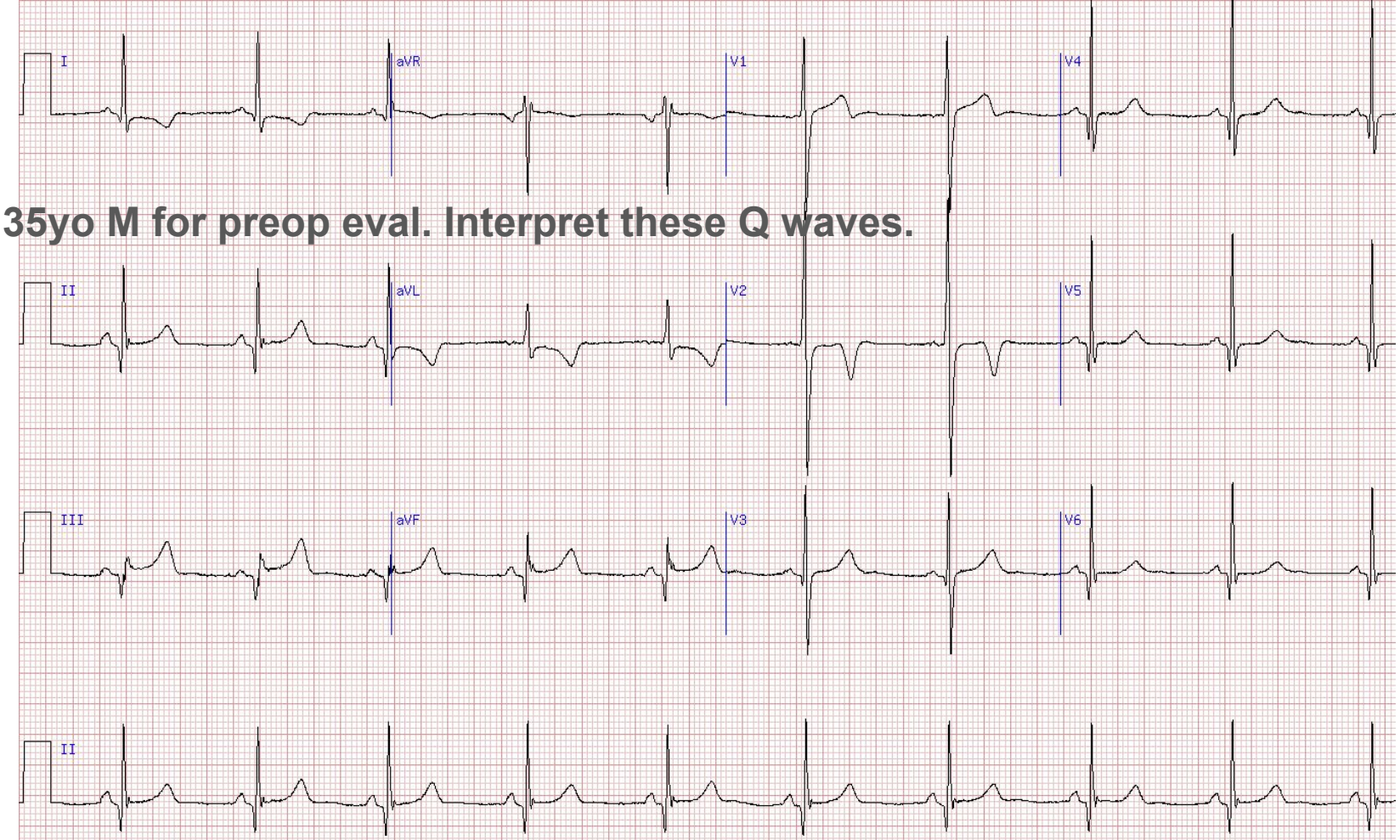


Q wave in myocardial infarction is accordingly of substantial amplitude (>= 25% of R wave) and duration (>=0.04 second)

THE THREE RULES OF Q WAVES

1. **Ignore** III and aVR
2. **Small Q waves** in most leads are OK (<1 wide, <2 tall)
3. … but any Q waves in V1-3 are **not normal.**

Quiz: 35yo M for preop eval. Interpret these Q waves.



Answer: Abnormal in II, aVF, V4-V6, with LVH. Interpretation: Hypertrophic cardiomyopathy.

Credits to Malcolm Thaler for most of the pictures, taken from:

The Only EKG Book You'll Ever Need. (Amazon)