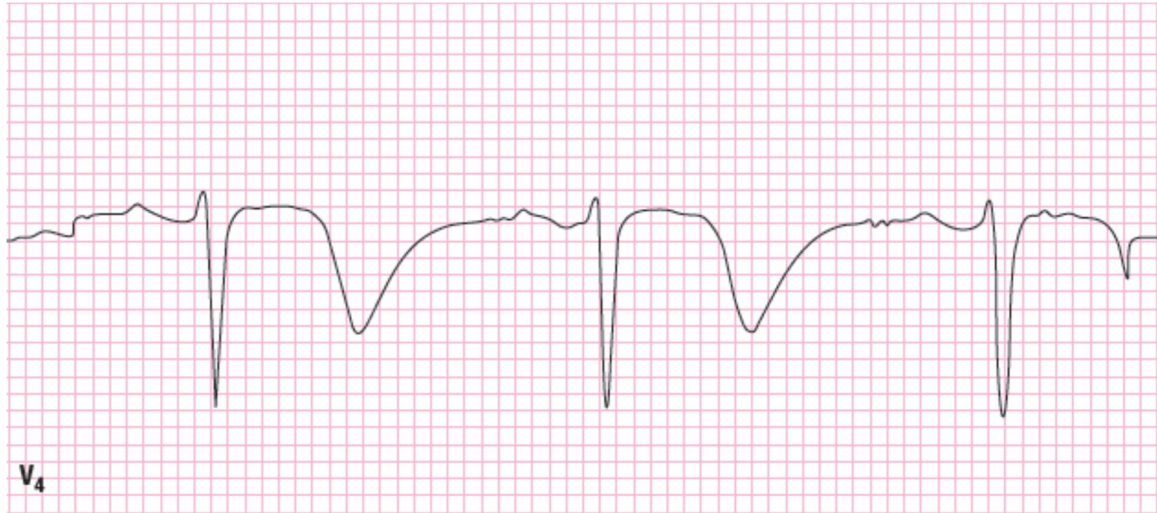- Prolonged QT interval

V₄

- Defined as a corrected QT interval (QTc) ≥ 470 msec in males and ≥ 480 msec in females

The QT interval represents the total period of ventricular systole (depolarization + repolarization) and varies inversely with heart rate. To correct for QT interval differences based on heart rate alone, the corrected QT interval (QTc) is determined (and is the standard of measure for the QT interval). For heart rates of 60–100 BPM, the most commonly used formula is QTc = QT interval divided by the square root of the preceding RR interval in seconds. (Example: If RR interval = 1.2 seconds, then QTc = QT interval/1.1). For heart rates of 60 BPM (RR interval = 1 second), the QTc and QT intervals are equal.

The QT interval should be measured in a lead with a large T wave and distinct termination, typically in lead II or V5. Also look for the lead with the longest QT interval.

Easier method to determine QT interval:

- Use 400 msec as the normal QT interval for a heart rate of 70. For every 10 BPM change in heart rate above (or below) 70, subtract (or add) 20 msec. Measured value should be within ± 40 msec of the calculated normal. *Example*: For a heart rate of 100 BPM, the calculated normal QT interval = 400 − (3 × 20 msec) = 340 ± 40 msec. For a heart rate of 50 BPM, the calculated normal QT interval = 400 msec + (2 × 20 msec) = 440 ± 40 msec.

- In general, for heart rates of 60–100 BPM in the absence of BBB or ventricular pacing, the normal QT interval should be < 50% of the preceding RR interval.

A prolonged QT interval is associated with an increased risk for malignant ventricular arrhythmias (TdP).

The QT interval is longer while asleep than while awake (presumably due to vagal hypertonia).

Leads II and V5 help distinguish between a T wave with an associated U wave (distinct isoelectric interval between the T wave and U wave) and a complex T wave (absence of an isoelectric segment allowing the different waves to merge into a "complex" T wave).
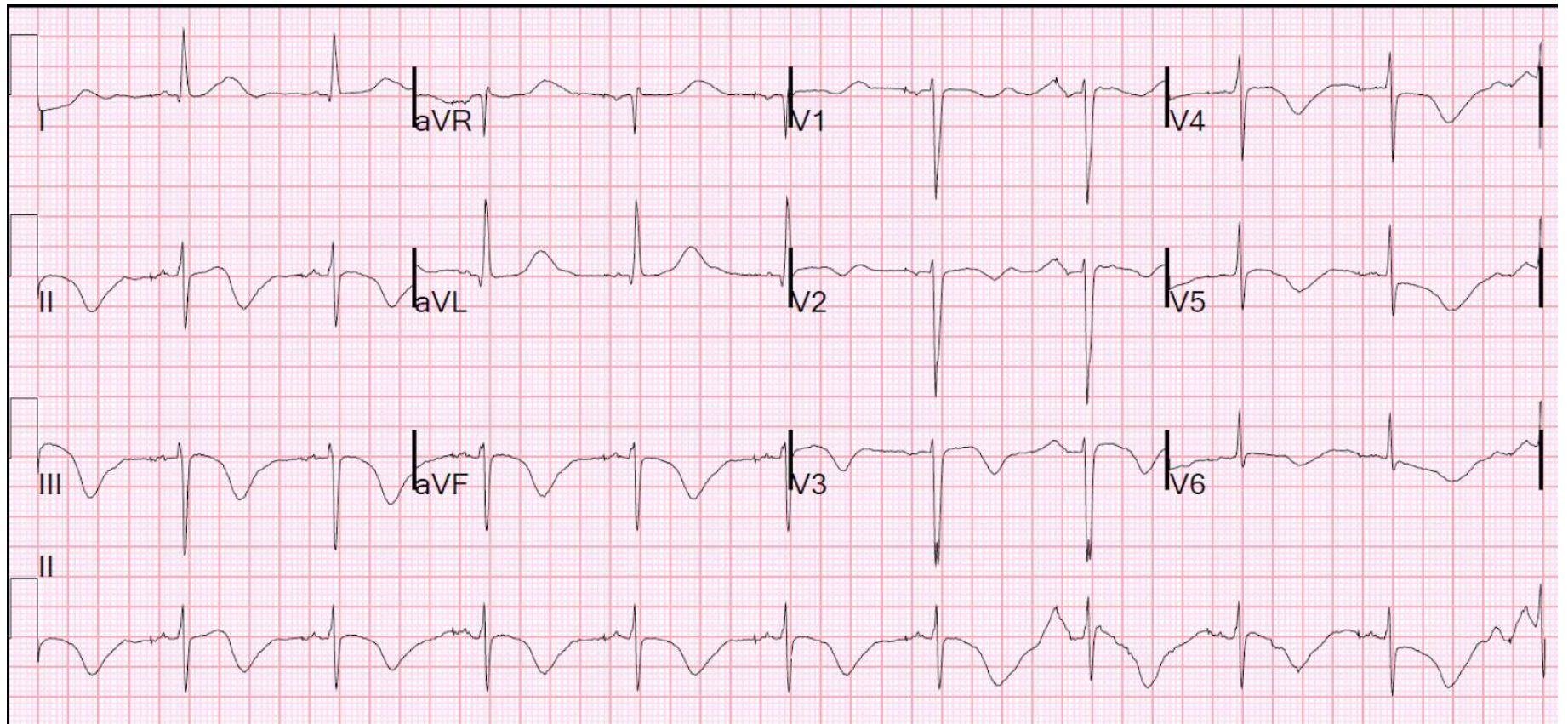
Prolonged QT with complex T wave mimicking U wave in lead V1, V2. All of the other leads clearly show this is long QT.

Conditions associated with a prolonged QT interval include:

- Drugs (quinidine, procainamide, disopyramide, amiodarone, dronedarone, sotalol, dofetilide, flecainide, phenothiazines, tricyclics, lithium)
- Hypomagnesemia
- Hypocalcemia
- Marked bradyarrhythmias
- CNS
- Myocarditis
- Mitral valve prolapse
- Myxedema
- Hypothermia
- Very high protein diets
- LVH
- Romano-Ward syndrome (congenital; with normal hearing)
- Jervell and Lange-Neilsen syndrome (congenital; with deafness)
- HCM (present in about 1 in 8 cases)