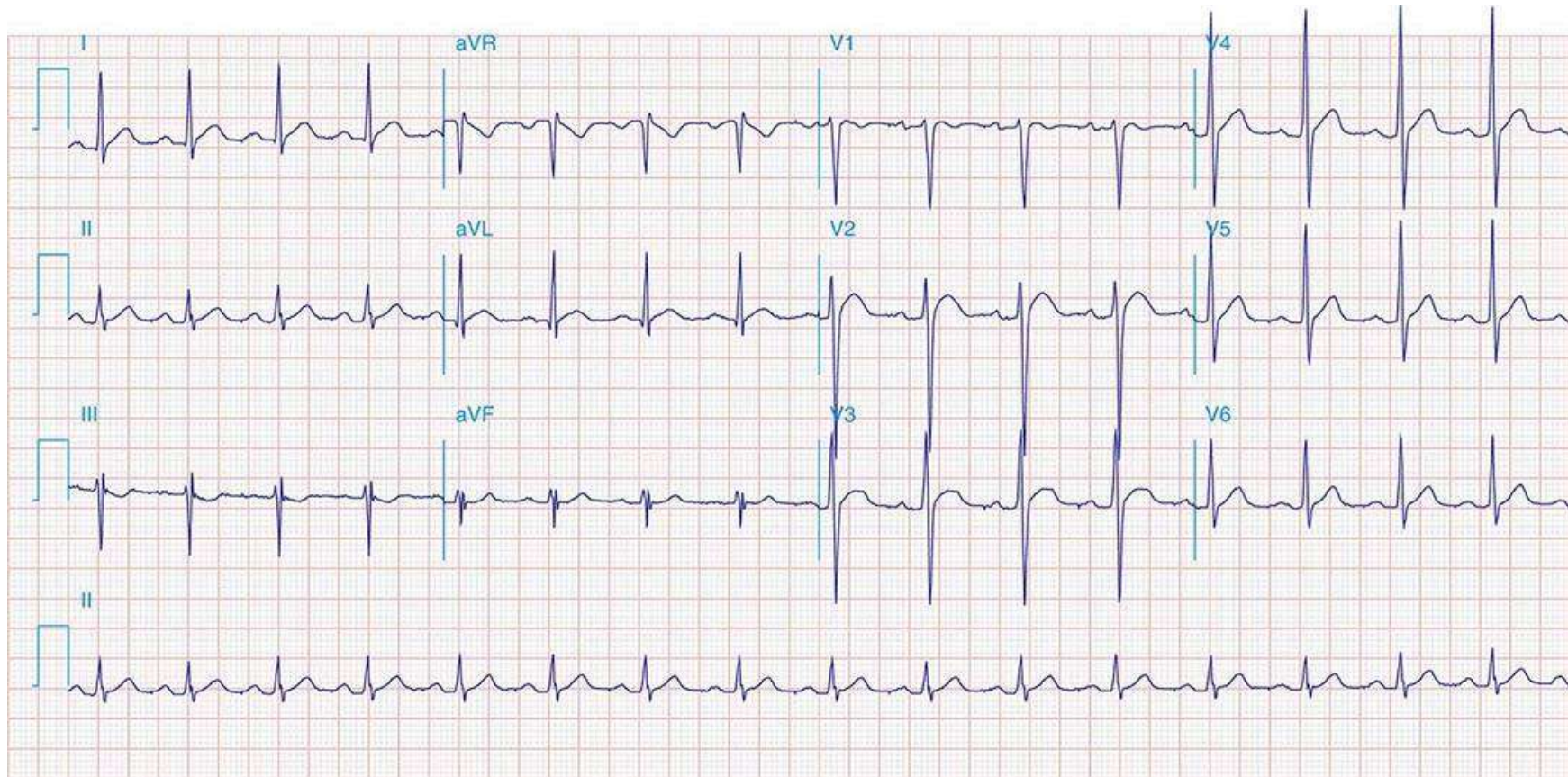


- **Hypercalcemia**



- QTc shortening, usually due to shortening of the ST segment *without* a change in T wave duration or morphology
- May see PR prolongation

Minor effects on the P wave, QRS complex, or T wave, except when the calcium level becomes severely elevated when non-specific IVCD is often seen.

J (Osborn) waves may be seen in severe hypercalcemia. It is an extra positive deflection between the terminal portion of the

QRS complex and the beginning of ST segment. While J waves may be seen in hypercalcemia, it is the classic finding of hypothermia. J waves also seen in normal variant early repolarization, brain injury, and vasospastic angina.

Other causes of a short QTc (< 0.35 seconds for heart rates of 60–100 BPM) include:

- Hyperkalemia
- Digitalis effect or toxicity
- Acidosis
- Vagal stimulation
- Hyperthyroidism
- Hyperthermia



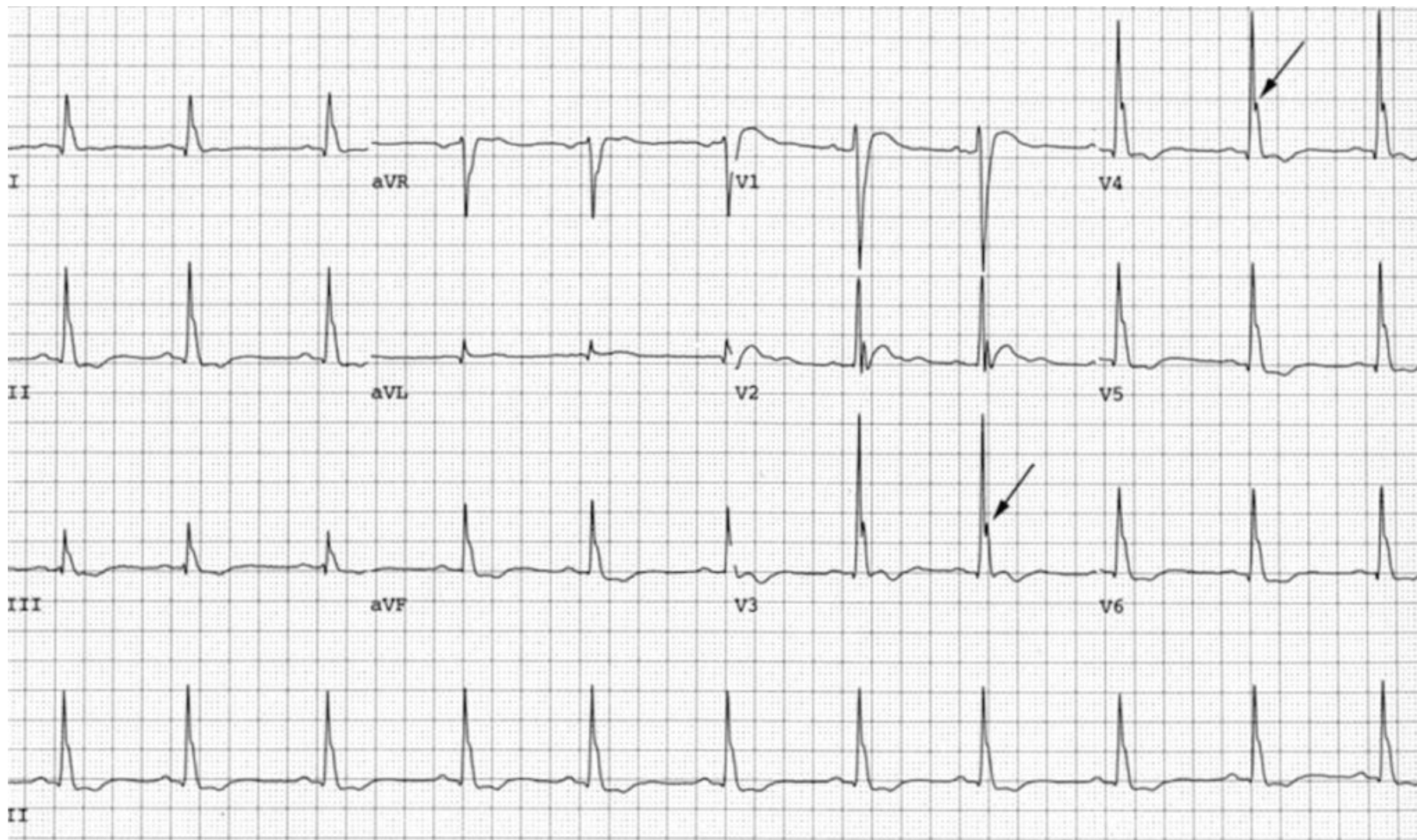
Hypercalcemia



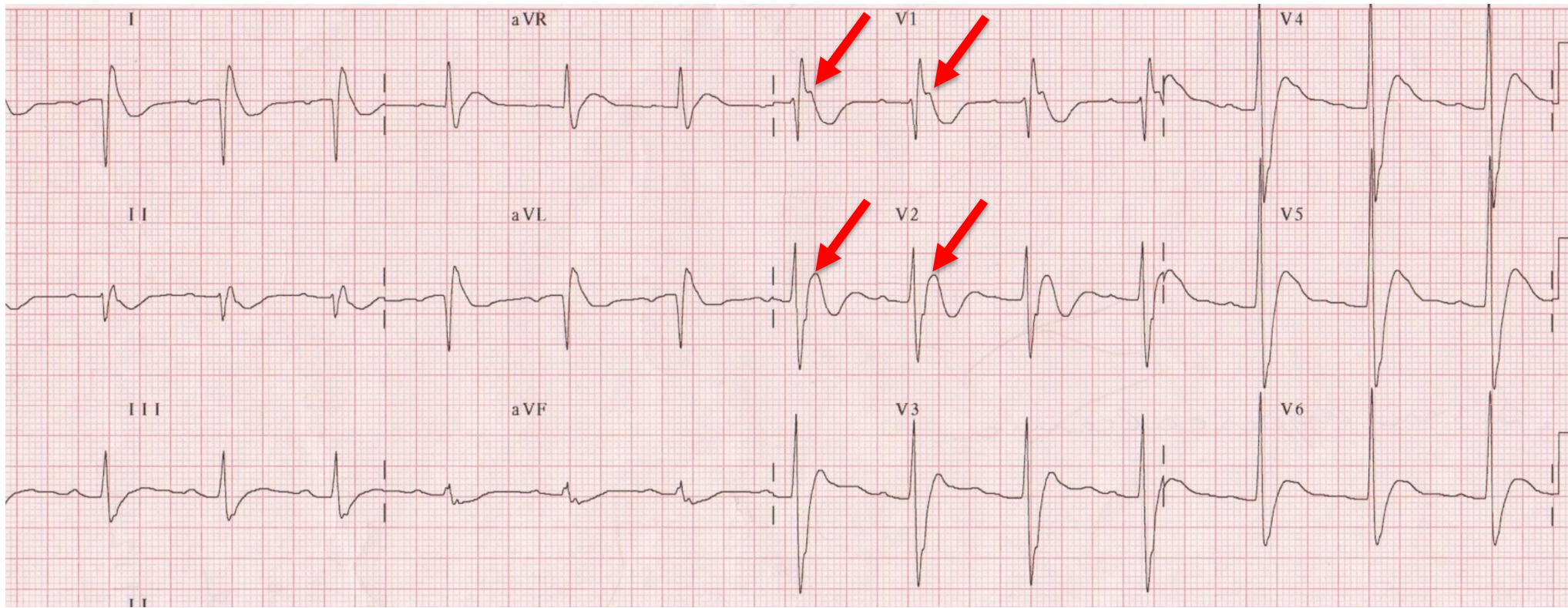
Normal calcium level



Hypocalcemia



Osborn wave (arrows) and short QT in setting of severe hypercalcemia. (ECG image from Life in the Fast Lane website)



Hypercalcemia – Note the short ST segment and Osborn waves (arrows)