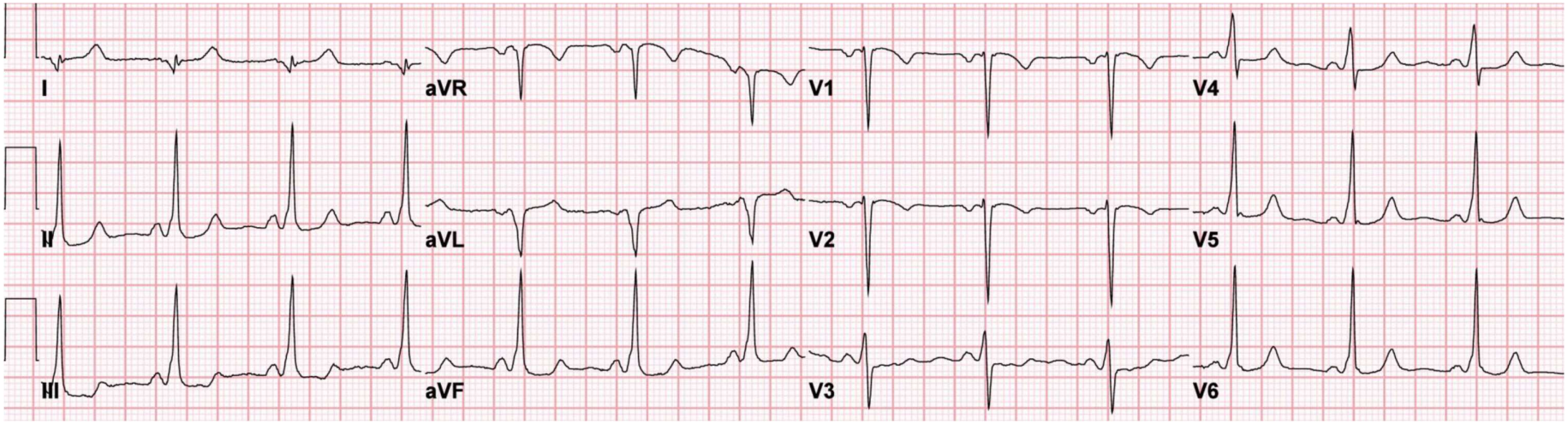
• Wolff-Parkinson-White (WPW) pattern



- Normal P wave axis and morphology
- PR interval < 120 msec (rarely > 120 msec)
- Initial slurring of the QRS (delta wave), resulting in an abnormally wide QRS (≥ 120 msec)

AV conduction over the accessory pathway (Bundle of Kent) bypasses the AV node (and intrinsic AV nodal conduction delay), resulting in preexcitation of the ventricles and a short PR interval.

The QRS duration is < 120 msec in 30%. In these cases, the ventricles are depolarized almost entirely by the normal AV conduction system, with minimal contribution from anterograde conduction over the accessory pathway resulting in a subtle to absent delta wave.

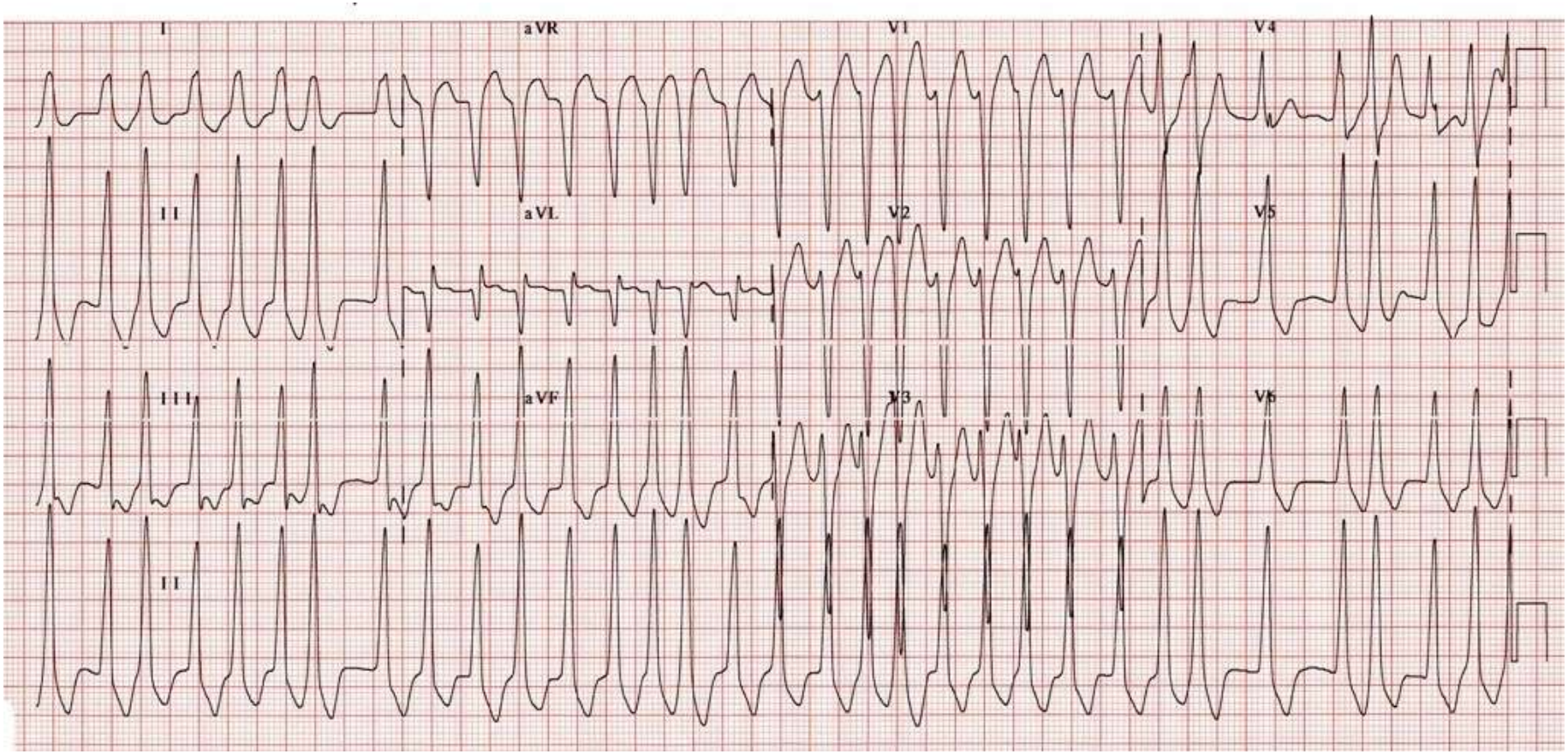
The widened QRS complex is a manifestation of fusion between electrical wave fronts conducted down the accessory pathway (delta wave) and the AV node. Differing degrees of preexcitation (fusion) may be present, resulting in variability in the delta wave and QRS duration

- Secondary ST-T wave changes opposite in direction to main deflection of QRS

The PJ interval (beginning of P wave to the J point [end of QRS complex]) is constant and ≤ 260 msec. This is due to an inverse relationship between the PR interval and QRS duration: if the PR interval shortens, the QRS widens; if the PR interval lengthens, the QRS narrows.

Ventricular preexcitation (WPW pattern) is associated with a short PR interval, slurred upstroke of the QRS due to the delta wave, and a widened QRS complex. The ventricular fusion between conduction over the accessory pathway and through the AV node can result in increased QRS amplitude, abnormal T waves, and Q waves suggestive of ventricular hypertrophy and/or myocardial ischemia/infarction, none of which should be coded once WPW pattern is identified.

Think WPW when AFIB or flutter is associated with a QRS that varies in width (is generally wide) and has a rate > 200 BPM



AFIB with WPW, heart rate = 200 BPM

Patients with Ebstein's anomaly often have WPW due to a right-sided pathway that connects the right atrium and right ventricle. This pathway and the resulting ventricular activation bypasses the normal conduction system and gives rise to a LBBB conduction pattern, distinctly different from the usual conduction pattern in patients with Ebstein's (which is a RBBB-type pattern) and a strong clue that WPW is present.

Overview: WPW is characterized by the presence of an abnormal muscular network of specialized conduction tissue that connects the atrium to the ventricle and bypasses conduction through the AV node. It is found in 0.2%–0.4% of the overall population and is more common in males and younger patients. Most patients with WPW do not have structural heart disease, although there is an increased prevalence of this disorder among patients with Ebstein's anomaly (downward displacement of the tricuspid valve into the right ventricle due to anomalous attachment of the
tricuspid leaflets), cardiomyopathy, and mitral valve prolapse. Two types of accessory pathways exist:

- In *manifest* accessory pathway, anterograde conduction occurs over the accessory pathway and results in pre-excitation on the baseline ECG, which may be intermittent.

- In *concealed* accessory pathway, anterograde conduction occurs via the AV node and retrograde conduction occurs over the accessory pathway, so preexcitation is not evident on the baseline ECG.

Approximately 50% of patients with WPW manifest tachyarrhythmias, of which 80% are atrio-ventricular macro-reentry tachycardia, 15% is AFIB, and 5% is atrial flutter. Asymptomatic individuals have an excellent prognosis. For patients with recurrent tachyarrhythmias the overall prognosis is good, but in rare instances, sudden death may occur. The presence of delta waves and secondary repolarization abnormalities can lead to false-positive or false-negative diagnosis of ventricular hypertrophy, BBB, and MI (old or acute). Once WPW has been diagnosed none of these other features should be scored oh the boards (e.g. LVH, RVH, MI, BBB). The polarity of the delta waves can be used to predict the location of the bypass tract.