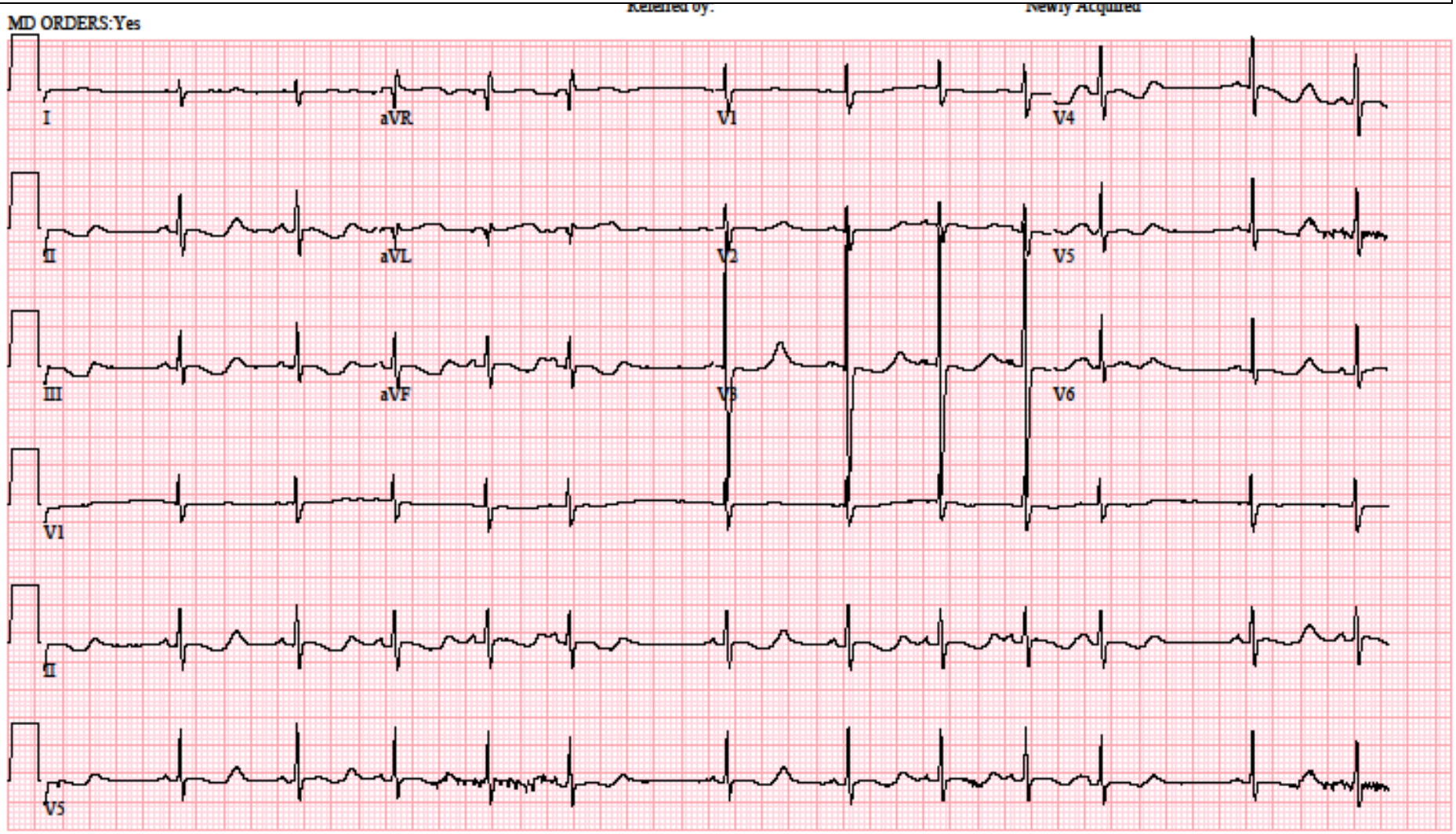
This EKG is from a 9 yo female being seen in the ED for dehydration.

1. What is the rate and rhythm?
2. Which interval is grossly abnormal on this ECG?
3. What electrolyte derangements are associated with this abnormality?
4. Name one of the original syndromes with this finding and another etiology for acquiring this ECG abnormality.



1) What is the rate and rhythm?

The best way to evaluate the rate when the rhythm is irregular is to count up the QRS complexes across the page (on a standard 25mm/sec ECG) and multiply by 6. Therefore the rate is:12 x 6 = 78bpm. The rhythm is sinus arrhythmia. P wave axis is normal, but the P-to-P intervals are somewhat variable.

2) Which interval is grossly abnormal on this ECG?

This patient has severe prolongation of the QT interval. The QTc measures 600-620 msec. The T wave in this case is biphasic and notched which is a particularly ominous finding. In general, the best places to measure the QT interval are in the lateral precordial leads (V5,V6) and at times in lead II.

3) What electrolyte derangements are associated with this abnormality?

Hypokalemia, hypocalcemia, and hypomagnesemia often can prolong the QT as these derangements affect myocardial repolarization. A prolonged QT interval can result in ventricular arrhythmias and ultimately Torsades, where magnesium is a common treatment option. Important patients to screen include adolescents with feeding disorders, chronically ill children with suboptimal nutrition, and severely dehydrated patients.

4) Name one of the original syndromes with this finding and another etiology for acquiring this ECG abnormality.

10 genetic mutations have been identified for congenital long QT syndrome. The three most common lesions are termed Long QT 1, 2, and 3. However, the autosomal recessive version of LQT 1 has been termed Jervell and Lange-Nielsen syndrome and is characterized by congenital deafness as well. The other named LQT syndrome is Romano-Ward and is an autosomal dominant form without deafness. These named syndromes have fallen out of favor as genetic testing has become widespread and now they are referred to primarily as LQT1-10.

The other common acquired etiology for prolonged QT intervals is from medications. The best website to review is http://www.azcert.org/ which categorizes all of the medications and puts them in separate risk categories for you.