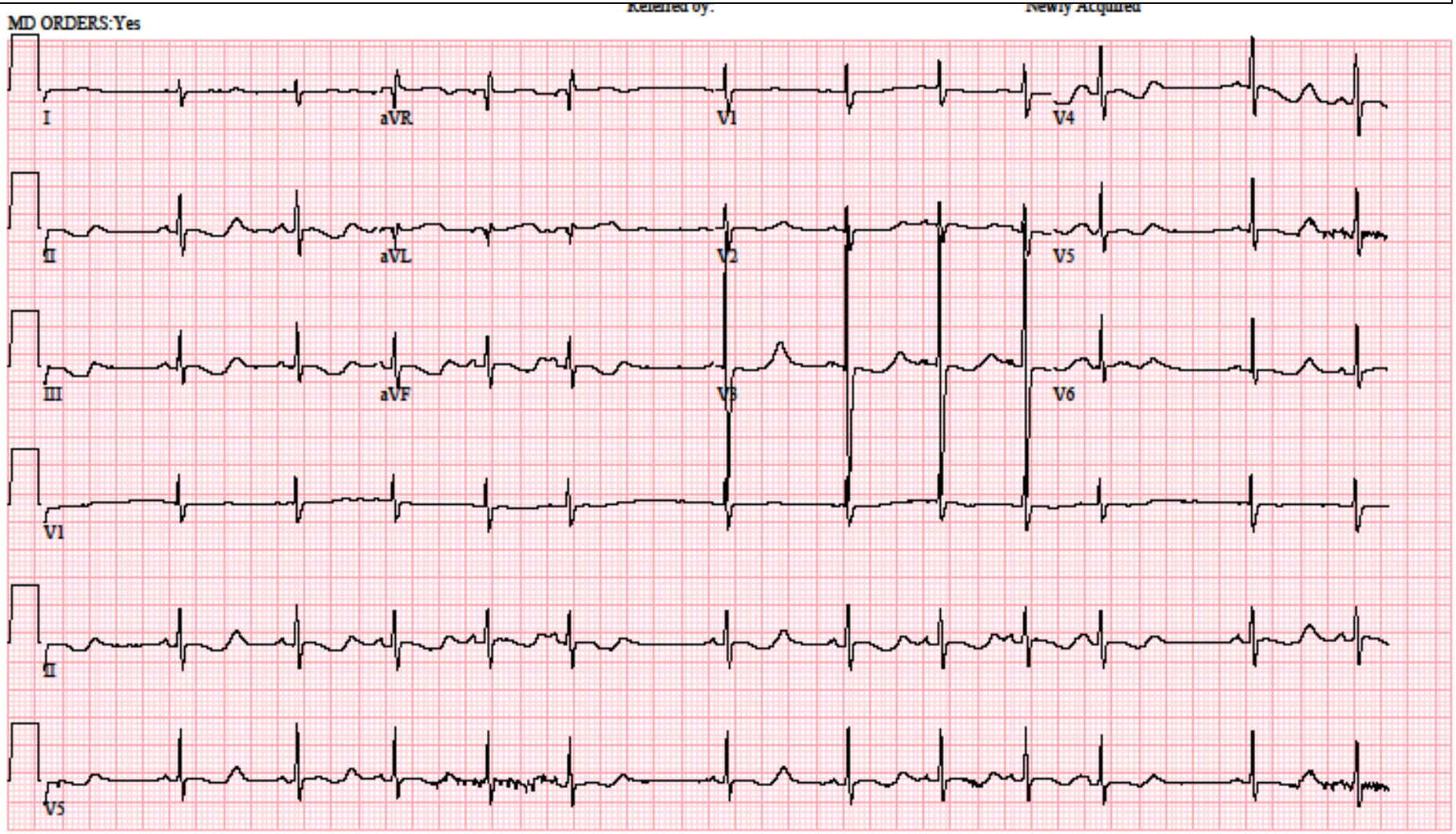
EKG of the Week

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

1. What is the rate, rhythm, and axis?
2. What is the major abnormality on this ECG (Hint, it is not the irregular rhythm)?
3. Name at least 2 potential causes of the major abnormality on the ECG.



EKG of the Week

1. What is the rate, rhythm, and axis?

-Notice that the rate is quite irregular. In this case you'd like to estimate the average heart rate. A standard ECG measures 10 seconds of data; therefore, if you count the number of beats and multiply by 6, you get a decent average HR. In this case, there are 12 beats across the ECG, so 12x6=72bpm.

-This is sinus arrhythmia, a normal variant. Note a P wave for every QRS, a QRS for every P, and that the P wave is normal morphology (up in lead I and lead aVF). Since the spacing of the P waves is a little irregular, we call this sinus "arrhythmia," but it is not considered an abnormality.

-QRS is equiphasic (as much up as down) in lead I, so axis is perpendicular to this lead. QRS is mor up than down in lead aVF and thus is directed inferiorly. Axis is therefore around 90 degrees.

2. What is the major abnormality on this ECG?

-Prolonged QTc. In this case, it's about 650msec! Recall the calculation:

(measured QT/square root of preceeding R-R in seconds)

3. Name at least 2 potential causes of the major abnormality on the ECG.

-Hypokalemia, hypocalcemia, and hypomagnesemia often can prolong the QT as these derangements affect myocardial repolarization.

-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.