ECG of the Week

You are called to the nursery to evaluate a newborn infant with tachycardia.

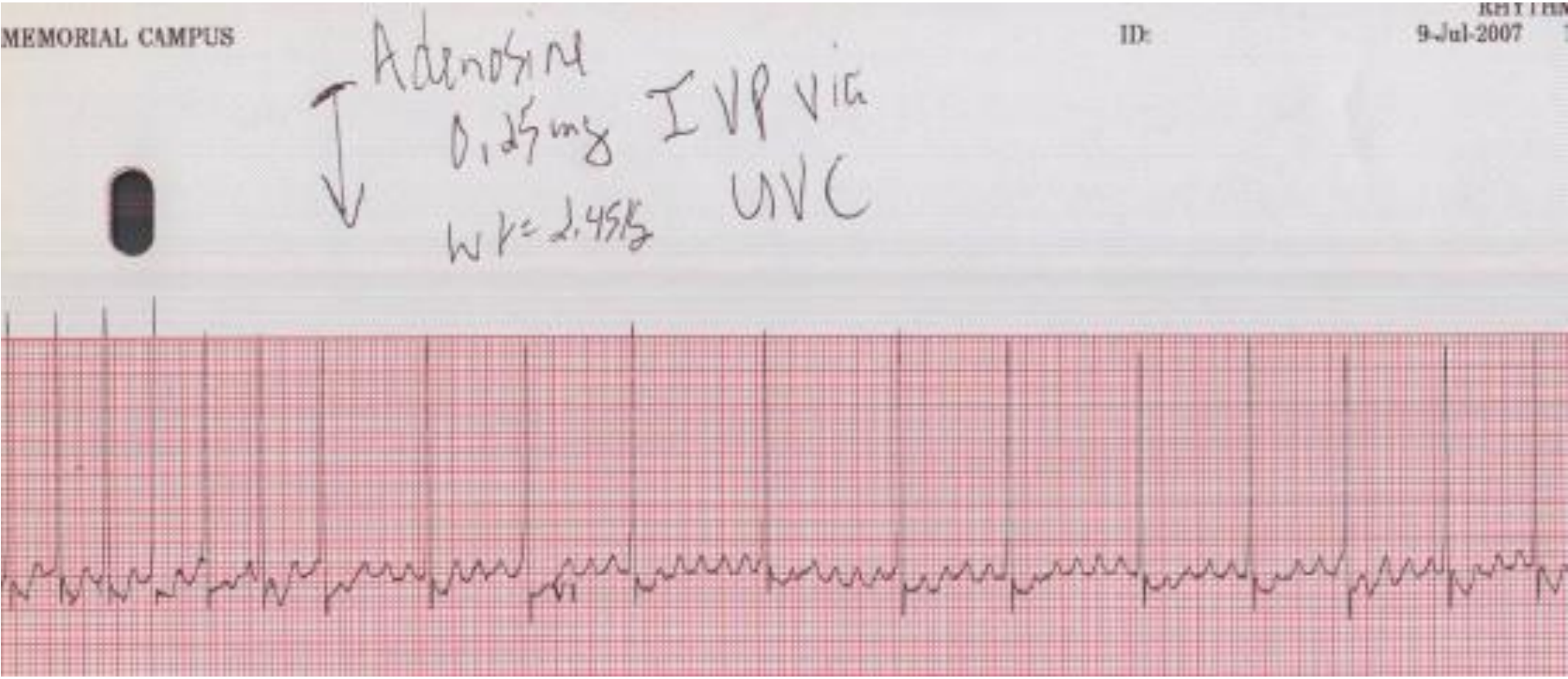
1) What is the rate and axis? This image is cropped so be careful with your HR technique! (1pt)

Go to the next slide…

You decide this is some sort of supraventricular tachycardia (SVT), and deliver 0.1mg/kg of IV adenosine. The rhythm strip is shown below:

2) What does adenosine do (i.e. how does it work)? (1 point)

3) What is the diagnosis? (1 point)



1) What is the rate and axis? This image is cropped so be careful with your HR technique! (1pt)

The rate can be determined by measuring the interval between QRS complexes (the R to R interval) in milliseconds and dividing 60,000 by this number:

~7 little boxes between QRS complexes

7 x 0.04 seconds = 0.28 seconds = 280 milliseconds

60,000/280 = 214 beats per minute

The QRS is *downward* in lead I and *upright* in lead aVF. It is therefore rightward and downward (southwest). More specifically, the QRS is nearly equiphasic (as much up as it is down) in lead aVR, therefore nearly perpendicular to this lead. The axis is therefore close to 120 degrees. This, by the way, is normal for a newborn.

2) What does adenosine do? (1 point)

Adenosine inhibits conduction through the AV node. It will prevent signals from conducting regularly from atria to ventricles through the AV node. If there is a reentrant type of arrhythmia that uses the AV node as part of the reentrant circuit, adenosine will terminate the arrhythmia.

3) What is the diagnosis? (1 point)

Atrial flutter! Note the classic "sawtooth" pattern that is revealed after the adenosine turns off (most) of the AV node activity. Once the QRS complexes go away, the flutter pattern is very clear. Note there are about 3.5 little boxes between each P wave, yielding an atrial rate of ~428 bpm, or exactly twic e the original ventricular rate! A-flutter frequently results in some degree of AV block (2:1 block in this case) as a result of its rapid frequency.