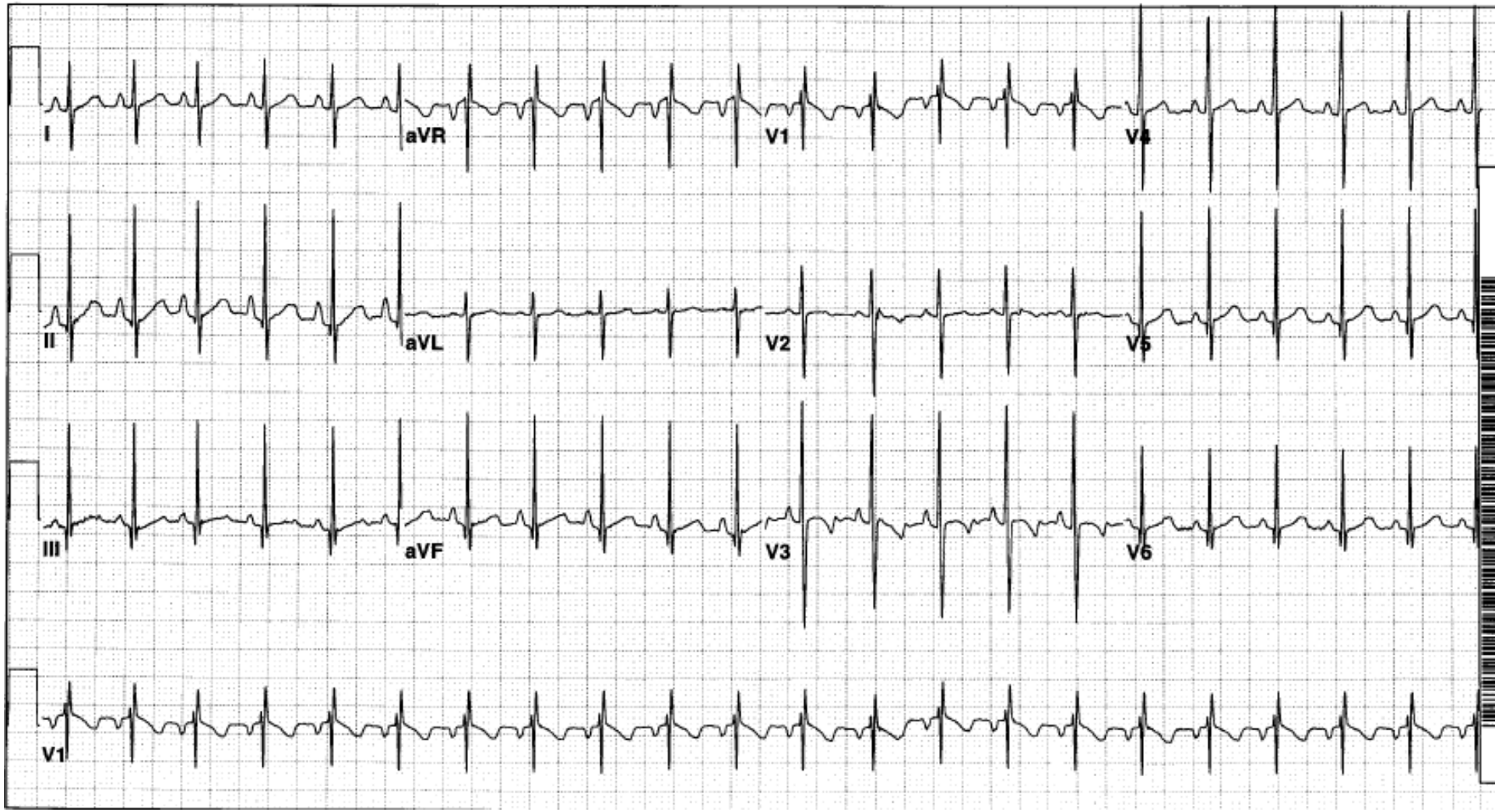
This is a routine ECG in a 10 month old patient with a history of congenital heart disease.

1) What is the rate, rhythm and axis? (1 point)?
2) Is there any evidence of chamber enlargement here? Which chamber(s)? (1 point)
3) What is the cardiac diagnosis that most likely explains the ECG findings (1 point)?



Solution

1) The rate is 22 x 6 = 132 bpm (there are 22 QRS complexes on this standard ECG that records 10 seconds of information). Rhythm is normal sinus: P for every QRS, QRS with every P, and P wave axis is normal. QRS axis is about 90 degrees (straight down). The QRS is up in aVF (toward aVF) and equiphasic in lead I (i.e. perpendicular to lead I).

2) There is **right atrial enlargement** evidenced by tall peaked P waves in lead II—these are also often seen in lead V1 but not in this patient. There is also possible **evidence of RVH**. Look at the QRS in lead V1. Note the rSR' pattern (R' means there's a second R wave), with the R' about 5mm taller than the first R wave. This is suggestive of RVH (this was a borderline finding in this patient).

3) The diagnosis most consistent with this ECG is an **atrial septal defect (ASD).** These defects allow left-to-right flow across the atrial septum, which results in both the right atrium and the right ventricle becoming dilated.

--Note that when we say "RVH" on an ECG interpretation, we usually do not distinguish between chamber dilation and chamber hypertrophy, although it's important to recognize that these are two very different problems. Chamber dilation occurs as the result of volume overload, whereas chamber hypertrophy usually occurs as the result of pressure overload. One would need to do an echocardiogram to truly determine if there was RVH or RV dilation on this patient.