

## A 30-year-old pregnant woman with bradycardia

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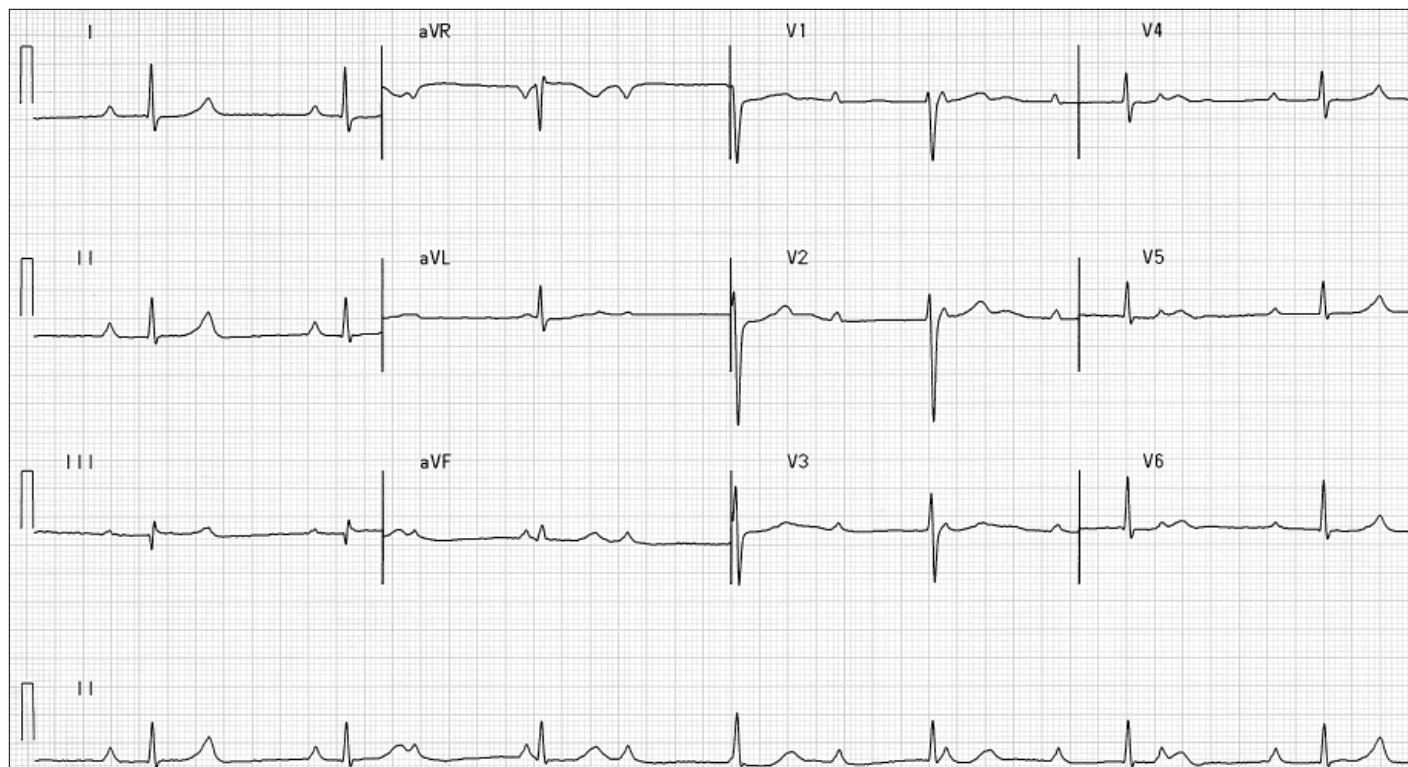


Figure. Admission electrocardiogram in a 30-year-old pregnant woman. See text for explication.

**A** 30-year-old woman (gravida 4, para 3) with full-term pregnancy presented in spontaneous labor. She had no significant medical history and was asymptomatic except for labor contractions. Her heart rate was 42 beats per minute, and her blood pressure was normal. Chest was clear to auscultation bilaterally. Her cardiac rhythm was regular with a varying first sound intensity. No murmurs were heard. Her extremities did not show significant edema.

The electrocardiogram (Figure) demonstrated complete atrioventricular block with a junctional escape rhythm at a rate of 43 beats per minute. The atrial rhythm was sinus with ventriculophasic sinus arrhythmia: the P-P intervals were shorter (0.70 to 0.75 seconds; mean 0.727) when they contained QRS complexes and longer (0.76 to 0.81 seconds; mean 0.782) when they did not. The R-R intervals were quite regular at 1.38 to 1.39 seconds. The electrocardiogram was unchanged from one recorded a year earlier. A previous evaluation had not revealed any abnormality other than the arrhythmia, and the patient was pre-

sumed to have congenital complete heart block. She delivered vaginally a healthy baby and has remained asymptomatic.

Congenital complete atrioventricular block occurs in approximately 1 of 25,000 live births (1), and estimates based on fetal echocardiography are that nearly an equal number of fetuses die in utero. The great majority of these deaths, as well as deaths in the neonatal period, occur in the 50% of patients who have associated congenital malformations, most commonly left atrial isomerism, often coexisting with atrioventricular septal defect,

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and ventricular inversion (congenitally corrected transposition of the great arteries). Among live births, congenital complete atrioventricular block is isolated in some 70% of patients, and most of their mothers have evidence of systemic lupus erythematosus, especially SS-A (anti-Ro) antibodies. Evidence suggests that these antibodies cross the placenta and damage the fetal conduction tissue (1). Some of these mothers have yet to experience clinical manifestations of lupus.

Blocked conduction may be due to an inadequate connection between the atria and the atrioventricular node, a defect in the node itself, or lack of connection between the node and the bundle of His (1). With rare exceptions, the escape rhythm arises above the His bifurcation, and the QRS complex is narrow. Although syncope and sudden death may occur, some 80% to 90% of patients with isolated congenital complete atrioventricular block survive to adulthood, and the majority are asymptomatic. Excessively slow ventricular rates or symptoms attributable to the bradycardia are indications for permanent pacemaker insertion (2).

Ventriculophasic sinus arrhythmia is seen in up to 40% of cases of complete atrioventricular block and has been described

in second-degree atrioventricular block, with ventricular premature complexes, and in pacemaker-induced ventricular rhythm (3–6). The possible mechanisms involved in this phenomenon include arterial baroreceptor-mediated changes in vagal tone, activation of the Bainbridge reflex by the ventricular contraction, mechanical traction on the atria, and perhaps an increase in blood flow to the sinoatrial node during ventricular systole.

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