Interesting Electrocardiogram: The Appearance of Left Bundle Branch Block During Treadmill Testing—Revisited

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These tracings were obtained on a 49-year-old male applying for a large amount of insurance. He was asymptomatic both on ordinary activities and during the treadmill exercise testing.

This treadmill test is shown in Figures 1a to 1d. The resting tracing (Figure 1a) is normal. During the exercise test when heart rate reaches 122/minute at the end of Stage 1 (Figure 1b, Stage 1 3:00), there are 1.5 to 2.0 mm ST depressions which increase as heart rate rises to 179/minute (Figure 1c, Stage 3 3:00). At Stage 4 when heart rate reaches 188/minute, complete left bundle branch block (LBBB) develops (Figure 1c, Stage 4 0:59). This LBBB remains present during all of the first few minutes of recovery (Figure 1c, Recovery 2:00) as heart rate falls to 151/minute. At the third minute of recovery when heart rate falls to 132/minute (Figure 1c, Recovery 3:00), the LBBB disappears, but the ST depressions persist throughout the rest of recovery (Figure 1d) even when heart rates fall to 104/minute. Thus ischemia appeared before the LBBB occurred and continued after LBBB disappeared. This sequence provides the evidence that coronary artery disease with exercise ischemia is the etiology of this rate-related LBBB. The nutrient coronary artery to the left bundle branch is the left anterior descending artery. Hence, this man probably has one vessel coronary disease with silent ischemia.

The conditions producing LBBB, either rate-related or constant, include: valvular heart disease, especially aortic stenosis and/or aortic insufficiency; left ventricular hypertrophy of any cause; the fibrotic degenerative IV septal and AV ring diseases described by Lev and Lenègre; myocarditis; and coronary disease.

In the past, coronary disease was thought to be the major cause of LBBB. However, with our present ability to analyze for this disease and with careful epidemiologic studies, it is now clear that coronary artery disease plays a role in producing LBBB in only one third of the cases. Therefore, in two thirds of LBBB cases, there is no coronary disease. In these two-thirds, the commonest etiology by far is the degenerative fibrotic lesions of Lev and Lenègre. These lesions are relatively benign and do not endanger the subject, who therefore is not at serious risk. However, when coronary disease is present as the cause for LBBB, as is the case in this man, the overall prognosis tends to be poorer than in coronary subjects with LBBB. He has one vessel disease and his ischemic episodes occur without symptoms, a fact which may make the prognosis even poorer.

Editors note: From the personal papers of Dr. Irené Ferrer, published here with the permission of her daughter, Dr. Marianne Legato. This piece was written in 1989.
Figure 1c.

Figure 1d.