Interesting Electrocardiograms

RATE-DEPENDENT BUNDLE BRANCH BLOCK

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These electrocardiograms were taken on a 36 year-old man, with no known cardiac abnormality. The twelve-lead tracing, which shows sinus rhythm at rates between 53 and 60/min., has abnormal T waves in V1-V4. A strip, using lead V6, shows the interesting phenomenon of **rate-dependent left bundle branch block** (LBBB). Please note in this strip that the first four sinus beats have normal QRS-T waves. The heart rates of these beats are of special interest as the sinus rate starting at 64/min. gradually increases, - from 67 to 71/min. At the fifth beat (marked with arrow) the heart rate has reached 75/min. and LBBB appears. The rest of the beats, with rates of 77/min., also show complete LBBB. When heart rate dropped below 75/min. normal (narrow) QRS complexes were immediately seen. This sequence was seen repeatedly, with the crucial rate being 74-75/min. each time.

The abnormal T waves in the anteroseptal V leads (see full tracing) suggests ischemia involving the left anterior descending coronary artery. This vessel is also the nutrient artery to the left bundle branch. It is suggestive, therefore, that coronary disease in this case, is the cause of the intermittent LBBB. The treadmill exercise test done on this subject could not be read since, as soon as the heart rate rose above 75/min., LBBB appeared. Treadmill tests, of course, cannot give information about myocardial ischemia in the presence of LBBB.

The somewhat unusual finding of rate-dependent LBBB contrasts with the much more common rate-dependent aberrancy of right bundle branch block. This latter has little serious implication but rate-dependent LBBB is considered a form of inermittent LBBB and has quite a different cardiologic outlook. A list of pertinent references to this rarity is appended.

The first point of interest is that the IV conduction defect appears at modest heart rates (75-80/min. as a rule). This suggests that the left bundle in such cases is indeed anatomically abnormal and a purely physiologic explanation is not valid.

The second fact of importance is that almost all cases of intermittent LBBB, if followed long enough, eventually develop constant LBBB. Thus this case, from an insurance point of view, becomes a problem of LBBB in a man without other impairment. Recent data (7) reiterates that LBBB is extremely rare among young and healthy subjects, and a congenital etiology (in contrast to RBBB) cannot be invoked. Nevertheless, the etiology often remains obscure, as more than half the subjects with LBBB have no evidence of ischemic, hypertensive, rheumatic, infective or other recognized forms of heart disease. A fibrotic degenerative process is likely when no other disease is evident.

The prognosis of LBBB appears more favorable in the group of subjects without other evident disease than in those with LBBB and known forms of heart disease (8). The five-year incidence of sudden death as the first manifestation of heart disease was reported (8) as ten times greater in men with LBBB than in those without it. However, age groups of 35 to 44 years of age had a far better prognosis than older men. The latter showed the increased mortality within the first five years of onset. Later on the prognosis grows better.

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