THE ELECTROCARDIOGRAM OF THE MONTH

The author would be pleased to receive comment and controversy from readers in relation to explanations offered.

M. S. is a 56-year-old white man who was hospitalized on November 10, 1956 for the first episode of congestive heart failure; he improved after digitalization. His past history includes hypertension averaging 180/100 mm. Hg. and angina pectoritis which required nitroglycerine only occasionally. He had had mild diabetes mellitus for about fifteen years. There is no history of myocardial infarction.

The electrocardiogram in the illustration was taken on December 14, 1956 and subsequent tracings are quite similar. It is of interest for two reasons:

(1) The pulses bigeminus shown in Lead II was found to occur frequently and could be induced by emotionally threatening problems. For example, with a patient attached to the electrocardiogram, a pleasant chat showed no arrhythmia. As the blood sugar report was brought into the room, producing an unpleasant look on the physician's countenance, bigeminal rhythm would appear and would last until the patient was reassured. This was repeated on eight occasions with the same results. While this is not proof, it is clinically suggestive and illustrates an old observation that premature beats (usually not coupled, however) are often emotionally precipitated.

(2) The electrocardiogram shows left axis deviation. The width of the QRS complexes is usually 0.11 seconds and occasionally 0.12 seconds. There is slurring of the ascending and descending limbs of the QRS complexes, espe-
cially well seen in Leads V1 and V2. (Some of the QRS complexes have been retouched for illustration purposes). The limb leads superficially suggest left bundle branch block with the broadened S waves in Leads V4—V6. Right ventricular hypertrophy would be considered because of the tall R waves in Leads VI—V3.

The vectorcardiogram (taken by the modified cube system of Grishman) clearly shows that the resultant vectors are directed to the right and posteriorly (well seen in the horizontal plane) and superiorly (well seen in the frontal and sagittal planes). The author has shown that this occurs when a large anterolateral or more often posterolateral myocardial infarct diminishes the electromotive forces generated by the left ventricle. Thus, the infarction vectors point to the right and superiorly accounting for the tall R waves in Leads aVR and VI—V3, which leads face the positive side of the QRS vector loop. From the pattern standpoint, tall R waves in Leads aVR and the right precordial leads are strongly suggestive of this type of large infarction. There is no evidence in the vectorcardiogram of a block in the main conduction bundles so that this tracing is neither right nor left bundle branch block; nor is there evidence of right ventricular hypertrophy.

Similar conclusions may be reached by employing Grant’s method of analysis: the initial 0.04 second vector of the QRS complex is at an axis of almost plus 115 degrees, while the terminal 0.04 second vector is at an axis of minus 95 degrees. The angle between these two vectors is 210 degrees, while in the normal heart it is under 100 degrees. According to Grant, when, in left axis deviation, the angle between the initial and terminal 0.04 second vectors exceeds 100 degrees, peri-infarction block in myocardial infarction is present. He believes it is due to a block in the major branch of the left conduction bundle. Certainly the circuitousness of the horizontal plane QRS vector loop suggests prolongation in the transmission of the depolarization forces in the left ventricle and explains the slurring and the prolongation of the terminal 0.04 seconds of the QRS complexes.

This electrocardiogram is considered to be an example of a large diaphragmatic (inferior) and lateral wall myocardial infarct with digitalis effect.

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