ELECTROCARDIOGRAM OF THE MONTH

Ventricular Parasystolic Tachycardia*

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The difficulty that may arise in differentiating a ventricular from a supraventricular tachycardia is well known. This problem occurs because the electrocardiographic criteria upon which the diagnosis of a ventricular tachycardia can be made are rarely present. If an interpretation cannot be made during the tachycardia, occasionally studying the isolated premature beats occurring before or after the paroxysm may be rewarding.

In the following case, ventricular tachycardia was diagnosed when parasystole was recorded with QRS complexes similar in contour to the beats of the tachycardia. The rarity of published cases of clinically occurring ventricular parasystolic tachycardia may be due to its lack of recognition.1-6

CASE REPORT

A 77-year-old white man was admitted to Nassau Hospital on June 2, 1966 with chest pain, diaphoresis and tachycardia. Physical examination revealed cardiomegaly with signs of congestive heart failure. The electrocardiogram showed sinus rhythm with left bundle branch block.

Shortly after admission, parasys toms of a slightly irregular tachycardia with a ventricular rate of 128 per minute were recorded (Fig 1). In the interim between the paroxysms, parasystolic ectopic contractions were identified both during sinus rhythm (Fig 2A) and following reversion of the sinus rhythm to atrial flutter (Fig 2B). In the latter electrocardiogram, a fusion beat helped confirm the ventricular origin of the extrasystoles. These beats had the same contour as the QRS complexes in the tachycardia which permitted a diagnosis of ventricular parasystolic tachycardia to be made.

DISCUSSION

The electrocardiographic diagnosis of ventricular tachycardia is frequently considered, but difficult to prove. In an attempt to substantiate this impression in the above case, isolated premature contractions occurring both before and after the bouts of tachycardia were studied. Analysis of long electrocardiographic strips revealed the simultaneous activity of two independent impulse forming centers (parasystole). This was established by the finding of: (1) an inconstant relationship of the ventricular responses to the sinus beats, or flutter waves to the ectopic beats, and (2) by the relatively constant relationship of the ectopic beats to each other. These beats had the same configuration as those in the tachycardia which suggested a similar origin. The finding of a fusion beat within the parasystole confirmed the ventricular origin of the isolated ectopic beat and established the diagnosis of ventricular tachycardia.

Careful examination of numerous interectopic intervals separated by supraventricular responses revealed that they varied from 140 to 549 hundredths of a second. In the representative examples

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FIGURE 1. Non-continuous electrocardiographic tracings obtained from lead V1. There is slight variation in the QRS complexes. They show a slightly irregular tachycardia with a widened QRS at the rate of 128/minute.
Figure 2. Selected electrocardiographic tracings from lead V1. They show ectopic ventricular beats from a parasympathetic focus. The inconstant relationship of the premature ectopic beats to the supraventricular excitation is clearly seen. A (upper): Successive ectopic periods measure 176, 545, 549, 158 and 122. There is a change in the atrial pacemaker with a slight slowing of the sinus rate following a premature atrial contraction (7th beat of top strip) with no change in the parasytole. B (lower): The supraventricular mechanism has changed to atrial flutter. Successive ectopic periods measure 416, 284, 140, 284 and 278. The third beat in the lower strip is a fusion beat. NPEB . . . Nonparasympathetic ectopic beat.

demonstrated in Figures 2A and 2B successive interectopic periods measured were 276, 545, 549, 158*, 122 and 416, 284, 140, 284 and 278 hundredths of a second, respectively. The least common denominator representing the fundamental rate of the parasympathetic pacemaker could not be determined from these intervals, but was measured directly from the ectopic intervals of the tachycardia (Fig 1). It varied from 46 to 48 hundredths of a second representing a heart rate varying from 125 to 130 beats per minute.

In order to explain the number of parasympathetic discharges which failed to produce a ventricular response, it was necessary to postulate either inter-

*The lengthening of the interectopic period with an increase in the length of the lowest common multiple is probably due to a delay in conduction to the ventricle of an impulse formed in the ectopic center. The following interectopic interval conducted normally is proportionately shorter. These interectopic intervals were not considered in the range of the interectopic intervals.

ference (the ectopic beat finding the ventricle in the refractory period of a supraventricular excitation) or exit block (unidirectional block preventing the ectopic impulses from stimulating the ventricle). The latter mechanism seemed most likely, as parasympathetic impulses falling outside the refractory period of the ventricle failed to produce an excitation. In addition, the presence of intermittent bouts of parasympathetic ventricular tachycardia could not be explained on the basis of interference. This suggested that a center which discharged at the rate of 128 per minute functioned with a 3:1 to as high as a 12:1 exit block to explain the long interectopic intervals. When the exit block suddenly decreased, it was easy to visualize how a supraventricular rhythm with an occasional innocent appearing extrasystole could in the next instance be replaced by a ventricular tachycardia. As suggested by Scherf,5 the separation of a parasytole from a rapid ectopic tachycardia is not
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sharp. It may be determined by the presence or absence of an exit block.

Although the high degree of exit block in this case is unusual, the rate of the tachycardia is typical of a parasystole with a rapidly firing pacemaker. Usually the rate of ventricular parasystolic tachycardia is not as rapid as ventricular tachycardia without the parasystolic mechanism. Chung et al8 studied 12 patients in whom the rate of the ectopic parasystolic center varied between 70 and 140 beats per minute. A rate greater than 150 beats per minute was not found in eight patients observed by Scherf and Bornemann.5

In conclusion, the difficulty that may arise in the interpretation of the tracing presently recorded, in addition to others cited above, underscores the importance of analysis of isolated ectopic beats.

PRIORITY: AESCULAPIAN SECTION VERSUS CESAREAN SECTION

Hesiodus first reported the wonderful birth of Aesculapius in the seventh century B.C., as the son of Apollo and the mortal Coronis, whom the latter had seduced. As Coronis was to be married by another, she was murdered by Apollo's sister Artemis; but the god let the innocent child live in the pregnant body of the mother and cut it out while still living from the body. Aesculapius was then entrusted to the centaur Chiron, who initiated him in the secrets of medical science. Pindar also repeated this legend with slight changes in the fifth century B.C. He portrays Aesculapius as a mortal, but as son of god. In later accounts his birth is seen as a divine miracle and it is surely no coincidence that the legend of his descent from a godly father, Apollo, and his birth from a virgin mother, Coronis, later greatly added to his being the sole Greek god to offer real competition to Christ, the Saviour. Thus, this cult was especially singled out for battle by the rising Christians; whereas they usually recognized heathen authorities in medicine such as Hippocrates and Galen, as their representation in a Christian church proves.


REFERENCES


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