Retrograde Conduction of Ventricular Extrasystoles with Consideration of Return Extrasystoles

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These two tracings were registered on a 59-year-old diabetic with angina pectoris and a known right bundle branch block for 14 years. A similar tracing was obtained three years previously.

The top tracing shows four multiform ventricular extrasystoles (Lead II). Each reveals a peaked, inverted P wave between the QRS and T indicating a reversed conduction of the extrasystole to the atria. The P-R interval of the extrasystoles is of the same duration. However, the extrasystole with a broad tall R wave typified by the third extrasystole of the top tracing, invariably has an R-P of 0.16 second in long tracings. These extrasystoles presumably originate in a focus where the impulse is delayed in reaching the A-V conduction system.

Another disturbance of rhythm illustrated by this tracing is the appearance of nodal escape beats following each extrasystole with reversed conduction. The extrasystole which is conducted in the retrograde direction reaches the sinus node where it inhibits impulse formation. This inhibition permits the escape of the A-V node.

The bottom tracing was obtained after the patient performed a dozen sit-ups. The first ventricular extrasystole is conducted back to the atria as in the top tracing. Likewise, the extrasystole with the broad R wave has a R-P interval of 0.16 second. The fourth extrasystole in this tracing, the only one in a very long strip, does not show retrograde conduction and is not followed by an escaped beat. Two trigeminus groups in this tracing show a sinus beat followed by two multiform extrasystoles. The first extrasystole exhibiting an inverted P between QRS and T is certainly conducted back to the atria. What, however, is the nature of the second extrasystole? Is it an extrasystole arising from another focus in the ventricles or is it a return extrasystole?

A return extrasystole results when a ventricular extrasystole with retrograde conduction to the atria goes back to the ventricles in another part of the conduction system andreactivates them. Thus, one impulse originating in the ventricles elicits one atrial and two ventricular contractions. Because of the law of the absolute refractory phase, two pathways in the conduction system must be postulated. One permits retrograde, the second antegrade conduction within a brief period of time. One of us demonstrated experimentally that a functional longitudinal dissociation is common in the A-V conduction system; whenever in the retrograde conduction of ventricular extrasystoles the R-P interval is prolonged sufficiently, a return extrasystole appears. In the two trigeminus groups of the bottom tracing, the R-P interval is, as usual in this patient only 0.12 second. This is not long enough to support the contention that the second extrasystole is a return extrasystole. Thus we are dealing with normal beats followed by two ventricular extrasystoles originating in different foci.

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