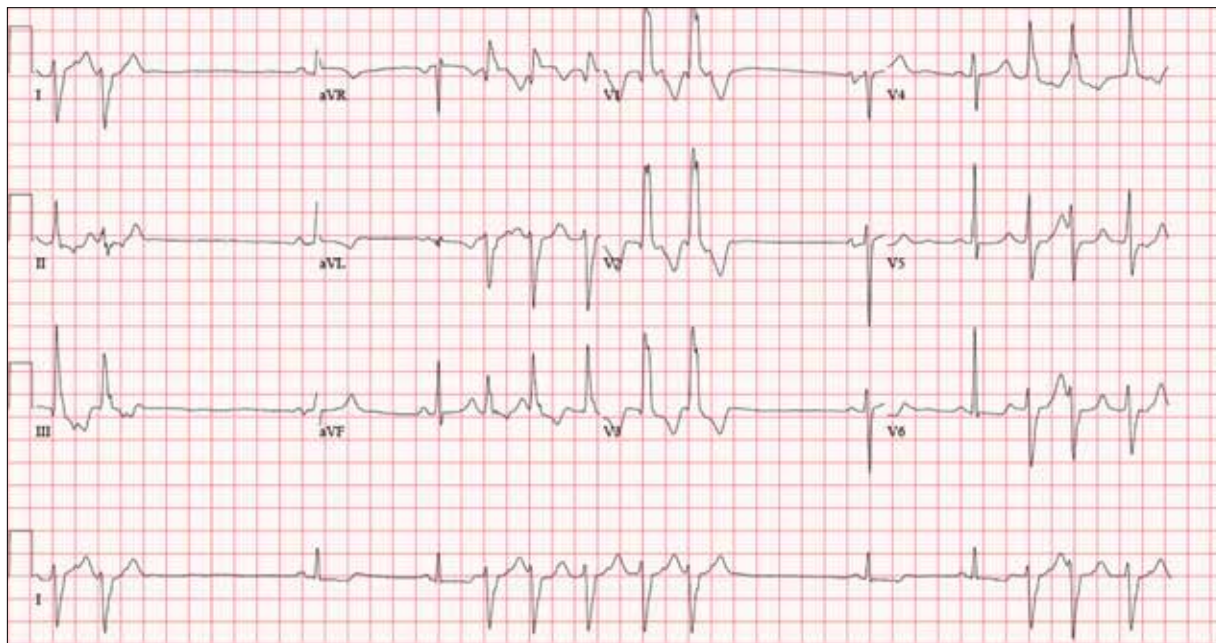


It Reminds Him of When His Heart “Got Very Sick”



An 84-year-old man is transferred to your facility from a skilled nursing facility (SNF). During the routine morning vital signs check, the medical assistant (MA) at the SNF noted that the patient had a normal blood pressure but an irregular heart rate that she hadn't observed before. The MA asked the nursing supervisor to verify her findings. The nursing supervisor noticed not only an irregular heart rate, but also pauses of up to 3 seconds.



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The patient denied chest pain, shortness of breath, or syncope, but he did say that twice overnight he had become lightheaded while walking from his bed to the bathroom. Upon further questioning, he informed the staff that this had happened once before: right before his “heart became very sick” and he spent a long time in the hospital “getting it fixed.” Given this history and the physical findings, the nursing supervisor called 911 to have him further evaluated.

Your first impression of the patient is that he is comfortable, pleasant, and in no distress. His medical history is remarkable for a nonischemic cardiomyopathy with acute onset chronic heart failure. A year ago, he had an echocardiogram at another facility that showed aortic sclerosis, mild mitral regurgitation, and a left ventricular ejection fraction

of 35%. He also has a history of hypertension, COPD, hypothyroidism, and osteoarthritis. His surgical history is remarkable for bilateral knee replacements, left hip replacement, and appendectomy.

Family history is significant for heart failure in both parents and in his maternal grandparents. His father died in World War I, and his mother died of complications from abdominal surgery.

The patient, a retired contract painter, became a widower five years ago, when his wife died of a hemorrhagic stroke. He has no children. Before voluntarily moving to the SNF after his wife's death, he smoked one pack of cigarettes and drank one six-pack of beer per day. He now abstains from both substances.

His medication list includes metoprolol, furosemide, potas-

sium, lisinopril, and levothyroxine. He is allergic to tetracycline antibiotics.

The review of systems is remarkable for hearing loss requiring bilateral hearing aids, corrective lenses, and use of a cane for ambulation. Physical examination reveals a frail, elderly male with a weight of 148 lb and a height of 68 in. His blood pressure is 104/52 mm Hg; pulse, irregularly irregular with pauses at an average rate of 80 beats/min; and O₂ saturation, 94% on room air. He is afebrile.

Pertinent physical findings include corrective lenses and bilateral hearing aids. A cataract is visible on the left eye. The lungs are clear bilaterally. The cardiac exam reveals an irregular rate, a grade II/VI early systolic murmur at the left upper sternal border with radiation into the neck, a grade II/VI early diastolic murmur heard during periods of a regular heart rate, and no rubs or gallops. The abdomen is protuberant but soft, with an old right lower quadrant surgical scar. The extremities

show no evidence of peripheral edema; however, there are advanced changes related to osteoarthritis in both hands, and surgical scars over both knees and the lateral aspect of his left hip.

Bloodwork is obtained for analysis, and an ECG is performed. The latter reveals a ventricular rate of 82 beats/min; PR interval, 146 ms; QRS duration, 76 ms; QT/QTc interval, 438/511 ms; P axis, 73°; R axis, 62°; and T axis, 92°. What is your interpretation of this ECG?

ANSWER

Findings on this ECG include sinus rhythm with frequent, consecutive premature ventricular complexes (PVCs) consistent with nonsustained ventricular tachycardia (NSVT). There is also evidence of a probable left atrial enlargement.

The key to interpreting this ECG is to first locate normal-appearing complexes. These are illustrated by the third, fourth, 10th, and 11th complexes on the rhythm strip (lead I) at the bottom

of the ECG. Notice that there is a normal-appearing PQRST complex for each of these beats.

The rate of 82 beats/min is calculated from a sum average of all beats on the 12-lead ECG; however, the R-R interval between the third and fourth and the 10th and 11th beats is roughly 60 beats/min, signifying a normal sinus rhythm. All other beats are PVCs arising from the left ventricle (as evidenced by a right bundle branch pattern in lead V₁).

Careful inspection will reveal retrograde P waves located in the terminal upstroke of the S wave. NSVT is defined as three or more consecutive PVCs at a rate greater than 100 beats/min with a duration of less than 30 seconds. The pauses seen between a PVC and a normally conducting P wave are caused by retrograde conduction from the ventricle to the atrium, with subsequent block within the atrium.

Finally, left atrial enlargement is evidenced by a biphasic P wave in the normally conducting beat seen in lead V₁. **CR**