High-Grade Atrioventricular Block Caused by His-Purkinje Injury During Contrast Left Ventriculography

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A 68-year-old woman with exertional chest discomfort was referred for cardiac catheterization. Her medications did not include atrioventricular (AV) nodal blocking agents, and she had no prior history of dizziness or syncope. Her admission ECG was normal, including a normal axis, PR interval, and QRS morphology and duration (Figure 1). Right heart catheterization and coronary angiography demonstrated normal right heart pressures, mild luminal irregularities in the left anterior descending coronary artery, a discrete 50% stenosis in the left circumflex coronary artery, and normal right coronary artery. A 6-French, 145-degree, angled pigtail catheter with end holes and multiple side holes was introduced into the left ventricle through a retrograde transaortic approach, and contrast ventriculography was performed using 45 cc of ionic contrast delivered at 15 cc/s using a standard power injector.

During the initial phase of injection, the pigtail catheter withdrew into the left ventricular outflow tract for several seconds before being advanced back into the midventricle (Figure 2A). Ventricular tachycardia was observed throughout the injection, followed by complete AV block with a wide complex escape rhythm (Figure 3). Cineangiography at the end of the ventriculogram showed persistent dye staining of the high interventricular septum, ∼5 to 10 mm beneath the aortic valve (Figures 2B and 2C).

Atropine 1.2 mg was administered intravenously, with no improvement in AV conduction or increase in escape rate. A temporary pacing catheter was placed in the right ventricular apex, and VVI pacing was established. Five hours after the procedure, there was return of 1:1 AV conduction with persistent right-bundle branch block and prolonged PR interval. However, over the next 4 days, there were frequent episodes of high-grade AV block (up to 6 seconds of ventricular asystole after slow withdrawal of ventricular pacing) and episodes of symptomatic 2:1 AV block with left bundle-branch block pattern on conducted beats, indicating persistent His-Purkinje system injury. A permanent dual-chamber pacemaker was implanted.

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Figure 2. A, Left ventriculogram in the 30-degree right anterior oblique view at the start of contrast injection. B, Left ventriculogram after completion of contrast injection. A dye stain is visible below the aortic valve. C, Magnified view of left ventriculogram after clearance of contrast from the ventricular cavity. Note discrete area of intramyocardial dye staining just below the aortic valve (double arrow).

Figure 3. The 12-lead ECG just before placement of temporary pacing catheter. The tracing shows sinus tachycardia with complete AV block and a wide-complex escape rhythm at 40 beats/min.
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