Cause of Complete Atrioventricular Block After Percutaneous Aortic Valve Implantation

Insights From a Necropsy Study

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Transcatheter aortic valve implantation is being established as an alternative treatment for some patients with symptomatic severe aortic stenosis who are not considered suitable for surgical aortic valve replacement because of prohibitive surgical risk.1-3 One of the potential complications is complete atrioventricular block requiring definitive pacemaker implantation. This complication occurs in 4% to 5% with the Edwards-Sapiens prosthesis (Edwards Lifesciences, Irvine, Calif),1 and in >30% with the CoreValve system (Medtronic CV, Luxembourg),3 but it also occurs in 5% of patients after percutaneous aortic valvuloplasty4 or surgical aortic valve replacement.5

The cause of complete atrioventricular block after transcatheter aortic valve implantation is unknown. Apart from traumatic lesions produced by aortic valve prosthesis expansion, ischemia of the conduction pathways resulting from insufficient myocardial protection might play a role. Here, necropsy findings in a patient with complete atrioventricular block after transcatheter aortic valve implantation are presented for the first time, showing the physiopathology of this complication.

A 79-year-old woman with symptomatic severe aortic stenosis and prohibitive surgical risk was referred for transcatheter aortic valve implantation. A 26-mm Edwards-Sapiens prosthetic valve was implanted without complications except complete atrioventricular block requiring transvenous pacemaker stimulation. Three days after transcatheter aortic valve implantation, the patient suffered sudden cardiac death that could not be resolved with resuscitation. Necropsy was performed to evaluate the status of the pros-
thetic valve and to gain potential insights into the cause of the atrioventricular block.

Necropsy found right ventricular perforation as the cause of death. Autopsy of the right ventricle showed a localized area of necrosis and hematoma in the right ventricular wall with communication between the right ventricular cavity and pericardial space produced by the pacemaker electrode. The aortic valve prosthesis was well expanded and apposed to the aortic annulus (Figure, A). Pathological macroscopic study showed also a localized hematoma at the interventricular septum at the site of aortic valve prosthesis expansion (Figure, B). This area was studied histologically. Compression of the bundle of His by this localized hematoma at the interventricular septum was found (Figure, C and D). It is possible that the mechanical effect of this hematoma over the bundle of His has been exaggerated by the pathological process caused by ageing and amyloid deposits at the myocardium found in this patient, resulting in interruption of the atrioventricular conduction system to produce complete atrioventricular block.

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References
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