Timing and potential mechanisms of new conduction abnormalities during the implantation of the Medtronic CoreValve System in patients with aortic stenosis.

New-onset left bundle branch block (LBBB) and complete atrioventricular block (AV3B) frequently occur following transcatheter aortic valve implantation (TAVI). We sought to determine the timing and potential mechanisms of new conduction abnormalities (CAs) during TAVI, using the Medtronic CoreValve System (MCS). Sixty-five consecutive patients underwent TAVI with continuous 12-lead ECG analysis. New CAs were defined by the occurrence of LBBB, RBBB, and/or AV3B after the following pre-defined time points: (i) crossing of valve with stiff wire, (ii) positioning of balloon catheter in the aortic annulus, (iii) balloon valvuloplasty, (iv) positioning of MCS in the left ventricular outflow tract (LVOT), (v) expansion of MCS, (vi) removal of all catheters. A new CA occurred during TAVI in 48 patients (74%) and after TAVI in 5 (8%). Of the 48 patients with procedural CAs, a single new CA occurred in 43 patients (90%) and two types of CAs in 5 (10%). A new LBBB was seen in 40 patients (83%), AV3B in 9 (19%), and RBBB in 4 (8%). The new CA first occurred in descending order of frequency-after balloon valvuloplasty in 22 patients (46%), MCS expansion in 14 (29%), MCS positioning in 6 (12%), positioning of balloon catheter in 3 (6%), wire-crossing of aortic valve
in 2 (4%), and after catheter removal in 1 patient (2%). Patients who developed a new CA during balloon valvuloplasty had a significantly higher balloon/annulus ratio than those who did not (1.10±0.10 vs. 1.03±0.11, P=0.030). No such relationship was found with the valve/annulus ratio. Transcatheter aortic valve implantation with the MCS was associated with new CAs in 82% of which more than half occurred before the actual valve implantation. It remains to be elucidated by dedicated studies whether new CAs can be reduced by appropriate balloon sizing—a precept that also holds for valve size given the observed directional signal of the valve size/aortic annulus ratio.