Abstract: **P1006**

Conduction disorders in patients with congenital heart disease and right atrial volume overload: an intraoperative epicardial mapping study

**Authors:**
C Houck¹, EAH Lanters¹, P Knops¹, PC Van De Woestijne¹, JW Roos-Hesselink², AJJC Bogers², NMS De Groot¹, ¹Erasmus Medical Center, Cardiology - Rotterdam - Netherlands (The), ²Erasmus Medical Center, Cardiothoracic Surgery - Rotterdam - Netherlands (The),

**Topic(s):**
Atrial Fibrillation - Pathophysiology and Mechanisms

**Citation:**
Dutch Heart Foundation [no 2012T0046]; LSH-Impulse [no 40-43100-98-008]; CVON [no 914728] and VIDI [no 91717339] to N.M.S. de Groot.

**Background:** Various atrial regions may contribute to the arrhythmogenic substrate for atrial tachyarrhythmias, including atrial fibrillation (AF), in patients with right atrial (RA) volume overload in congenital heart disease (CHD). It is widely recognized that structural and electrical remodelling of the RA occurs, but a previous endovascular mapping study showed that the left atrium (LA) was also affected in patients with atrial septal defect (ASD). The role of Bachmann's bundle (BB) and posterior left atrium (PLA) is yet unknown.

**Purpose:** To quantify and compare prevalence and severity of conduction disorders during sinus rhythm between atrial regions in patients with CHD and RA volume overload, using intraoperative high-resolution epicardial mapping.

**Methods:** Thirty-one patients (female: n=18, age: 48.5±13.8 years, history of AF: n=5) undergoing cardiac surgery for secundum ASD (n=18), sinus venous defect (n=11) or isolated partial abnormal pulmonary venous return (n=2) were included. Intra-operative epicardial mapping (N=128/192 electrodes, interelectrode distance: 2mm) of the RA, BB, LA and PLA was performed during sinus rhythm. Conduction delay (CD) and block (CB) were quantified per region as proportion (%), length of lines (mm) and maximum conduction time (? local activation time between two adjacent electrodes).

**Results:** Proportion of CD on BB was 3.9% (2.3-4.9), RA 3.1% (1.9-3.8), PLA 2.4% (1.2-3.6) and LA 2.3% (1-3) and was higher on BB compared to PLA (p=0.002) and LA (p<0.001) but not RA (p=0.063). Proportion of CB on BB was 2.1% (1.2-5.4), RA 2.2% (1.1-3.4), PLA 0.8% (0.1-2.4) and LA 0.8% (0.3-1.6) and was smaller on LA compared to BB (p=0.001) and RA (p=0.004).

There were no significant differences in length of CD/CB lines between regions, except that length of the longest CB line per patient was longer in the RA compared to LA (p=0.008).

Maximum conduction time was highest in the RA (median 40ms) as opposed to BB (31ms), LA (21ms) and PLA (18ms; all p<0.0083 with Bonferroni correction), suggesting conduction disorders were more severe in the RA.

For sub analysis, the RA surface was divided into 1) the crista terminalis region and 2) the lateral RA wall. In the crista terminalis region, proportions of CD and CB were higher, CD/CB lines were longer and maximum conduction times were higher (all p<0.05). Differences between patients with and without AF were solely observed on BB; patients with AF had a higher proportion and longer lines of CB (p<0.05), though outcomes should be interpreted with caution due to the small number of patients with AF.
Conclusions: In adult patients with CHD and RA volume overload, both RA and BB were affected by conduction disorders. More specifically, conduction disorders in the RA were mainly concentrated in the crista terminalis region. These findings suggest that not only the RA but also BB may be involved in the arrhythmogenic substrate for atrial tachyarrhythmias in these patients.