

## Circulation: Arrhythmia and Electrophysiology – CHALLENGE OF THE WEEK

### ANSWER TO APRIL 30<sup>th</sup> QUESTION

#### B. Atrial septal defect

##### Explanation

The electrocardiogram in the April 30<sup>th</sup> Question (Figure) shows sinus rhythm with right bundle branch block and left axis deviation (left anterior fascicular block pattern). Additional features include presence of qR pattern in lead V1 and a notched/fractionated QRS complex. These findings are consistent with ostium primum atrial septal defect whose ECG is characterized by an incomplete or complete right bundle branch block pattern and left axis deviation (option B).<sup>1</sup> On the other hand ostium secundum atrial septal defect is characterized by an incomplete or complete right bundle branch block pattern with a right axis deviation.<sup>1,2</sup> A crochetage pattern or notching in QRS in conjunction with incomplete right bundle branch block pattern has been described as a sensitive and specific feature of secundum atrial septal defect.<sup>3</sup>

Primum atrial septal defect is a type of atrioventricular septal defect where there is developmental failure of the septum primum to fuse with the endocardial cushions forming the interventricular septum.<sup>4,5</sup> This results in a scooped out muscular interventricular septum with absence of the atrioventricular septum. In the absence

of the atrioventricular septum the triangle of Koch and the AV node are displaced inferoposteriorly with a long non-branching bundle of His running in the crest of the muscular ventricular septum,<sup>5,6</sup> that is prone to injury during surgical closure of the ASD.<sup>7</sup> In this patient the ECG abnormality was missed with no further evaluation till 4 years later when she underwent further evaluation and surgical ASD closure. She developed post-operative complete AV block and underwent pacemaker implantation.

The ECG in congenitally corrected transposition is characterized by Q waves in right precordial and inferior leads with left axis deviation and absence of septal Q waves in the lateral leads.<sup>2,8</sup> The ECG in tetralogy of Fallot shows right bundle branch block with tall R' in V1 due to right ventricular hypertrophy and a wide QRS duration.<sup>2</sup> Epsilon waves and inverted T wave in right precordial leads are pathognomonic of arrhythmogenic right ventricular cardiomyopathy.<sup>9</sup> Brugada syndrome is characterized by a coved ST elevation followed by T wave inversion in the right precordial leads.<sup>10</sup>

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**Figure.** Twelve-lead electrocardiogram.

