Electrocardiographic changes in Atrial Septal Defect

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30 year old man presented with orthopnoea, palpitation and exercise intolerance. He had had recurrent respiratory infections since childhood. However, due to residence in a remote village, he had never visited any hospital for these problems. On examination he was found to have raised pulsatile jugular veins and mild cyanosis. Blood pressure was 100/60 mm of Hg. Cardiac echocardiography revealed ostium primum (OP) atrial septal defect (ASD) and atrio-ventricular septal defect with moderate mitral regurgitation and severe tricuspid regurgitation (TR) (TR gradient: 76 mm of Hg) (Figure 1). There was right ventricular and right atrial hypertrophy. Electrocardiography (ECG) showed (Figure 2):

“Crochetage” sign in inferior leads  
Tall R waves in leads V1 and V2  
Defective T wave (DTW) changes in leads V1 and V2  

Crochetage sign is a comparatively new sign in cardiology, being described only in 1996.¹ This is a notch in R wave in inferior leads, as seen here. Running the ECG machine at double speed (50 mm/sec) makes this sign even more prominent (Figure 3). If present in all 3 inferior leads, this sign is 92—100% specific for ASD.²

Tall R wave or incomplete right bundle branch block (RBBB) pattern is also a very common ECG finding in ASD.³ But since this sign may be present in a variety of other disorders or even in normal persons, this is not diagnostic of ASD.

Defective T wave (DTW) has recently been described as a sensitive marker of ASD.³ This a defined as an inverted proximal limb of T wave in right precordial leads.⁴ Thus, the T wave looks biphasic. This is clearly present in lead V2 in our case. In different studies, the coexistence of RBBB and DTW is found to have a very high specificity in diagnosing ASD.⁵ Even in absence of RBBB, DTW has been found to have high sensitivity and specificity in diagnosing ASD.⁶ Another variation of T wave in ASD is called “dart T wave” which is a double peaked T wave with prominent second summit⁷. Some studies have also documented a correlation between the height of this second summit and pulmonary arterial pressure.⁴

Thus, in resource limited settings, ECG can help in a provisional diagnosis of ASD.

References