Atrial septal aneurysm mimicking ECG signs of enlarged right atrium

Eberhard P. Scholz*, Edgar Zitron, Hugo A. Katus, Christoph A. Karle, and Derliz Mereles

Third Department of Internal Medicine (Cardiology), University Hospital Heidelberg, Im Neuenheimer Feld 410, 69120 Heidelberg, Germany

Received 16 January 2007; accepted after revision 20 February 2007; online publish-ahead-of-print 15 May 2007

In a routine ECG from a young asymptomatic woman, changes in P-wave morphology and the frontal plane atrial vector were noted. Two-dimensional echocardiography revealed a large atrial septal aneurysm as probable underlying cause. This case report demonstrates that non-specific right atrial ECG signs may be indicative of lone atrial septal aneurysm.

KEYWORDS
Atrial septal aneurysm; P-wave morphology; Echocardiography; Electrocardiography

A routine electrocardiogram (ECG) was recorded in a 39-year-old woman without any history of cardiac disease, who had been hospitalized because of an affective disorder. In this ECG, a peaked and moderately enlarged P-wave (2 mm in leads II, III, and aVF) in combination with a marked right axis deviation of the frontal plane atrial vector (approximately +85°) was noted (Figure 1A). There were no clinical signs of acute or chronic right ventricular overload. As recommended, the woman was referred for further diagnostic investigation to our outpatient department. The ECG recording was repeated and the changes in P-wave morphology were confirmed (Figure 1B). The patient reported no limitations in physical capacity, and physical examination revealed no pathological findings. However, two-dimensional echocardiography revealed a large atrial septal aneurysm (ASA, type 1R) with no evidence of inter-atrial shunting (Figure 1C). Left atrial size and ventricular measures were found to be normal, and the systolic pulmonary artery pressure was normal (~ 20 mmHg).

ASA is a localized protuberance of the atrial septum with a reported prevalence of up to 1% in autopsies. The current classification of ASA differentiates between five types: 1R, 2L, 3RL, 4LR, and 5. Type 1R protrudes from the midline of the atrial septum to the right atrium throughout the cardiorespiratory cycle. In case of unidirectional types, a sacculation of more than 10 mm is generally required for diagnosis. ASA may be associated with congenital or acquired heart diseases. Clinically, ASA has been linked to an increased incidence of supra-ventricular tachyarrhythmias, possibly provoked by the movement of the atrial septum. Besides, lone ASA is associated with cardiogenic embolism. This association was found to be more significant when ASA was combined with other cardiac abnormalities, such as inter-atrial shunting. However, the patient declined anti-thrombotic therapy.

Traditional ECG criteria for right atrial enlargement include a peaked P-wave in leads II, III, and aVF with an increased amplitude in combination with a rotated P-wave axis. In both ECG recordings, P-waves were found to be peaked and moderately enlarged in leads II, III, and aVF and the frontal P-wave axis was markedly rotated (see insertion in Figure 1A and 1B). The negative P-waves in lead aVR and aVL and the relatively short PQ interval may indicate an ectopic right atrial rhythm. As atrial morphology and size were found to be normal except for the ASA, P-wave signs of an enlarged right atrium might result from the combination of both, a potentially ectopic right atrial rhythm and the sacculation of the atrial septum.

To our knowledge, no pathognomonic changes of ECG morphology indicative of specific forms of ASA have been reported to date. This may be due to the large morphological variability, which may result in a plethora of ECG changes. In this case, the ASA caused ECG signs of right atrial enlargement that may also be associated with other pathological substrates such as tricuspid stenosis or atrial septal defects.

In summary, ASA is a frequent anomaly of the atrial septum that has been associated with incident supra-ventricular arrhythmia and cardiogenic embolism. The diagnosis of ASA is generally made by chance or after incident cardiogenic embolism. This case report demonstrates that non-specific right atrial ECG signs may be indicative of asymptomatic lone ASA. Therefore, we recommend that an echocardiographic examination be performed in asymptomatic patients.
presenting with non-specific right atrial ECG changes to exclude ASAs.

References

