Diverging P waves after convergent procedures: What do they mean?

Atrial Fibrillation (AF) ablation procedures have become a common place in clinical practice. Specifically, targeting both paroxysmal and persistent AF with ablation procedures has yielded relatively good success rates and outcomes. Various strategies have been employed to achieve the desired results. These have included various forms of energies such as RF, cryo and Laser. Also, hybrid convergent procedures where both endocardial and epicardial lesion sets are made have been developed to effectively achieve pulmonary vein and posterior left atrial (LA) wall isolation.

Ablation of the posterior wall of the LA is expected to have an impact on the morphology of the P wave on a 12-lead surface ECG. Typically, lead V1 on a 12 lead surface ECG is biphasic in nature. The initial component is positive while the terminal portion is negative. The initial portion reflects posterior electrical forces approaching an anteriorly placed lead V1 as the sinus node lies posteriorly at the junction of the right atrium and the superior vena cava. The later component in V1 typically has a negative deflection as the LA is activated late due to its posterior orientation in the chest. This accounts for the typical biphasic morphology of the P wave in V1.

In this issue, Yang and colleagues [1] described P wave morphology changes in leads II, III, and V1 after patients underwent convergent ablation procedures for both paroxysmal and persistent atrial fibrillation. They noted that the terminal portion reflects posterior electrical forces approaching an anteriorly placed lead V1 as the sinus node lies posteriorly at the junction of the right atrium and the superior vena cava. The later component in V1 typically has a negative deflection as the LA is activated late due to its posterior orientation in the chest. This accounts for the typical biphasic morphology of the P wave in V1.

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masked in the initial portion of lead V1 due to the large forces pointing towards the LV.

The findings from this paper have potential implications. P wave duration of the terminal negative portion in lead V1 can decrease after ablation of the LA posterior wall and maintain these changes over time. It is possible that one may be able to quantify the risk of recurrence based on the magnitude of reduction in these forces. This would offer a powerful tool to predict risk of recurrence of AF after undergoing an ablation procedure. Also, understanding P wave morphology changes post ablation would reduce the risk of misdiagnosing patients with atypical atrial flutters, resulting in unnecessary treatments. A large prospective trial comparing such ECG changes to both short and long term outcomes would be valuable to practicing physicians.

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Gopi Dandamudi*
IU Heath Atrial Fibrillation Center, Indiana University School of Medicine, 1801 Senate Boulevard, Suite 4000, Indianapolis, IN 46202, USA
*Tel.: +1 317 962 0500; fax: +1 317 962 0100.
E-mail address: gdandamu@iu.edu
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