Abstract: P313

The automatically assessed P-wave axis predicts cardiovascular events in patients with cardiovascular risks: The Japan Morning Surge Home Blood Pressure (J-HOP) Study

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Background: An abnormal P-wave axis in electrocardiography predicts the development of atrial fibrillation (AF) and cardiovascular events. There have been few reports on the relationships among an automatically assessed P-wave duration, left atrial enlargement, left ventricular hypertrophy, and cardiovascular events in patients with cardiovascular risk factors.

Purpose: To determine the relationship among an abnormal P-wave axis, left atrial enlargement, left ventricular hypertrophy, and cardiovascular events in patients with cardiovascular risk factors.

Methods: We enrolled 829 subjects from the J-HOP Study who had ≥1 of four cardiovascular risk factors: hypertension, dyslipidemia, diabetes, and smoking. Twelve-lead electrocardiography was conducted, and the P-wave axis was calculated automatically using a 12-lead ECG Analysis system (Fukuda Denshi, Tokyo) according to the following formula: \( \arctan\{\sqrt{3}(I+III) / (2I+II-III)\} \). We divided the patients into three groups: those with a normal axis (0°–75°, n=692), left axis deviation (<0°, n=39), or right axis deviation (=75°, n=56). The primary endpoints were fatal/nonfatal cardiovascular events: myocardial infarction, stroke, hospitalization for heart failure, and aortic dissection. We conducted echocardiography and measured the left atrial (LA) diameter, left ventricular mass index (LVMI), and brain natriuretic peptide (BNP).

Results: The LA diameter, LVMI, and BNP in the patients with left axis deviation were significantly higher than those in the patients with a normal axis (LA diameter: 40.2±7.0 vs. 37.0±5.0, p=0.008; LVMI: 105.7±25.7 vs. 96.9±25.2 g/m², p<0.001; median BNP: 41.6 vs. 16.5 pg/dL, p<0.001). The mean follow-up period was 101±34 months, and 92 cardiovascular events occurred. A Cox proportional hazards model including age, gender, smoking, history of hypertension, dyslipidemia, diabetes, LA dia., and LVMI revealed that left axis deviation of the P wave was independently associated with cardiovascular events (hazard ratio 2.31, 95%CI 1.18–4.55, p=0.015). Conclusions: Leftward deviation of the automatically assessed P-wave axis was associated with left atrial enlargement, left ventricular hypertrophy, and cardiovascular events in patients with cardiovascular risk.