Do Electrocardiography Scores Predict the Presence of Right Ventricular Dysfunction in Patients with Pulmonary Hypertension?

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Electrocardiography (ECG) is non-invasive and inexpensive. Although the diagnostic utility of ECG for ischemic heart diseases has been established, ECG has not been used as a screening tool to evaluate patients with pulmonary hypertension (PH) (1). Because ECG frequently seems to show changes consistent with right ventricular (RV) hypertrophy and right axis deviation in PH patients, its predictive value in PH has been widely studied. Ahearn et al. reported that 13% of 61 patients with PH demonstrated normal ECG findings despite having an average mean pulmonary arterial pressure (PAP) of 47 mmHg (2). The National Institutes of Health (NIH) registry has also demonstrated similar results. Of the 187 patients with PH in the NIH registry, RV hypertrophy was not noted on ECG in 13% and right axis deviation was not present in 21% (3). Therefore, ECG has been considered to be an inadequate screening tool to rule out the presence of clinically relevant PH. However, whether ECG predicts the presence of RV dysfunction in PH patients has so far not been fully investigated.

In patients with PH, it is very important to predict the presence of RV dysfunction, as the severity of RV dysfunction is a strong determinant of a poor prognosis (4). Echocardiography is commonly used as a non-invasive tool to estimate the RV function and PAP. Among many echocardiographic parameters, tricuspid annular plane systolic excursion (TAPSE) is very useful for detecting RV dysfunction and predicting poor prognosis in PH patients (5). However, in some cases, well-established sonographic techniques may be required to describe the exact apical four chamber view of an enlarged RV. Recently, cardiac magnetic resonance (CMR) has been developed to provide reliable data regarding the RV parameters, such as the mass index, wall motion, wall thickness, volume and ejection fraction (6). Although CMR is able to assess regional and global RV performance without complex geometric limitations, it is difficult to frequently perform CMR because the procedure demands significant technical support and expertise. Therefore, non-invasive and convenient approaches to predict the presence of RV dysfunction are needed.

Nagai et al. reported that two ECG variables, qR pattern and R/S >1 in lead V1, are significantly positive in comparison to other ECG parameters in patients with RV dysfunction (7). In addition, PH patients who are positive for these two variables show significant RV dysfunction. Therefore, the authors concluded that the ECG scores (a score of 2 for the qR pattern and a score of 1 for R/S >1 in lead V1) noted in their study might be useful for predicting the presence of RV dysfunction in PH patients. Although it is still questionable as to whether the ECG scoring system is useful as a screening tool for RV dysfunction, it can nevertheless provide very important information for physicians to help them determine whether to perform more invasive and expensive procedures in PH patients with higher ECG scores. In the future, a larger study is needed to confirm the accuracy of the ECG scoring system for predicting the presence of RV dysfunction in PH patients.

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References


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