

Editorial



Left Axis Deviation in Patients with Acute Heart Failure with Left Bundle Branch Block: Does It Really Matter?

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Conflict of Interest

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QRS widening, especially left bundle branch block (LBBB), is known to associate with an increased risk of mortality in patients with heart failure (HF), and cardiac resynchronization therapy (CRT) could improve survival in those patients. Based on the greater benefits of CRT in patients with complete LBBB on mortality compared to those with non-specific intraventricular conduction delay or right bundle branch block, a recent guideline recommends only patients with complete LBBB as being assigned a class I indication.¹⁾ Not only QRS morphology and width, but also axis deviation could influence the activation sequence of ventricles, which might be associated with clinical outcome. In patients without overt HF, the prognostic implication of left axis deviation (LAD) with LBBB is controversial. Although the study population was small (n=102), among patients with LBBB, those with LAD had an increased incidence of myocardial dysfunction, more advanced conduction disease, and greater cardiac death compared to those with normal axis.²⁾ Also, myocardial scar score as calculated by the Selvester QRS scoring system was reported to be higher in those with concomitant LAD and LBBB.³⁾ Recently, large population study (n=2,794, median follow-up duration 20 months) reported that LAD did not have significant association with mortality in patients with LBBB.⁴⁾ Although clinical characteristics of healthy subjects without cardiovascular risk factors but with LAD and those with HF are different, the prognostic implication of LAD in patients with HF and LBBB is also controversial.⁵⁾⁶⁾ In sub-analysis of the Multicenter Automatic Defibrillator Implantation Trial (MADIT)-CRT trial, among patients with LBBB, those with LAD showed a significant higher risk of HF or death and had a statistically not significant trend of less benefit from CRT than those without LAD. However, in those with implantable cardioverter defibrillator (ICD) only therapy, LAD did not show an increased risk of HF or death, which is in line with previous studies in a non-HF population. In contrast to these studies, Perrotta et al.⁷⁾ recently reported that LAD or right axis deviation showed independent risk of HF hospitalization and all-cause death in the presence of LBBB in patients with HF undergoing CRT.

Choi et al.⁸⁾ analyzed the prognostic implication of LAD in patients with acute heart failure syndrome (AHFS) with LBBB using the Korean Acute Heart Failure registry (KorAHF). This registry is a prospective multicenter cohort enrolling patients hospitalized due to AHFS, having detailed information regarding clinical characteristics, laboratory data, electrocardiograms (ECGs), echocardiographic data, and clinical outcomes. Based on the unique characteristics

of the KorAHF registry, they reported the absence of prognostic impact of LAD on mortality focused on patients with acute HF. Second, this study evaluated right ventricle (RV) dilatation using surface ECG in the presence of at least two of three ECG criteria and found that those with LAD showed a higher proportion of RV dilatation on ECG compared to those without LAD. RV dilatation could produce anatomical change, including cardiomegaly, or alter ventricular activation sequence, which could affect the outcome of CRT. Therefore, the positioning of the left ventricular pacing lead should be individualized according to the frontal axis.

Choi et al.⁸⁾ noted several limitations to their study, including the small study population (n=292), which attenuated the statistical power. Considering that complete LBBB is an absolute indication for CRT, a significant proportion of the study population was possible candidates for CRT after optimal medical therapy. However, many patient records were missing regarding CRT or ICD therapy during the follow-up period, which could have affected mortality. The ECG criteria of RV dilatation have been validated in a previous study, but detailed information about RV dysfunction in echocardiography was not provided.

Considering the high-risk study population, the lack of additive prognostic implication of LAD on mortality in patients with AHFS and LBBB was not surprising. Although a causal relationship was not clearly demonstrated in this observational study, the mechanism of positive correlation of LAD with grade of left ventricle dysfunction and presence of RV dilatation needs to be elucidated in future study.

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