

Editorial



The Role of Transthoracic Echocardiography in Patients with Acute Ischemic Stroke: We Should Pay More Attention to Left Ventricular Ejection Fraction

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► See the article “Left Ventricular Ejection Fraction Predicts Poststroke Cardiovascular Events and Mortality in Patients without Atrial Fibrillation and Coronary Heart Disease” in volume 48 on page 1148.

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Conflict of Interest

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Acute ischemic stroke (AIS) is a major cause of disability and mortality globally.¹⁾ Even after successful recovery from AIS, long-term clinical outcome of AIS is poor. Cardiovascular disease is 1 of the main determinants of long-term outcome in patients after AIS.^{2,3)} By the improvement in primary prevention, diagnosis and therapy, there has been a considerable improvement in stroke prognosis for last several decades. However, stroke is still on the second place on mortality list following ischemic heart disease, and prevalence of AIS is expected to continuously increase with the increase in the aging population.¹⁾ Therefore, risk stratification and individualized therapy of patients with AIS is of paramount importance for clinicians to reduce their cardiovascular risk and overall prognosis. In this purpose, modifiable lifestyle risk factors such as smoking, heavy alcohol use and physical inactivity, and traditional risk factors such as hypertension, diabetes mellitus, dyslipidemia and smoking have been focused as treatment targets in patients with AIS.⁴⁾ However, this strategy focusing on vascular risk factors may be insufficient, and overall stroke burden has greatly increased last decades. In this context, additional approach identifying high-risk patients based on reliable marker is required for targeted aggressive secondary prevention treatment.

Transthoracic echocardiography (TTE) is frequently performed in patients with AIS. Although most physicians may pay attention to the evaluation of cardiac source of embolism in the setting of AIS,⁵⁾ TTE can provide more comprehensive information on cardiac structure and function. Among various echocardiographic parameters, left ventricular ejection fraction (LVEF) is a useful and reliable marker of left ventricular (LV) systolic function, and most commonly used in the diagnosis, risk stratification and monitoring of patients with various cardiovascular conditions. There has been growing interest in the relationship between stroke and LV dysfunction. Heart failure and stroke commonly coexist and share common risk factors such as atrial fibrillation.⁶⁾ Heart failure is 1 of the important risk factors of ischemic stroke, and AIS in patients with heart failure is associated with more severe neurologic sequelae and poor cardiovascular outcomes.⁷⁾ In spite of this known interaction between heart failure and stroke outcome, the specific role of LVEF, as a prognostic indicator,

in patients with AIS has not been well evaluated. Although there were few studies on this issue, their results are still conflicting.⁷⁻⁹⁾

Lee et al.¹⁰⁾ investigated 1,465 patients with AIS undergoing TTE, and demonstrated that LVEF is an independent predictor of 1-year cardiovascular outcome. There was a linear correlation between LVEF and the incidence of cardiovascular events: as increase of LVEF by 10%, their cardiovascular risk reduced by 46%. Of note, among many important clinical factors such as traditional risk factors and stroke severity, only old age and low LVEF were associated with the occurrence of cardiovascular events in multivariable models. These results suggest that measurement of LVEF may help to identify patients with AIS who are at increased cardiovascular risk and who could potentially benefit from intensified secondary prevention management. Compared to previous studies, this has several strengths by enrolling consecutive large number of AIS patients and excluding the influence of atrial fibrillation and coronary artery disease which are 2 major determinants of cardiovascular outcome after AIS. This study reminds us the importance of the information on LVEF obtained by TTE in AIS for secondary prevention. We should take an interest in not only cardiac thrombus but also LVEF during TTE evaluation in patients with AIS. This result also suggests the need of the routine use of TTE in the purpose of risk stratification of patients with AIS. Another important finding of this study is that even mildly impaired LVEF on baseline TTE is influential to long-term prognosis of patients with AIS. This finding suggests a need of further evaluation on the prognostic role of more sensitive markers of LV function than LVEF such as strain or LV diastolic indices in patients with AIS. Close cooperation between neurologist and cardiologist is needed in patients with AIS especially when they have a reduced LVEF. Further prospective studies are needed to confirm whether LVEF measurement may constitute a suitable risk stratification tool and improvement of LVEF is associated with clinical benefit in patient with AIS.

REFERENCES

1. Benjamin EJ, Blaha MJ, Chiuve SE, et al. Heart disease and stroke statistics-2017 update: a report from the American Heart Association. *Circulation* 2017;135:e146-603.
[PUBMED](#) | [CROSSREF](#)
2. Matsumoto N, Whisnant JP, Kurland LT, Okazaki H. Natural history of stroke in Rochester, Minnesota, 1955 through 1969: an extension of a previous study, 1945 through 1954. *Stroke* 1973;4:20-9.
[PUBMED](#) | [CROSSREF](#)
3. Roth EJ. Heart disease in patients with stroke. Part II: impact and implications for rehabilitation. *Arch Phys Med Rehabil* 1994;75:94-101.
[PUBMED](#)
4. Powers WJ, Rabinstein AA, Ackerson T, et al. 2018 guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke* 2018;49:e46-110.
[PUBMED](#) | [CROSSREF](#)
5. Saric M, Armour AC, Arnaout MS, et al. Guidelines for the use of echocardiography in the evaluation of a cardiac source of embolism. *J Am Soc Echocardiogr* 2016;29:1-42.
[PUBMED](#) | [CROSSREF](#)
6. Batul SA, Gopinathannair R. Atrial fibrillation in heart failure: a therapeutic challenge of our times. *Korean Circ J* 2017;47:644-62.
[PUBMED](#) | [CROSSREF](#)
7. Ois A, Gomis M, Cuadrado-Godia E, et al. Heart failure in acute ischemic stroke. *J Neurol* 2008;255:385-9.
[PUBMED](#) | [CROSSREF](#)
8. Vemmos K, Ntaios G, Savvari P, et al. Stroke aetiology and predictors of outcome in patients with heart failure and acute stroke: a 10-year follow-up study. *Eur J Heart Fail* 2012;14:211-8.
[PUBMED](#) | [CROSSREF](#)

9. Milionis H, Faouzi M, Cordier M, D'Ambrogio-Remillard S, Eskandari A, Michel P. Characteristics and early and long-term outcome in patients with acute ischemic stroke and low ejection fraction. *Int J Cardiol* 2013;168:1082-7.
[PUBMED](#) | [CROSSREF](#)
10. Lee JY, Sunwoo JS, Kwon KY, et al. Left ventricular ejection fraction predicts poststroke cardiovascular events and mortality in patients without atrial fibrillation and coronary heart disease. *Korean Circ J* 2018;48:1148-56.
[CROSSREF](#)