The clinical impact of the patent foramen ovale for the cerebral lesions on magnetic resonance imaging in patients with atrial fibrillation

Taishi Fujisawa
Kenji Hashimoto
Terumasa Yamashita
Hiroshi Miyama
Kazuaki Nakajima
Yoshinori Katsumata
Takehiro Kimura
Seiji Takatsuki

Introduction: Patent foramen ovale (PFO) is well known etiology of embolic stroke of undetermined source. However, the incidence of cerebral lesion in patients with PFO is still not enough elucidated. Therefore, we evaluated the incidence of cerebral lesion in atrial fibrillation (AF) patients with PFO.

Methods: We analyzed the patients with non-valvular AF undergoing radiofrequency catheter ablation. They had at least 1 month of adequate anticoagulation and the presence of PFO was verified with transesophageal echocardiography before the catheter ablation. Cerebral magnetic resonance imaging (MRI) was also performed before the procedure. The cerebral lesions on the MRI consisted of periventricular hyperintensities, deep and subcortical white matter hyperintensities, old lacunar infarction or old cortical infarction. We investigated the predictors of cerebral lesions before the ablation procedure, using the logistic regression analysis.

Result: We retrospectively analyzed 117 patients (59.0 ± 10.1 years, 100 [85.5%] males, 75 [64.1%] paroxysmal atrial fibrillation). PFO was identified in 14 (12%) of patients. Of those, 4 patients underwent previous atrial septal puncture in the prior catheter ablation. Right to left shunt was identified in 1 patient. Cerebral lesions were observed in 26 (22.2%) patients (3 periventricular hyperintensities, 18 deep and subcortical white matter hyperintensities, 13 old lacunar infarction, 5 old cortical infarction in total). In univariate analysis, the presence of PFO, diabetes, the type of AF and serum creatinine level were not associated with the presence of the cerebral lesions. However, CHADS2 score, age, hypertension and serum brain natriuretic peptide level were associated with the presence of the cerebral lesions. However, CHADS2 score, age, hypertension and serum brain natriuretic peptide level were associated with the presence of the cerebral lesion (odds ratio [OR] 2.69, \( P < 0.001 \); OR 1.09, \( P = 0.003 \); OR 2.89, \( P = 0.023 \); OR 1.01, \( P < 0.001 \), respectively). In multivariate analysis, CHADS2 score and serum brain natriuretic peptide level were independent predictors of cerebral lesions (OR 2.18, \( P = 0.043 \); OR 1.01, \( P = 0.011 \) respectively).

Conclusion: The PFO was not associated with the cerebral lesions in patients with AF. CHADS2 score and serum brain natriuretic peptide level were independently predictive of the cerebral lesions in patients with atrial fibrillation.