Ischemic Stroke Patients with Non-Valvular Atrial Fibrillation have a Risk for Aortogenic Embolizations

Keisuke Kojima, Daisuke Fukamachi and Yasuo Okumura

Division of Cardiology, Department of Medicine, Nihon University School of Medicine, Tokyo, Japan

We have a great interest in the article by Suzuki et al. titled “Complex Aortic Arch Atherosclerosis in Acute Ischemic Stroke Patients with Non-Valvular Atrial Fibrillation (AF).” The authors identified 41 (38.7%) transesophageal echocardiography (TEE)-derived complex aortic arch plaques (CAPs) among 106 patients with acute ischemic stroke and AF, suggesting that patients with acute ischemic stroke and AF often had CAPs. The atheromatous lesions at the aortic arch are one of the causes of ischemic strokes. If patients with acute ischemic stroke have both AF and CAPs, it becomes unclear whether the cause of the strokes is due to cardiogenic embolisms from AF or aortogenic embolisms from CAPs. Cardiogenic strokes due to AF occupied 22% of all-causes of strokes. Embolic strokes of undetermined sources also included latent AF. Therefore, patients with strokes frequently have AF. On the other hand, several studies have reported that patients with AF often have co-existing CAPs, which could be an embolic stroke. In an international multicenter registry including 770 patients with AF, CAPs were identified by TEE in 25% of the cohort. In the study of Suzuki et al., 28% of the cohort did not undergo TEE because they had severe NIHSS scores and an old age. Older individuals have a high risk of CAPs, so if all patients in the study underwent TEE, the percentage of patients with CAPs could have been higher than what was reported.

TEE is a useful imaging modality to detect CAPs; however, its resolution is not sufficient to observe small embolic sources. Non-obstructive general angioscopy (NOGA), which is a newly developed method to evaluate aortic atheromatous plaques with real-time and high spatial resolution images, can clearly detect the atherosclerotic vulnerability of the aortic wall in more detail than TEE. An interesting report showed that NOGA detected embolic sources as aortogenic embolic strokes in the aortic arch when TEE could not detect CAPs. We, herein, present a NOGA-derived aortic arch

---

**Key words:** Aortic atherosclerosis, Atrial fibrillation, Non-obstructive general angioscopy, Stroke

---

See article vol. 28: 776-785
Patients with acute ischemic stroke and AF often have CAPs. The cause of strokes could not only be cardiogenic embolisms due to AF but also aortogenic embolisms due to CAPs. Although anticoagulation therapy is the golden standard treatment for cardiogenic embolic strokes due to AF, appropriate therapies for patients with aortogenic embolic strokes have not been fully investigated. The possibility of concomitant CAPs should be considered for patients with stroke and AF. NOGA might help to diagnose aortic plaques in the aortic arch more accurately than TEE.

Patients with acute ischemic stroke and AF often have CAPs. The cause of strokes could not only be cardiogenic embolisms due to AF but also aortogenic embolisms due to CAPs. Although anticoagulation therapy is the golden standard treatment for cardiogenic embolic strokes due to AF, appropriate therapies for patients with aortogenic embolic strokes have not been fully investigated. The possibility of concomitant CAPs should be considered for patients with stroke and AF. NOGA might help to diagnose aortic plaques and embolic materials in the aortic arch. Further studies are needed to elucidate the causes of ischemic strokes and are expected to improve the outcomes for acute ischemic strokes in patients with AF.

Acknowledgements

None.
Temporal Trends From 1993 to 2015 of Ischemic Stroke Subtypes: A Systematic Review and Meta-Analysis. Stroke, 2018; 49: 814-819

Daisuke Fukamachi has a research grant from Daiichi Sankyo. Yasuo Okumura belongs to the endowed departments of Boston Scientific Japan, Abbott Medical Japan, Japan Lifeline, Medtronic Japan, and Nihon Kohden.

References
1) Suzuki M, Furuya K, Ozawa M, Miura K, Ozawa T, Matsuzono K, Mashiko T, Koide R, Fujimoto S, Tanaka R: Complex Aortic Arch Atherosclerosis in Acute Ischemic Stroke Patients with Non-Valvular Atrial Fibrillation. J Atheroscler Thromb, 2021; 28: 776-785
2) Ornello R, Degan D, Tiseo C, Di Carmine C, Perciballi L, Pistoia F, Carolei A, Sacco S: Distribution and

Funding
None.

Disclosures
Daisuke Fukamachi has a research grant from Daiichi Sankyo. Yasuo Okumura belongs to the endowed departments of Boston Scientific Japan, Abbott Medical Japan, Japan Lifeline, Medtronic Japan, and Nihon Kohden.

References
1) Suzuki M, Furuya K, Ozawa M, Miura K, Ozawa T, Matsuzono K, Mashiko T, Koide R, Fujimoto S, Tanaka R: Complex Aortic Arch Atherosclerosis in Acute Ischemic Stroke Patients with Non-Valvular Atrial Fibrillation. J Atheroscler Thromb, 2021; 28: 776-785
2) Ornello R, Degan D, Tiseo C, Di Carmine C, Perciballi L, Pistoia F, Carolei A, Sacco S: Distribution and

Temporal Trends From 1993 to 2015 of Ischemic Stroke Subtypes: A Systematic Review and Meta-Analysis. Stroke, 2018; 49: 814-819

3) Blackshear JL, Pearce LA, Hart RG, Zabalgoitia M, Labovitz A, Asinger RW, Halperin JL: Aortic plaque in atrial fibrillation: prevalence, predictors, and thromboembolic implications. Stroke, 1999; 30: 834-840
4) Kojima K, Kimura S, Hayasaka K, Mizusawa M, Misawa T, Yamakami Y, Sagawa Y, Ohtani H, Hishikari K, Sugiyama T, Hikita H, Takahashi A: Aortic plaque distribution, and association between aortic plaque and atherosclerotic risk factors: An aortic angioscopy study. J Atheroscler Thromb, 2019; 26: 997-1006
5) Komatsu S, Ohara T, Takahashi S, Takewa M, Minamiguchi H, Imai A, Kobayashi Y, Iwa N, Yutani C, Hirayama A, Kodama K: Early detection of vulnerable atherosclerotic plaque for risk reduction of acute aortic rupture and thromboemboli and atheroemboli using non-obstructive angioscopy. Circ J, 2015; 79: 742-750
6) Higuchi Y, Hirayama A, Komatsu S, Kodama K: Embolic Stroke Caused by Aortic Ruptured Plaque and Thrombus Visualized by Angioscopy. J Am Coll Cardiol Case Rep, 2020; 2: 705-706