Case Report

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Simultaneously Presented Acute Ischemic Stroke and Non-ST Elevation Myocardial Infarction in a Patient with Paroxysmal Atrial Fibrillation

Hack-Lyoung Kim, MD, Jae-Bin Seo, MD, Woo-Young Chung, MD, Joo-Hee Zo, MD, Myung-A Kim, MD, and Sang-Hyun Kim, MD

Cardiovascular Center, Seoul National University Boramae Medical Center, Seoul, Korea

Although atrial fibrillation is the most frequent cause of embolic stroke, coronary embolism from atrial fibrillation is a very rare cause of acute myocardial infarction. Therefore, simultaneously presented acute ischemic stroke and acute myocardial infarction due to atrial fibrillation in the same patient has not been documented. The present report describes the case of a 58-year-old man with paroxysmal atrial fibrillation who initially presented with a large cerebral infarction due to embolic occlusion of the left middle cerebral artery. Four hours after the diagnosis of cerebral embolism, he was subsequently diagnosed with acute myocardial infarction due to concurrent coronary embolism. He underwent successful coronary revascularization with a drug-eluting stent. The possibility of combined coronary embolism as a rare etiology should be kept in mind when a patient with acute embolic stroke presents, especially when there is evidence of acute myocardial infarction. **(Korean Circ J 2013;43:766-769)**

KEY WORDS: Atrial fibrillation; Cerebral infarct; Embolism; Myocardial infarction; Percutaneous transluminal coronary angioplasty.

Introduction

Atrial fibrillation is a common arrhythmia in the general population, and a major risk factor for stroke.[1)2)] It has been reported that atrial fibrillation is associated with a five-fold increased risk of stroke.[2)] Atrial fibrillation can cause coronary embolism; however, this is a very rare condition.[3)] Therefore, simultaneously presented cerebral and coronary embolism due to atrial fibrillation has been scarcely reported. Herein, we describe a patient with paroxysmal atrial fibrillation who suffered acute ischemic stroke and concurrent acute myocardial infarction.

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Correspondence: Sang-Hyun Kim, MD, Department of Internal Medicine, Seoul National University College of Medicine, Seoul National University Boramae Medical Center, 20 Boramae-ro 5-gil, Dongjak-gu, Seoul 156-707, Korea
Tel: 82-2-870-3864, Fax: 82-2-870-3866
E-mail: shkimmd@snu.ac.kr

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Case

A 58-year-old man was admitted to our emergency department because of altered mental state. He had lived alone and his neighbor discovered him lying in his room unconscious. Therefore, the precise time of the event was unclear. He had no previous history of medical illness. His initial blood pressure was 114/57 mm Hg, heart rate 110 per minute, respiratory rate 24 breaths per minute and body temperature was 35.8°C. On neurologic examination, he showed global aphasia and right sided weakness. His initial electrocardiogram showed sinus tachycardia (Fig. 1A). However, serial electrocardiograms demonstrated paroxysmal atrial fibrillation with intermittent rapid ventricular response (Fig. 1B). His initial creatine kinase-MB (CK-MB) was mildly elevated at 14.6 ng/mL (upper normal limit: 3.6 ng/mL) and troponin I was within the normal range at 0.11 ng/mL (upper normal limit: 0.5 ng/mL). Brain magnetic resonance imaging and angiography showed a large infarction in the left basal ganglia area due to total occlusion of the left middle cerebral artery (Fig. 2). Three-hundred mg of aspirin was loaded. Because of lack of information about the stroke onset time and the possibility of hemorrhagic conversion, thrombolysis and anticoag-

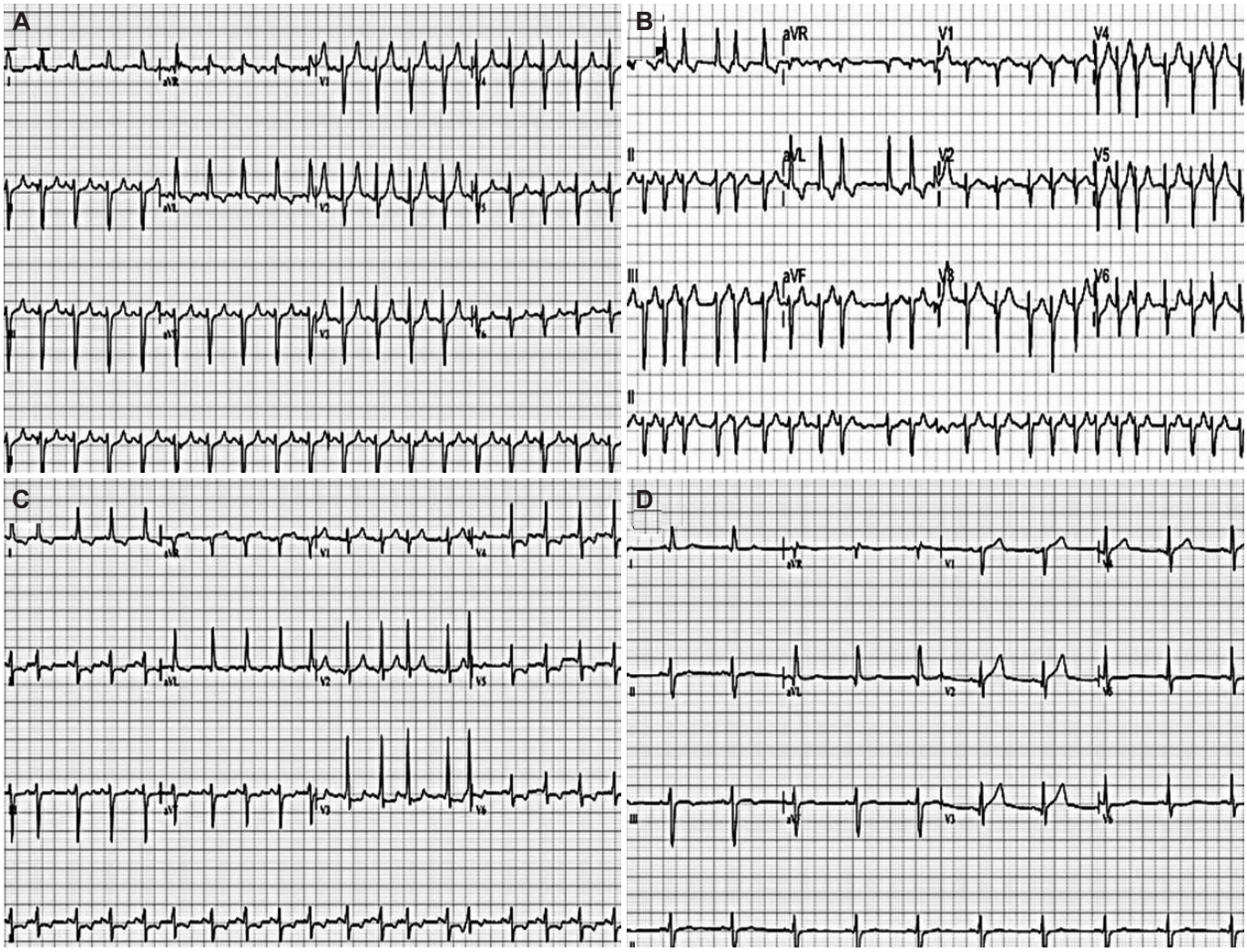

Fig. 1. Serial electrocardiograms of the patient. A: electrocardiogram (ECG) at initial presentation. B: ECG showing atrial fibrillation with fast ventricular response. C: ECG showing dynamic ST-segment depressions in multiple leads. D: ECG after percutaneous coronary intervention showing sinus rhythm without ST-segment changes.

ulation therapy were not considered initially. Four hours after admission, newly appeared 2-mm ST-segment depression in the V 3-6, II and aVf leads was noticed in his electrocardiogram (Fig. 1C) and the cardiac enzymes were elevated: CK-MB increased to 55.7 ng/mL and troponin I increased to 3.86 ng/mL. Blood pressure dropped to 71/53 mm Hg. A clopidogrel loading dose of 600 mg was given, and emergent coronary angiography was performed. The left coronary angiogram showed a large thrombus located at the bifurcation of the septal branch of the left anterior descending artery (Fig. 3A). There was no significant stenotic lesion in other coronary arteries. Repeated thrombectomy with an aspiration catheter was tried, but thrombus aspiration failed. Direct stenting with a drug-eluting stent (Nobori, 3.5×24 mm; Terumo Corporation, Tokyo, Japan) was performed. After stenting, the coronary angiogram showed no residual thrombus and good distal coronary flow (Fig. 3B). He was stable after the procedure. His electrocardiogram after stent implantation showed sinus rhythm with normalized ST-segments (Fig. 1D). Both transthoracic and transesophageal echocardiographic examinations were performed on the next day after percutaneous coronary intervention. His left ventricular systolic function was good and there was no regional wall motion abnormality on transthoracic echocardiography. There was no thrombus in both cardiac chambers on transesophageal echocardiography.

Discussion

A common and serious complication of atrial fibrillation is arterial thromboembolism, of which ischemic stroke is the most evident clinical manifestation.[1] Cardioembolic infarction is generally the most serious ischemic stroke subtype with a high mortality rate because of the large size of the cardiac emboli.[4] In most cases, cardiac emboli cause a massive infarct in the middle cerebral artery

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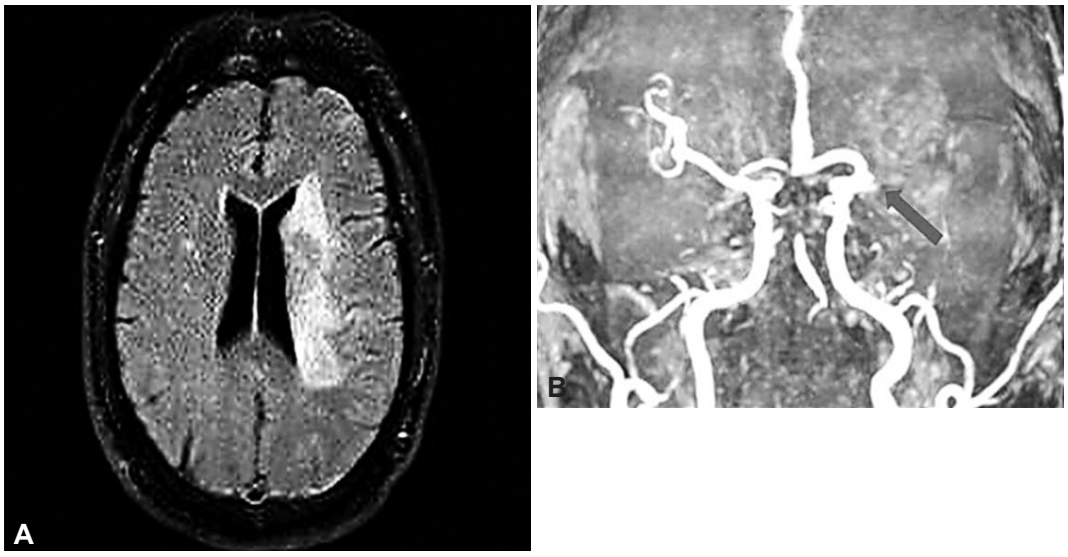

Fig. 2. Acute large middle cerebral artery infarction shown in diffusion-weighted scan of brain magnetic resonance image (A) and magnetic resonance cerebral angiography (arrow) (B).

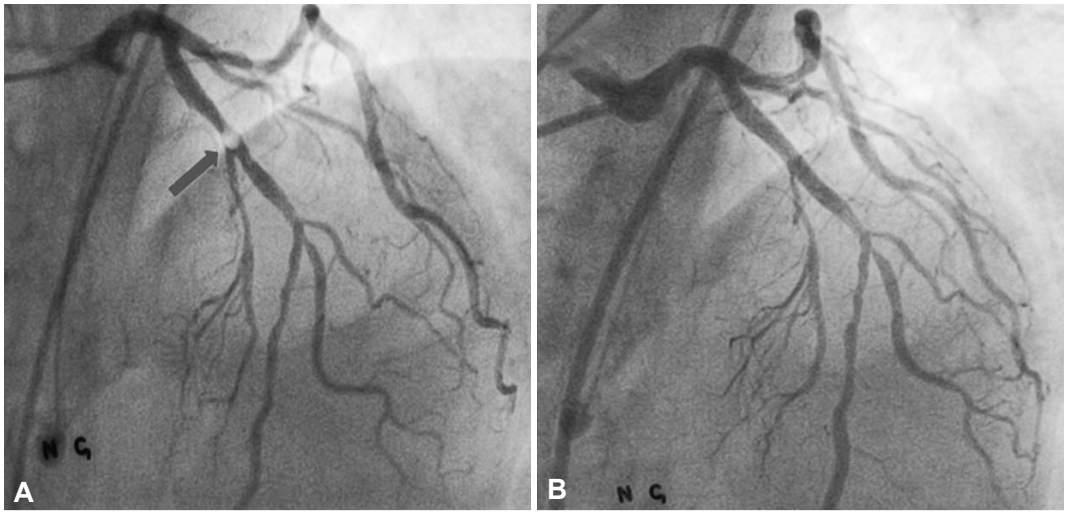

Fig. 3. Left coronary angiography showing a large thrombus located in the mid-portion of the left anterior descending artery (A, arrow), which completely disappeared after stent implantation (B).

leading to maximal neurologic deficits including a decreased level of consciousness or global aphasia at the onset,[5] a presentation which was consistent with the findings in our patient.

Acute myocardial infarction is usually caused by atherosclerotic coronary obstruction. Coronary embolism is an uncommon condition causing acute myocardial infarction, which has been reported in the context of special conditions such as a prosthetic heart valve,[6] atrial fibrillation,[3] and infective endocarditis.[7] Several case reports have shown thrombus aspiration to be an effective technique for the treatment of coronary embolism with acute myocardial infarction.[3][7] In our case, thrombus aspiration using an aspiration catheter failed due to the large size of the thrombus. However, coronary revascularization with a drug-eluting stent was successfully performed without complications. Stent implantation can be a therapeutic option for the treatment of coronary embolism in selected patients with failed thrombectomy. In addition, devices preventing distal embolization during the procedure were considered for use as another adjunctive treatment of this patient but we did not use it.[8]

In this case, there was no evidence of thrombus in the heart chambers including the atrial appendages on transesophageal echocardiography. However, we hypothesized that the coronary and cerebral emboli were consequences of thromboembolism due to atrial fibrillation. These emboli might have caused ischemic stroke and acute myocardial infarction simultaneously. The lack of visualization of a thrombus within the heart after the event does not mean that it has not existed previously.

Ischemic-like electrocardiographic changes and cardiac enzyme elevation due to neurologically mediated myocardial injury is often observed during the acute phase of stroke, which causes diagnostic and management dilemmas for clinicians.[9] Considering that both coronary artery disease and stroke share common risk factors, and a patient with myocardial infarction has a high risk of ischemic stroke,[10] the possible existence of combined acute coronary syndrome in a patient with stroke, as in our case, should not be overlooked.

In conclusion, we report concurrently occurred acute ischemic stroke and non-ST elevation myocardial infarction in a patient with paroxysmal atrial fibrillation. Although thrombus was not observed in the cardiac chambers, the clinical presentation strongly suggested possible cerebral and coronary embolism due to atrial fibrillation. To the best of our knowledge, this is the first report of concurrent cerebral and coronary embolism diagnosed with brain magnetic resonance imaging and coronary angiography. Although combined transient ischemic attack and acute myocardial infarction in a patient with atrial fibrillation was reported in one previous study,[11] they did not diagnose the embolism with imaging studies. The possibility of combined coronary embolism in a patient with acute embolic stroke as a rare etiology should be kept in mind, especially when there is evidence of acute myocardial infarction.

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