

CASE REPORTS

Safety of intravenous thrombolysis in embolic stroke by infective endocarditis

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Abstract

Ischemic stroke is a serious neurological complication of infective endocarditis. Intravenous tissue plasminogen activator (t-PA), which has only been approved for treatment of hyperacute stroke, has been excluded as an ischemic stroke treatment due to infective endocarditis according to current expert consensus guidelines. Here, we describe a case of a hyperacute stroke patient treated with intravenous t-PA, who was later diagnosed with infective endocarditis.

INTRODUCTION

Ischemic stroke is one of the most common serious neurological complications from infective endocarditis.^{1,2} Intravenous tissue plasminogen activator (rt-PA) has not been considered for the treatment of ischemic stroke due to infective endocarditis, although it is a proven treatment for hyperacute stroke.³ In addition, cases of septic embolism have been excluded from large trials of thrombolytic agents⁴, possibly due to a theoretical increase in risk of cerebral hemorrhage. There have not been any randomized trials to study the effects of a thrombolytic agent in the treatment of hyperacute stroke due to infective endocarditis, so the efficacy and safety are still unknown. Here we describe a case of a hyperacute stroke patient who was treated by intravenous rt-PA, and was later diagnosed with infective endocarditis.

CASE REPORT

A 62-year-old man developed sudden onset global aphasia and right hemiparesis. He had developed well-controlled type 2 diabetes and hypertension 3 months prior. He had no history of valvular heart disease, dental surgery, intravenous drug use, or recent skin infections. Upon arrival at the emergency room, he was afebrile. He had gaze deviation to the left side, global aphasia, severe right-sided hemiparesis and hypoesthesia. The patient's National Institutes of Health Stroke Scale (NIHSS) score was 18. Initial laboratory test results were within normal ranges, except for a C-reactive protein (CRP) level of 3.58 mg/dL

and white blood cell count (WBC) of 15,400/ μ l. A diffusion-weighted image showed a wedge-shaped infarction in the left middle cerebral artery (MCA) distribution (Figure 1A). Initial MR angiography showed an occlusion in the supraclinoid segment of the internal carotid artery (Figure 1B). Tissue-plasminogen activator (rt-PA) was intravenously infused at 40 minutes after symptom onset. Two hours later, the patient had a fever of 39°C. We could not find the source of the fever. Transthoracic and transesophageal echocardiography (TTE and TEE) showed a vegetative growth over the aortic valve of about 4.5×4.3 mm, with severe aortic regurgitation. Infective endocarditis with septic embolism was suspected. Antibiotic treatment was started immediately. Twenty-four hours later, a follow-up brain MRI and MR angiography showed ischemic lesion extension without hemorrhagic transformation and no recanalization (Figure 1C and D). The NIHSS had not changed. Blood cultures revealed *Streptococcus constellatus* in 2 out of 6 bottles. A repeat TEE showed reduced size of the vegetation, but worsened atrial regurgitation. The patient underwent valve replacement after the stroke. His neurological deficits slowly improved. Six months after symptom onset, he was able to walk with assistance.

DISCUSSION

We present a case of hyperacute stroke due to infective endocarditis treated by intravenous rt-PA. Cerebral hemorrhage or hemorrhagic transformation was not present on follow-up brain

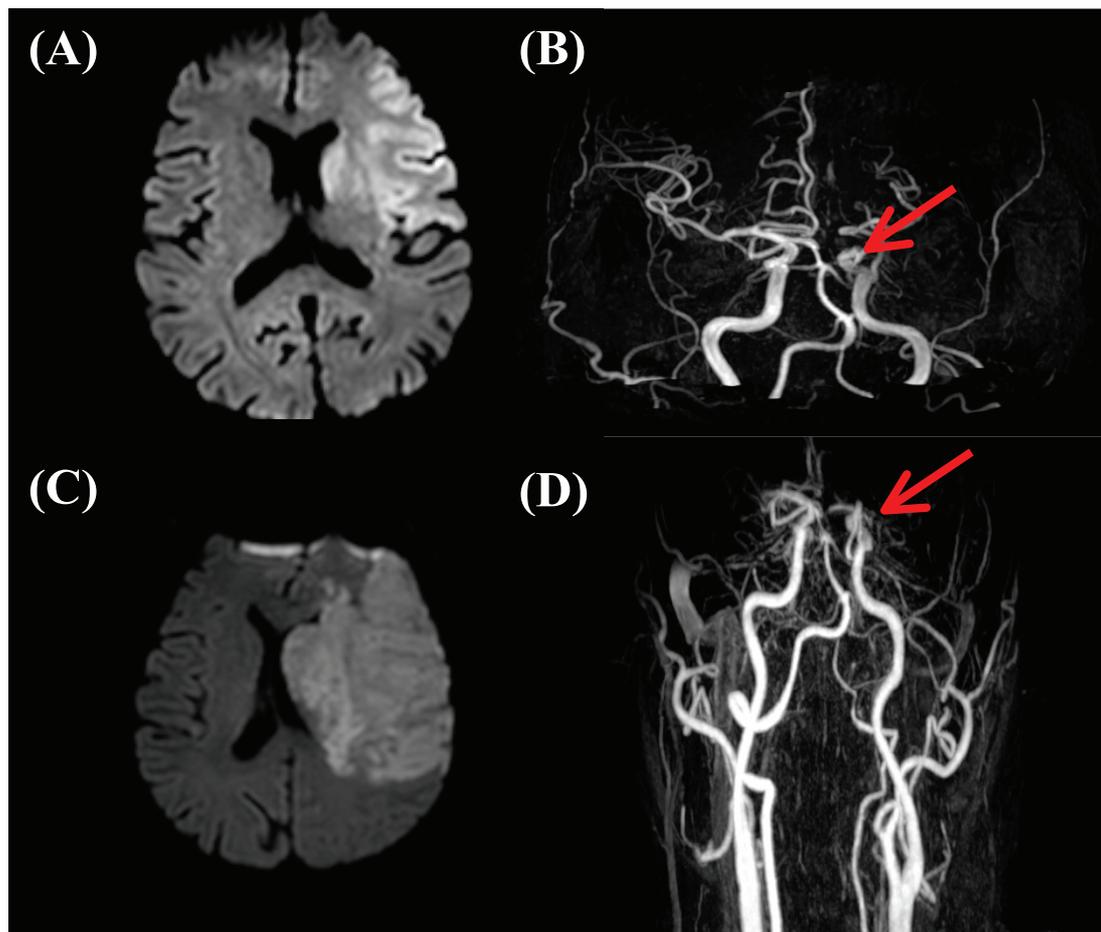


Figure 1. Hyperacute lesion in the left middle cerebral artery territory (A) and occlusion in the left supraclinoid segment of the internal carotid artery (B). Follow-up MRI and MRA revealed lesion extension (C) and no recanalization (D).

imaging, although no successful recanalization occurred.

Stroke occurs in 15% to 20% of infective endocarditis cases, usually within the first 48 hours. Ischemic stroke is more frequently observed than hemorrhage.² The vegetation in ischemic stroke is composed of platelets, fibrin, microorganisms and inflammatory cells, as well as leaflet disruption.⁵ Thus, fibrinolytic therapy may be helpful in resolving the embolus that includes the fibrin from vegetation or new fibrin that may develop after embolization. There have been two reported cases of intravenous thrombolysis in ischemic stroke secondary to infective endocarditis.^{6,7} Intra-arterial thrombolysis in the basilar artery and internal carotid artery have been reported in two additional patients.^{8,9} All four cases responded to thrombolysis and improved clinically. On the other hand, intracranial hemorrhage following intravenous rt-PA use for

stroke caused by infective endocarditis has also been reported.¹⁰

In our case, successful recanalization after 24 hours of thrombolysis was impossible. Although there was no hemorrhagic complication, the inability to recanalize could be due to a difference in the composition of the embolic material. Our patient's valve was necrotic including predominantly neutrophils with a scant amount of fibrin. Therefore, an embolus from this valve might respond poorly to the fibrinolytic effects of rt-PA.

The diagnosis of infective endocarditis was based on a suspicion of it in case of unexplained fever. Also, it was only diagnosed after thrombolysis in most cases including our patient. The number of reported cases of rt-PA treatment for acute ischemic stroke in patients with infective endocarditis is too small to make any conclusion. However, we suggest, based on previous cases as

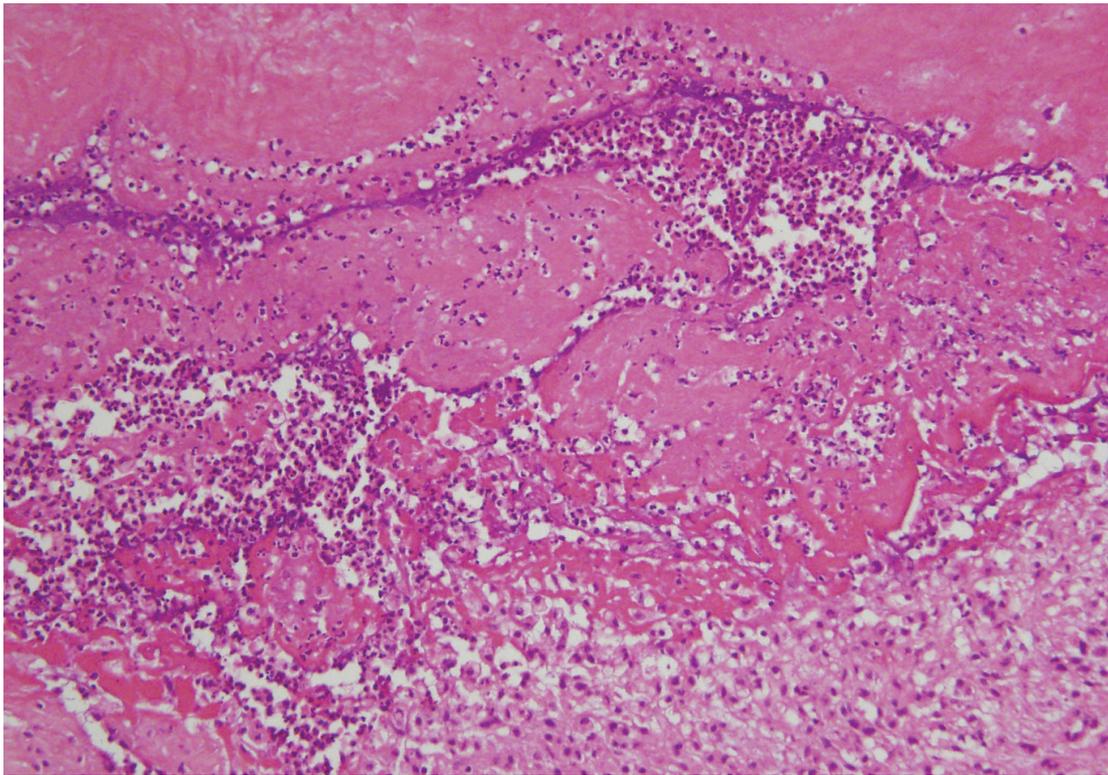


Figure 2. Hematoxylin and eosin stain of the aortic valve and its vegetation showed polymorphonuclear leukocytes intermixed with fibrin (magnification $\times 200$).

well as our current report, that intravenous rt-PA might be safe in a patient with acute ischemic stroke caused by infective endocarditis. Further study is needed to determine the safety and efficacy of intravenous thrombolysis in infective endocarditis.

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