

# Characteristic brain computed tomography of infective endocarditis after thrombolysis for ischemic stroke: A clinical note

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## Keywords

Endocarditis; Ischemic Stroke; Thrombolytic Therapy; Intracranial Hemorrhages; Brain; Computed Tomography Scan; Neuroimaging; Tissue Plasminogen Activator

Cerebrovascular abnormalities, including acute ischemic stroke (AIS) and intracranial hemorrhage (ICH), have a strong correlation with infective endocarditis (IE).<sup>1-6</sup>

Currently, thrombolysis is recommended for the treatment of AIS within 4.30 hours.<sup>2-5</sup> ICH is a significant complication of thrombolytic therapy in AIS. The risk is much higher in patients with IE. Therefore, it is not recommended in IE.<sup>2-4</sup> Mycotic aneurysms and cerebrovascular vulnerability are other neurological consequences of IE. Cerebral microbleeds have a predictive value for ICH in IE.<sup>6</sup>

Here, we report a patient with AIS in whom, thrombolysis caused a unique radiological pattern of cortical microbleeds, highly specific for IE.

A 52-year-old man was admitted to our emergency ward (Shariati Hospital, Tehran, Iran)

on October 25, 2020. The patient complained of sudden development of difficulty speaking and right-sided limb weakness 30 minutes prior to admission. He gave a history of hypertension (HTN) and was taking aspirin (80 mg/day) and metoprolol (47.5 mg/day). He was not taking anticoagulant medication and did not report any active or recent bleeding, previous ischemic stroke, ICH, or head trauma.

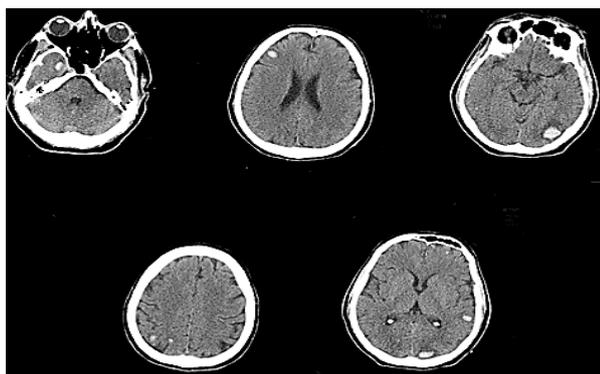
On physical examination, his vital sign recordings were as follows: blood pressure = 146/92, pulse rate = 92/minute, respiratory rate = 18/minute, and temperature = 37 °C.

Neurological examination, rapidly assessed, showed normal mental status. The patient had dysarthria, moderately severe right-sided facial paresis, mild right hemiparesis, and downgoing plantar responses.

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Cerebellar examinations were normal. Spiral (non-contrasted) brain computed tomography (CT) scan was performed, which was normal.

Diagnosed as AIS, Tissue plasminogen activator (TPA, i.e., Alteplase), 0.9 mg/kg, was administered. A second brain CT scan, performed the next day, showed multiple small cortical/sub-cortical hemorrhages unrelated to any vessel territory (Figure 1). Brain magnetic resonance imaging (MRI) confirmed AIS and showed an acute lacunar infarction in the left parietal lobe. The patient's blood tests showed mild anemia [hemoglobin (Hb) = 11].



**Figure 1.** Multiple small cortical/sub-cortical hemorrhages not related to any vessel territory, characteristic of infective endocarditis (IE) after receiving thrombolysis

A repeated interview with the patient revealed that he had chills and fever about one month before his stroke and was taking acetaminophen (325 mg/day). General physical examination showed mild liver and spleen enlargement. Moreover, the patient complained of painful swellings of his hands (palms) that were "retrospectively" diagnosed due to Osler's nodes. Abdominal sonography confirmed mild hepatomegaly and showed an abscess in the spleen. Transthoracic echocardiography (TTE) was reported as normal; nevertheless, transesophageal echocardiography (TEE) was compatible with endocarditis. TEE findings included: moderate aortic insufficiency, prolapsed non-coronary cusp (NCC) suspicious to perforation, and two moderate-

sized masses on the tip of left coronary cusp (LCC) and NCC, highly suspicious to vegetation. Intravenous (IV) antibiotics (ceftriaxone and vancomycin) were immediately started. Blood cultures, taken prior to antibiotic therapy, grew *Streptococcus*-spp bacteria. After two weeks of antibiotic therapy, digital subtraction angiography (DSA) of brain vessels was performed, which did not show any vascular abnormality. Then, the patient was transferred to the cardiac surgery ward. Aortic valve replacement and splenectomy were performed on the 43<sup>rd</sup> day of admission.

The patient was discharged on warfarin therapy. Up until two years of follow-up, he was symptom-free.

Medical literature generally disapproves of thrombolysis in managing AIS in patients diagnosed with IE.<sup>2,4</sup> Meanwhile, time is essential in managing AIS, and diagnosing occult IE during this short time window is very challenging. Therefore, thrombolysis is reasonable and should not be delayed.<sup>2</sup> The unique brain imaging pattern described is critical. Neurologists must remember it in order to not miss this dangerous and potentially fatal illness. When the described imaging pattern of "multiple small cortical/sub-cortical hemorrhages not related to any vessel territory" (similar to figure 1) appears after thrombolysis, neurologists must investigate extensively to find IE.

Written informed consent was acquired from the patient. Research Ethics Committees of the Neuroscience Institute approved the use of humans for this study, and the related ID is IR.TUMS.NI.REC.1400.073. This study conforms to the requirements of the Declaration of Helsinki (1989).

Authors have full access to the data. They take full responsibility for the analyses and have the right to publish all data.

#### Conflict of Interests

The authors declare no conflict of interest in this study.

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None.

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