Case Report

Case report: Thrombolysis for severe posterior circulation infarction with basilar artery occlusion

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Background

Acute ischemic stroke related to basilar artery occlusion poses a high risk of fatality, representing one of the most severe stroke subtypes. Here, we present a case of a patient with basilar artery occlusion-induced acute ischemic stroke, characterized by limb paralysis and critical condition, whose symptoms rapidly improved and muscle strength normalized following bridging thrombolysis therapy.

Case Presentation

The patient, a 57-year-old male, presented with sudden onset of slurred speech and weakness in all four limbs for 3.5 hours. He has a history of hypertension.During the examination, the patient presented with drowsiness, severe dysarthria, right-sided gaze deviation, peripheral facial palsy on the right side, uncooperative tongue protrusion, grade 0 muscle strength in all four limbs, normal muscle tone in the upper limbs, and increased muscle tone

in the lower limbs.

The CT scan of the head showed no abnormalities. The patient was promptly administered tenecteplase (rhTNK-tPA) for thrombolysis at a dosage of 0.25mg/kg over 5-10 seconds. Twelve minutes after receiving thrombolytic therapy, the patient's right peripheral facial palsy improved, and the muscle strength in both upper limbs recovered from grade 0 to grade 3.

Fifteen minutes post-thrombolysis, a head MRI and head MRA revealed multiple infarctions in the bilateral cerebellar hemispheres, pons, midbrain, and left basal ganglia. The head MRA indicated a lack of visualization of the vertebral basilar artery (Figure 1). Ninety minutes post-thrombolysis, the patient exhibited significant improvement in symptoms, with partial alleviation of facial palsy, gaze deviation, and dysarthria. Muscle strength in all four limbs was graded as 5, and muscle tone in the limbs returned to normal.

Three hours post-thrombolysis, digital subtraction angiography (DSA) revealed occlusion in the intracranial segment of the right vertebral artery (RVA) and severe stenosis in the left vertebral artery (LVA) V4 segment with visible thrombotic material. The basilar artery showed good opacification (Figure 2). Revascularization was considered post intravenous thrombolysis. The patient underwent LVA thrombectomy, balloon angioplasty, and stent placement procedure (Figure 2).

The patient's symptoms continued to improve. Five days after thrombolysis, a follow-up MRI showed a significant reduction in the infarct size in the brainstem compared to the day of thrombolysis (Figure 3). Six days post-thrombolysis, a repeat CTA revealed patent posterior circulation vessels (Figure 4). At this point, the patient was alert, coherent, with normal eye movements bilaterally, and full muscle strength in all four limbs. The only deficit noted was slight instability in the right finger-to-nose test, resulting in an NIHSS score of 1.

Discussion

Basilar artery occlusion (BAO) accounts for only 1%-2% of ischemic strokes, yet due to its high disability and mortality rates, it poses a significant

burden on patients.[1,2] Reperfusion therapy is the standard care for improving outcomes in eligible acute ischemic stroke patients. Most countries' stroke management guidelines do not differentiate treatment strategies based on the location of the stroke.[3-7]

Tenecteplase is a genetically modified form of tissue plasminogen activator, with three amino acid substitutions in its sequence compared to alteplase [8].These structural alterations provide teniposide with pharmacological and pharmacokinetic advantages [9-11], including an extended half-life, reduced plasma clearance rate, the feasibility of single-dose intravenous administration, and improved patient transport between hospitals [12-14].Additionally, tenecteplase demonstrates increased fibrin specificity and resistance to PAI-1 (plasminogen activator inhibitor-1) [8].The characteristics of tenecteplase theoretically suggest a higher rate of vascular patency and a lower risk of bleeding in venous thrombolysis [15].Recent studies suggest that tenecteplase could be more beneficial than alteplase in managing acute ischemic stroke (AIS) induced by large vessel occlusion (LVO), with comparable safety outcomes [16].Therefore, the administration of alteplase for acute ischemic stroke within 4.5 hours of onset has been recommended in the latest guidelines both domestically and internationally [3-7].

At the time of consultation, the patient's condition was grave, with a suspected severe posterior circulation infarction and a probable BAO. Consequently, tenecteplase thrombolysis, recognized for its effectiveness in addressing major arterial blockages, was administered.Following thrombolysis, imaging studies indicated successful reperfusion of the previously occluded basilar artery, resulting in sustained amelioration of the patient's condition. A pre-discharge MRI revealed a notable decrease in the infarct area compared to the ischemic lesion in the brainstem observed 12 minutes post-thrombolysis.

Following thrombolysis, the patient experienced rapid symptom relief. Nevertheless, given the critical condition at onset and the potential life-threatening consequences of BAO recurrence, DSA examination was pursued. The intervention of embolectomy, balloon angioplasty, and stent placement

successfully resolved vascular issues in the patient's posterior circulation, markedly diminishing the risk of disease relapse.

Thrombolytic treatment using tenecteplase may yield better results in managing large arterial occlusions in these patients, warranting additional validation through larger, higher-quality randomized controlled trials or registry studies.

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Figure 1: Fifteen minutes post-thrombolysis, the head MRI revealed multiple infarctions in the bilateral cerebellar hemispheres, pons, midbrain, and left basal ganglia. The head MRA indicated a lack of visualization of the vertebral basilar artery.

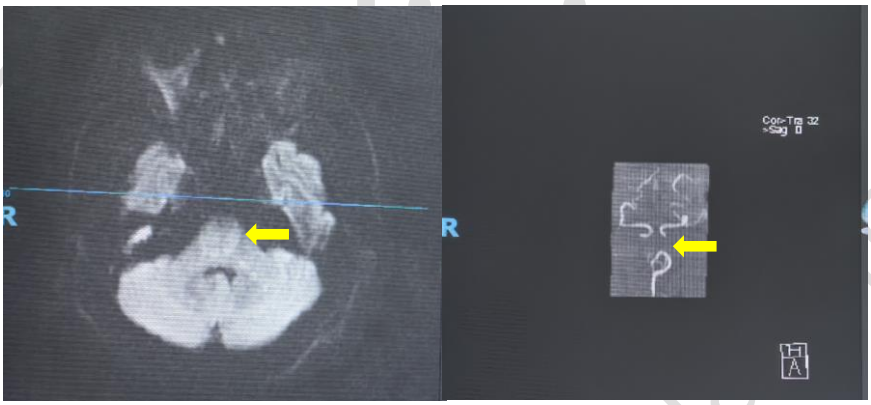

Figure 2: Three hours post-thrombolysis, digital subtraction angiography (DSA) revealed occlusion in the intracranial segment of the right vertebral artery (RVA) and severe stenosis in the left vertebral artery (LVA) V4 segment with visible thrombotic material. The basilar artery showed good opacification.

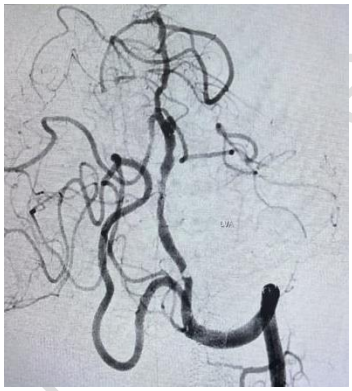

Figure 3: Five days after thrombolysis, a follow-up MRI showed a significant reduction in the infarct size in the brainstem compared to the day of thrombolysis.

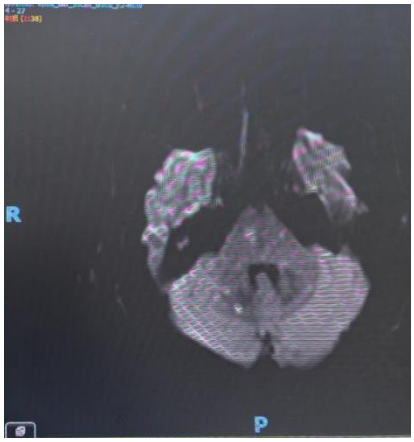

Figure 4:Six days post-thrombolysis, the CTA revealed patent posterior circulation vessels.