

Acute Ischaemic Stroke –
Ischaemic Stroke Acute Thrombolysis with or without Thrombectomy

Successful Bridging Therapy in a 103-Year-Old Woman with Acute Terminal Internal Carotid Artery Occlusion

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Keywords

Very old patient · Stroke · Reperfusion treatment · Thrombectomy · Oldest

Abstract

The efficacy of intravenous thrombolysis and endovascular therapy and their favorable treatment outcomes have been established in clinical trials irrespective of age. Current guidelines do not recommend an age limit in selecting eligible patients for reperfusion treatment as long as other criteria are satisfied. A 103-year-old woman was admitted at our hospital within 1 h of stroke onset secondary to a left internal carotid artery terminus occlusion. On admission, her National Institutes of Health Stroke Scale (NIHSS) score was 30, with a small left thalamic diffusion restriction lesion on MRI. Her medical history included paroxysmal atrial fibrillation, prior myocardial infarction, hypertension, chronic kidney disease, and diabetes mellitus. Her pre-stroke modified Rankin Scale score was 0, and she was fully independent before stroke. Once intravenous thrombolysis was started, the patient successfully underwent mechanical thrombectomy, and thrombolysis in cerebral infarction-3 recanalization was achieved 225 min after symptom onset. She showed dramatic recovery (NIHSS score of 5 after 48 h) and was

discharged on day 7 with a modified Rankin Score of 1. To our knowledge, our patient is the second oldest documented patient who successfully underwent bridging therapy for stroke.

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Introduction

For acute ischemic strokes, the benefit of intravenous (IV) thrombolysis with alteplase increases with earlier treatment, which remains significant up to at least 4.5 h after stroke onset irrespective of age [1]. Four recent randomized trials for endovascular stroke therapy without an upper age limit have demonstrated favorable outcomes [2–5]. A meta-analysis of individual patient data from these trials confirmed the efficacy of mechanical thrombectomy (MT) for large vessel occlusion among patients aged 80 years and older [6]. In the latest American Heart Association/American Stroke Association guidelines, endovascular intervention within 6 h received level IA recommendation for acute ischemic stroke patients secondary to a large vessel occlusion in the anterior circulation [7]. In particular, an upper age limit for this treatment has not been defined in the guidelines [7]. It remains controversial whether endovascular reperfusion therapy is beneficial for nonagenarians. A recent study by Ikeuchi et al. [8] reported poor outcomes in patients aged 90 years and older after MT, while Drouard-de Rousiers et al. [9] showed that successful reperfusion improved the functional outcomes of nonagenarians, particularly when first-pass recanalization could be achieved. We present a case of successful bridging therapy in a 103-year-old woman, the second oldest case with favorable outcome documented [10].

Case Presentation

A 103-year-old woman residing just 1 km away from our hospital was brought to the emergency room after a sudden onset of dizziness, slurred speech, and decreased consciousness 4 min earlier. Her granddaughter, an emergency physician in our hospital, reported that the patient had been fully independent before stroke. Her past medical history was noted for paroxysmal atrial fibrillation, prior myocardial infarction, hypertension, chronic kidney disease, and mild diabetes mellitus. She was taking aspirin 81 mg/day, valsartan 80 mg/day, bisoprolol 2.5 mg/day, and atorvastatin 40 mg/day. On examination, her heart rate was regular at 90 bpm, blood pressure was 90/60 mm Hg, oxygen saturation was 99% on room air, respiratory rate was at 20/min, and blood glucose was 99 mg/dL. Her Glasgow Coma Scale score was 8 (E2M5V1) with severe aphasia and right-sided hemiparesis, with a NIHSS score of 30. An emergent non-contrast CT (NCCT) brain revealed no hemorrhage with an Alberta Stroke Program Early CT Score (ASPECTS) of 10. The patient met the criteria for IV thrombolysis, and alteplase was initiated at 50 min after symptom onset with a reduced dose of 0.6 mg/kg, divided into a 15% bolus and an 85% IV infusion over one hour. Because of her renal impairment and contraindication to IV contrast, an emergent MRI brain scan was performed, which revealed a small diffusion restriction lesion in the left thalamus and occlusion of the left internal carotid artery terminus (ICA-T), and severe stenosis of the left posterior cerebral artery (Fig. 1).

She was taken to the angiography suite and the time from arrival at the emergency room to groin puncture was 146 min. Endovascular procedure was performed under general anesthesia with some difficulty in approaching the occlusion site due to vessel tortuosity. Eventually, we managed to retrieve a clot of 4 mm in diameter with manual aspiration using a 20-mL syringe and achieved TICI-3 recanalization (Fig. 2). The total procedure time was 75 min, and time to achieve recanalization from symptom onset was 225 min. Follow-up NCCT showed a small infarct in the left thalamus with no sign of hemorrhagic transformation. She recovered rapidly with a NIHSS score of 5 on day 2, and on day 5 her neurological function had almost fully recovered. She was discharged on day 7 with a modified Rankin Score of 1. We started a new oral anticoagulant (NOAC), and continued statin and anti-hypertensive agents for secondary stroke prevention.

Discussion

The incidence of acute stroke is highest among patients aged 80 years and older, who also account for the most rapidly expanding group of acute stroke patients in the world [10]. Indeed, these very elderly patients represent a highly vulnerable population, with more frailty, multiple comorbidities, and poorer functional outcomes. Arterial tortuosity is also more prevalent in the elderly than in younger patients, which could potentially preclude the benefit MT due to difficulty in accessing the occlusion site or increased complication rate [9]. The incidence of atrial fibrillation also increases with age, and it constitutes the most frequent cause of acute large vessel occlusion in elderly stroke patients [9]. Our patient presented to the hospital within 1 h of stroke onset secondary to ICA-T occlusion, with an admission NIHSS score of 30. Due to her history of paroxysmal atrial fibrillation, we suspected cardioembolic occlusions of both left PCA and left ICA-T. Her entire left hemisphere barely survived on collateral blood flow through the anterior communicating artery, which explained her severe neurological deficits on presentation. She met the inclusion criteria for IV thrombolysis, but the benefit IV thrombolysis has been uncertain among nonagenarians due to high rates of symptomatic intracerebral hemorrhage and early death [11]. We used the low-dose alteplase regime according to the ENCHANTED trial in this patient, as this regime was associated with significantly fewer symptomatic intracerebral hemorrhages compared to standard-dose alteplase [12]. After IV thrombolysis, the decision to perform MT was based on her early presentation, excellent ASPECTS, the relatively good premorbid status of the patient, as well as the significant benefits demonstrated in the endovascular trials [6]. We decided to undertake MT only in left ICA-T as her severe neurological deficits were more likely attributed to left ICA-T occlusion rather than PCA stenosis. A retrospective analysis of nonagenarians in the ETIS registry showed that MT could improve functional outcome when successful reperfusion was achieved after the first pass [9].

To our knowledge, this is the second oldest documented case with successful outcome after bridging stroke revascularization therapy [10]. However, there are limited reports with acute stroke revascularization therapy for extremely elderly patients in a developing country, and our patient is a very exceptional case with early presentation and treatment made possible because she lived near the hospital and her family member was a physician. Therefore caution should be taken in treating extremely elderly stroke patients, and decisions on revascularization therapy should be made on a case-by-case basis.

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Statement of Ethics

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Disclosure Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Trung Q. Nguyen was a major contributor in writing the manuscript and performing the literature review. Hoang T. Phan, Tinh Q. Dang, and Vu T. Tran made substantial contributions to revise the manuscript and interpret part of the patient data. Thang H. Nguyen supervised the study, interpreted the patient data, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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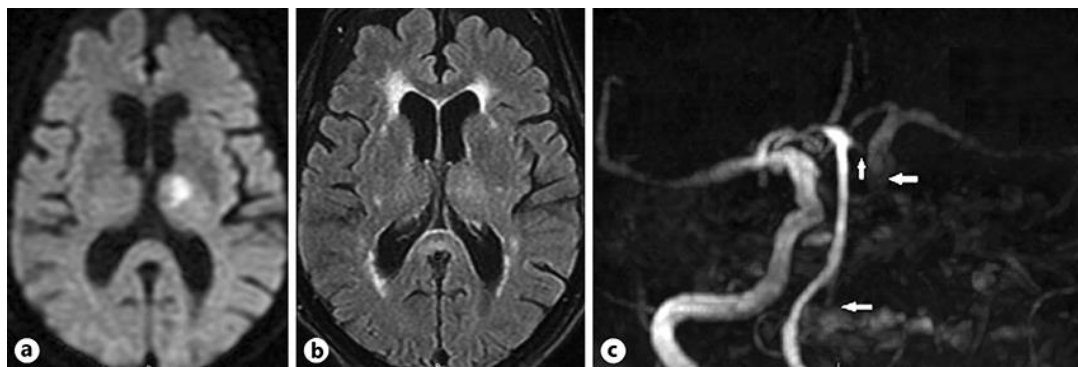


Fig. 1. DWI-MRI showed a small left thalamic acute diffusion restriction lesion (a, b), occlusion of left ICA-T, and severe stenosis of left PCA and VA (arrows) were found on 3D-TOF MRA (c).



Fig. 2. Successful reperfusion with TICI-3 recanalization.