

Management of Acute Ischemic Stroke in a Patient with a Past History of Intracranial Hemorrhage

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Abstract

Intravenous thrombolysis remains the gold standard in the management of acute ischemic stroke if the patient presents within the window period. Endovascular thrombectomy is another line of therapy in selected cases. Nonetheless, one of the most devastating complications of IV thrombolysis is intracranial hemorrhage (ICH); in such cases, the previous history of ICH is considered a potential contraindication to thrombolysis. Evidence regarding the safety of thrombolysis administration in patients with a previous history of ICH is scarce. We encountered a patient with acute ischemic stroke with a past history of hypertensive ICH. A 59-year-old female, presented with complete right-sided body weakness, global aphasia and gaze preference. A computed tomography (CT) brain perfusion scan revealed a mismatch suggestive of left middle cerebral artery (MCA) ischemic stroke. The patient received intravenous thrombolysis and showed significant clinical improvement with no subsequent complications or ICH. In reporting this case, we aim to provide evidence supporting the safety of thrombolytic therapy in selected cases with a previous history of ICH when no alternative line of management is available.

Keywords

Ischemic Stroke, Acute Ischemic Stroke, IVtPA in History of Hemorrhagic Stroke, Hemorrhagic Stroke, Intravenous Thrombolysis

1. Introduction

Despite the recent labeling of a history of intracranial hemorrhage (ICH) as a potential contraindication of intravenous thrombolysis in acute ischemic stroke

management guidelines, evidence regarding its clinical safety is still limited. We report a rare case that involved a new practice of managing a patient with a prior history of intracranial hemorrhage who presented with acute ischemic stroke. From this case, we aim to provide clinical data that supports the safety of intravenous thrombolysis in selected cases of patients with a past history of intracranial hemorrhage, who present later with acute ischemic stroke, and who are deemed unfit for thrombectomy. Early administration of intravenous thrombolysis can be justifiable in similar cases, resulting in significant favorable outcomes.

2. Case Presentation

We report a case of a 59-year-old right-handed, Saudi female who presented to the emergency department with acute complete right-sided body weakness and inability to speak for 30 minutes' duration. Her past medical history was remarkable for diabetes, hypertension, dyslipidemia, and left basal ganglia bleed one year prior to this presentation, followed by complete recovery (**Figure 1**). The patient was in her usual state of health until 30 minutes before presentation when she suddenly could not move her right upper and lower limbs and was unable to talk. There was no history of abnormal movement, tongue biting, fever, neck pain, nuchal rigidity or head trauma. The family history and a review of other systems were unremarkable. On presentation, the patient was vitally stable: temperature 36.7°C, BP 167/87 mmHg, pulse 92 bpm with a regular rhythm, respiratory rate 20 bpm, SpO₂ 100% on room air and random blood glucose of 179 mg/dl. She was conscious and globally aphasic. Pupils were equally reactive to light with left gaze palsy. Corneal and gag reflexes were intact, with right upper motor neuron facial palsy. According to the Medical Research Council (MRC) grading system, the power was 0/5 on the right side of the body, with an up-going plantar response, whereas, on the left side, the power was 5/5 with a down-going plantar response. The cerebellar examination was intact. Due to her global aphasia, as she was unable to communicate or to understand, a sensory examination could not be assessed. Her initial National Institutes of Health Stroke Scale (NIHSS) score was 21 - 22. The patient went into extensive hematological investigation; basic laboratory workups, including LFT, RFT, lipid profile, and coagulation study, were done. On presentation, prothrombin time (PT) measured 10.5, and partial thromboplastin time (PTT) 22.2. A plain head computed tomography (CT) was done and showed no hemorrhage or acute infarction (**Figure 2**). In addition, a CT angiography (CTA) showed no obvious large vessel occlusion, and the proximal branches were all patent (**Figure 3**). CT perfusion (CTP) was carried out and showed a mismatch consistent with a stroke of the distal branch of the left middle cerebral artery (MCA). With this clinical picture and radiological findings, the diagnosis of acute ischemic stroke was confirmed. Due to her past history of left basal ganglia hemorrhage, the decision-making regarding the administration of IV thrombolysis was challenging.

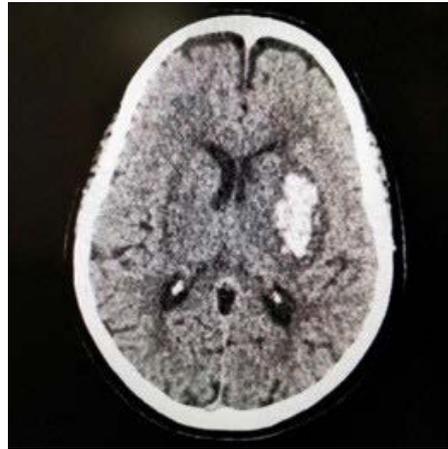


Figure 1. Plain head CT scan of the old left basal ganglia 1 year prior to this present.

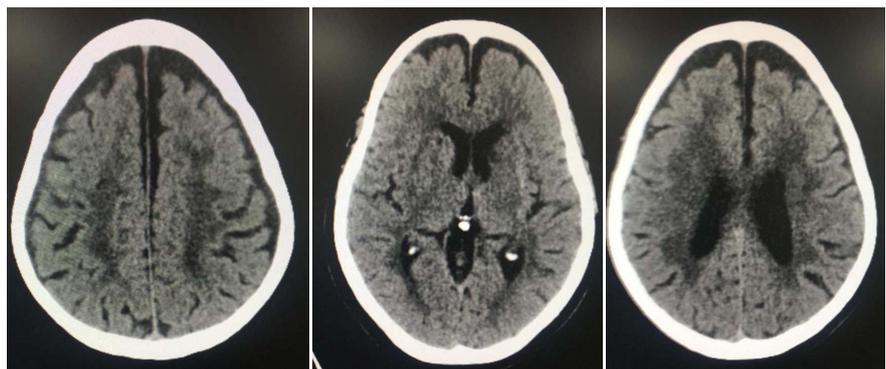


Figure 2. Plain head CT scan upon presentation showed no hemorrhage or acute infarction on multiple cuts.



Figure 3. CT angiography showed no obvious large vessel occlusion.

Moreover, as the anatomical location of the infarction was in the distal branch of the MCA, the patient was deemed an unfit candidate for thrombectomy as she would be less likely to benefit from this treatment. Due to the severity of her symptoms, and the dilemma related to the absence of other alternatives, the

family agreed to sign a high-risk IVtPA consent form after discussing the possibility of benefit and the potential risk of hemorrhage, which was higher in her than in the general population. The patient was started on tPA IV 0.9 mg/kg and aspirin was held. The patient was then transferred to the intensive care unit (ICU) under the care of neuro-critical and neurovascular teams, where they kept her NPO and started IV normal saline (NS) 0.9 cc/hour. A repeated CT scan was done 24 hours post-IVtPA and showed no hemorrhage (**Figure 4**). Therefore, she was started on Aspirin 81 mg PO OD and Heparin 5000 units SQ Q12. An echocardiogram and 24-hour Holter monitor showed ventricular hypertrophy grade 2 diastolic dysfunction with no thrombus or shunt. Clopidogrel 75 mg OD had been started 3 days post-IVtPA. A few days later, the patient started to show clinical improvement in terms of speech and gaze deviation. During her admission, the patient underwent repetitive (CT) scans which showed no ICH post-IVtPA. On discharge, the NIHSS score improved to 11. Moreover, her speech and gaze improved dramatically and she returned to her baseline. Nonetheless, unfortunately, she did not regain full power on the right side. The patient was discharged on Clopidogrel 75 mg OD, to be followed by a stroke clinic. Patient was seen in the clinic 6 months and 12 months post IVtPA in which she showed no new neurological deficits and was walking with the aid of a cane.

3. Discussion

Acute ischemic stroke (AIS) continues to be a major disease burden resulting in myriad neurological deficits, depending on the degree of arterial occlusion [1]. Acute ischemic stroke is a heterogeneous spectrum of sudden neurological deficits resulting from a vascular occlusion to the brain, spinal cord or retina [2]. Evidence has shown that IV thrombolysis can lessen the extent of neurological damage if administered within the window before complete infarction occurs [1]. Intravenous thrombolysis remains the most approved line of therapy in

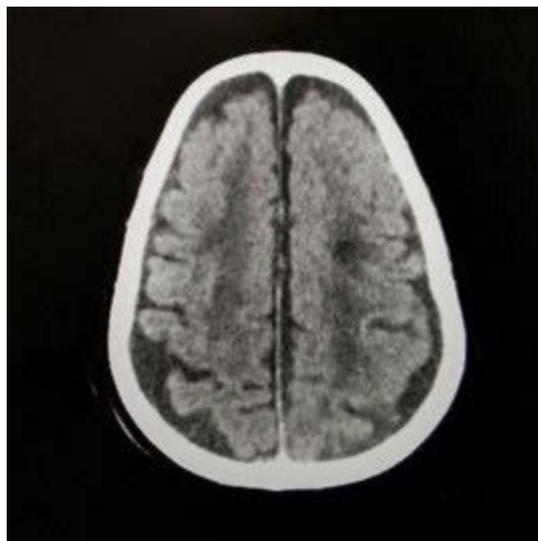


Figure 4. Plain head CT scan post-IV tPA showed no hemorrhage.

the management of acute ischemic stroke. Administration of intravenous recombinant tissue plasminogen activator (rtPA) is recommended within three hours from the onset of acute ischemic stroke. Other trials have expanded this window up to four and a half hours, supporting its clinical efficacy. One of the most devastating complications of IV thrombolysis is intracranial hemorrhage (ICH); for this reason, for many years, a previous history of ICH was considered a contraindication of using (rtPA). Intracranial hemorrhage (ICH) was labeled as a potential contraindication to IV thrombolysis according to the 2018 guideline by the American Stroke Association for the management of acute ischemic stroke [3]. Another line of management of (AIS) is a surgical intervention which is classified as acute, emergent or non-acute treatment. Acute management is initiated within hours of stroke onset and it aims to: re-establish blood flow, restore lost neurological function and prevent permanent tissue damage. On the other hand, non-acute interventions aim to reduce secondary insults resulting from brain swelling and to prevent new strokes. However, IVtPA remains the gold standard management line in the approach to AIS. Nevertheless, approximately 30% of patients with acute ischemic stroke will have involvement of proximal intracranial arteries with large vessel occlusion and, as a consequence, the efficacy of IVtPA will be reduced and, hence, the surgical approach is recommended [4]. The percentage of patients receiving IVtPA has increased to 7% from 2003 to 2011. However, only 15% - 32% of patients with AIS present to the hospital within the window period, limiting the possibility of administering IV thrombolysis. Moreover, only 1% - 7% are candidates for surgical intervention [5]. Although our patient presented within the window of IVtPA, due to her previous history of ICH, the decision-making regarding the administration of IV thrombolysis was challenging. Furthermore, as the occlusion was in the distal branch of the left MCA, she was not a candidate for endovascular thrombectomy. Due to the insufficient data regarding the safe use of IV thrombolysis and the frequently reported ICH as a serious complication of using thrombolytic therapy, some healthcare providers are still hesitant to administer IVtPA for patients with previous ICH [1]. A retrospective study conducted at Shandong University, China, was published in 2019. The study analyzed the safety and efficacy of IVtPA for treating AIS patients with a history of cerebral hemorrhage who arrived within 4.5 hours. Among 1694 (AIS) patients enrolled in the study, 805 received IVtPA. A total of 76 AIS patients with a history of cerebral hemorrhage received IVtPA (n = 12) or conventional therapy (n = 64). A significant difference was noted in the 90-day modified Rankin scale (90-d mRS) in 41.7% of those who received IVtPA, while no significant difference was found in symptomatic intracerebral hemorrhage (SICH) measurements and 90-d mortality rates [6].

Another prospective multicenter study of the stroke registry database, published in 2016, analyzed 1495 patients who were treated with IVtPA. 73 (4.9%) had previous intracerebral hemorrhage. No significant increase in the risk of

symptomatic hemorrhagic transformation, mortality or functional outcome measures was found [7].

Results in the National Institute of Neurologic Disorders (NINDS) trials, using (rt-PA), recorded 11% - 15% absolute benefit regardless of the increased risk of symptomatic ICH (SICH) [8]. The rate of developing total ICH following IV thrombolysis, according to NINDS trial, is 10%, including both SICH and fatal ICH. A similar percentage has been found in other prospective studies. The rate of ICH may be affected by the time of administering thrombolytic therapy, its type and dose, the CT findings of hypodensity, and the current use of anticoagulant or anti-platelets agents [9]. Other predictors include initial CT scan of early and advanced ischemic changes, cardioembolic stroke, the extent of stroke and pulse pressure [9]. Although multiple studies have investigated the safety of IV thrombolysis in patients with a past history of ICH, data addressing the proper time interval between the ICH and AIS is lacking. Moreover, current evidence does not show whether it is safe in chronic ICH cases with underlying vascular abnormalities or with recurrent cases [10].

4. Conclusion

A past history of intracranial hemorrhage may not be an absolute contraindication for intravenous thrombolysis. In some patients, administration of IVtPA has shown tremendous clinical improvement with no significant increase in the risk of symptomatic intracranial hemorrhage, or mortality rate. Our analysis of this case, leads us to recommend that clinicians reconsider administration of IVtPA on selected patients who present with AIS and who have a previous history of ICH. Further randomized controlled trials are needed to study the safety and efficacy of thrombolysis in similar cases.

Consent

Informed consent for publication of the clinical details was obtained from the patient.

Declarations

Authors' Contributions

Concept, literature search preparation, editing and revision of manuscript: Gha-deer Al-Shabeeb, Fatimah AlZawad.

Patient data, imaging acquisition, supervision and revision of manuscript: Osama Basheir.

Availability of Data and Materials

Data available upon request.

Financial Support and Sponsorship

None.

Conflicts of Interest

All authors declared that there are no conflicts of interest.

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