Case Report

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Importance of Recombinant Tissue Plasminogen Activator (rt-PA) Thrombolysis in Hyperacute Stroke Patients with Aphasia-A Case Report

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Abstract

Thrombolysis in an acute stroke has been shown to have a good outcome measure in an eligible candidate. However, the benefits and effectiveness of it in acute minor stroke are still not well established. We describe a case of 35-year-old male who was presented with isolated aphasia with the total National Institutes of Health Stroke Scale of 3 out of 42. Magnetic Resonance Imaging of the brain showed a focal left middle cerebral artery territory infarction secondary to distal vessel occlusion at M4 segment distally on Diffusion-Weighted Imaging sequence which was mismatched on Fluid-Attenuated Inversion Recovery sequence. Recombined tissue plasminogen activator was administrated intravenously without any complication. The patient's condition improved gradually with positive outcome measures. Intravenous r-TPA can be a beneficial treatment for a subset of patients with minor stroke.

Keywords: Alteplase, isolated aphasia, minor stroke, thrombolysis

Introduction

When an acute stroke occurs within a window of less than 4.5 hours, intravenous recombinant tissue plasminogen activator (r-TPA) is still the primary treatment option. There is a chance of haemorrhages with this medication, particularly intracranially. Therefore, the treating physician can be reluctant or uneasy about thrombolyzing this group of patients, especially those who have shown up with mild symptoms like isolated aphasia, because the danger of injury to the patient is greater than the benefit of treatment (1). Furthermore, even in the absence of thrombolysis, this kind of small stroke has a favourable prognosis within three months of treatment and a 75% good recovery rate (2).

However, there is still controversy as to which category the patient with a minor stroke falls into. Most researchers or clinicians use the National Institutes of Health (NIHSS) Stroke Scale as a stroke assessment tool and dictate a score from 0 to 4 as an indicator of a mild stroke (3). This may lead to inaccuracies as the NIHSS score is weighted more towards the anterior circulation, specifically the left (dominant) hemisphere (4), compared to other areas such as the right hemisphere or the posterior circulation. Stroke affecting isolated area of language without motor or sensory involvement is rare and is often due to mimic strokes, such as those of toxic or metabolic origin (5). However, if the stroke itself exhibits aphasia, this predicts an unfavourable prognostic marker for a minor stroke (6). This article describes the benefit of aggressive thrombolysis in a mild, disabling symptomatic stroke that has achieved a good outcome within a few months.

Case Report

We described a 35-year-old Malay man who had a history of chronic smoking who presented with generalised body weakness that caused him to fall in the bathroom. Subsequently, he develops aphasia and family members noticed the patient lost the ability to talk. Within two hours of the commencement of symptoms, he was in the emergency stroke unit. Upon the initial assessment, he was alert with expressive aphasia. Apart from that, there was no drift noted over his right and left upper or lower limbs. There were no noteworthy findings from any other neurological examinations. The patient was able to respond to the question by indicating the correct response on a sheet of paper during the NIHSS assessment for component no. 1b. He received a score of 1 for dysarthria and 2 for best language on component no. 10. The total NIHSS score was 3 out of 42.

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The following clinical information was available at admission: thrombocyte count, 367 × 103 mm³ (normal: 130 × 103–400 × 103 mm³), international normalised ratio (INR), 1.04, prothrombin time (PT), 11.3 seconds (control: 9.95–11.34 seconds), activated partial thromboplastin time (aPTT), 25.20 seconds (normal: 32.36–42.0 seconds), and creatinine level, 70 umol/L. The brain's magnetic resonance imaging (MRI) revealed an acute infarct in the left temporoparietal region, which corresponds to the left middle cerebral artery (MCA) territory. This was probably caused by a distal vessel occlusion (DVO), and the imaging from the Fluid-attenuated Inversion Recovery (FLAIR) sequence appears mismatched with the Diffusion-weighted Imaging (DWI) sequence. Additionally, there was no blooming effect that would indicate bleeding on the susceptibility-weighted imaging (SWI) sequence (Figure-1). Magnetic Resonance Angiography (MRA) also shows no evidence of major vessel blockage (Figure-2).

It was decided to thrombolyse the patient after considering the patient's clinical presentation of a minor stroke, which was based on the NIHSS score of 3 but was also linked to a disabling aphasic symptom. The clinical advantage of r-TPA in this sort of mild stroke was also taken into consideration. Informed consent was obtained before 0.9 mg/kg of r-TPA with alteplase was infused intravenously. During and after r-TPA administration, no immediate complications arise. On day four following thrombolysis, a repeat MRI revealed a

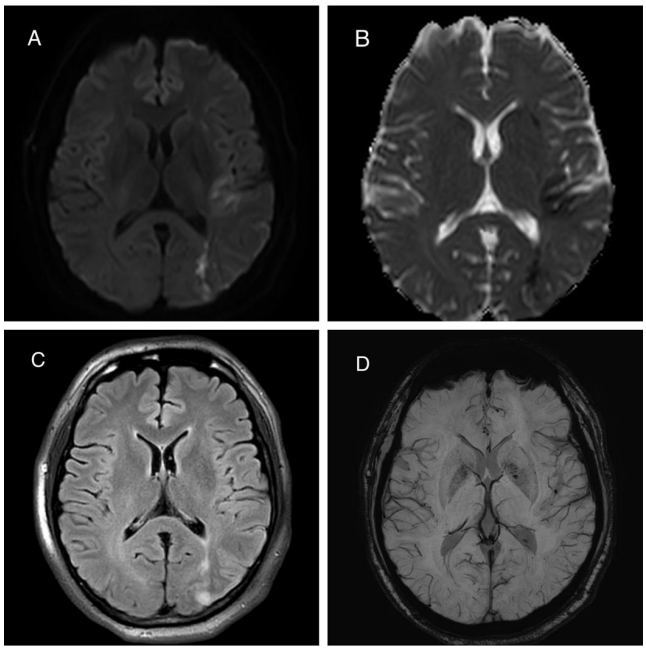

Figure 1. A-B: Showing diffusion weighted imaging (DWI) (Figure-1A) and the apparent diffusion coefficient (ADC) (Figure-1B) map showing acute infarct at the left temporo-parietal region, corresponding to the left middle cerebral artery (MCA) territory, likely due to a distal vessel occlusion (DVO).
C: No matched high signal intensity is noted on the fluid attenuated inversion recovery (FLAIR) sequence.
D: No blooming is seen on the susceptibility weighted imaging (SWI) sequence to suggest hemorrhage.

Figure 2. MRA demonstrated no obstruction of large vessel in carotid artery, anterior, middle, and posterior cerebral artery & basilar artery.

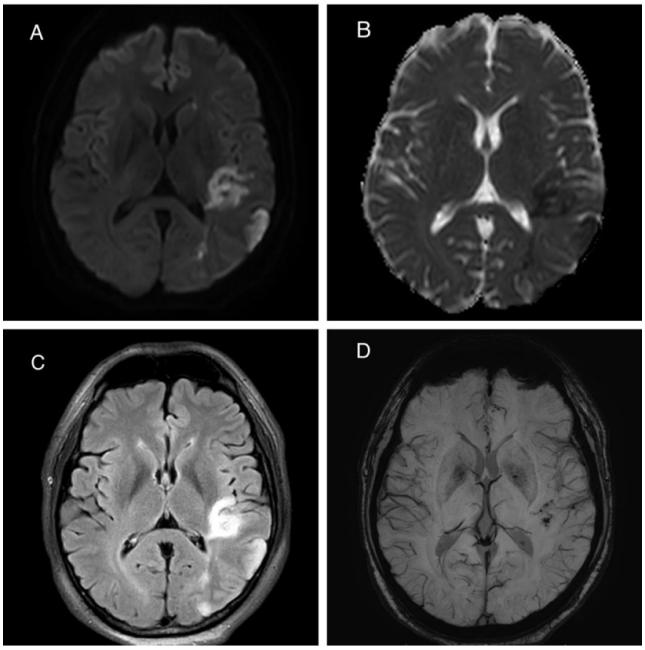

Figure 3. Repeated brain magnetic resonance imaging (MRI) on day 4 showing;
A-B: The DWI and ADC map shows established infarct at the left temporo-parietal region.
C: Corresponding matched abnormal high signal intensity is more conspicuous on the FLAIR sequence.
D: Minimal microhaemorrhages are seen.

confirmed infarct at the left temporoparietal area on the DWI and ADC maps, accompanied with mild microhaemorrhages and an abnormally high signal intensity that was more noticeable on the FLAIR sequence (Figure-3). On the fifth day after his stay, he was released with a slight aphasia that was still present, but an improved NIHSS score to 1. He had a good score of 97 on the Western Aphasia Battery (WAB) when he was examined during the follow-up in the clinic one month's time.

Discussion

It is still debatable and not fully demonstrated whether thrombolysis is safe and appropriate in cases of acute mild

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stroke. Although there are currently numerous methods and scoring systems for defining a mild stroke, a study indicates that there are no appreciable changes in the outcome measure between patients who receive treatment and those who do not, with roughly 30% of the former experiencing a bad outcome within 90 days (7). An intracranial and extracranial vascular occlusive lesion on imaging, or a parameter in the NIHSS component such as leg weakness and extinction/inattention, may be the cause of the adverse outcome in a mild ischaemic stroke (8). Additionally, on vascular imaging, some people who have had small strokes may have substantial artery blockage. If thrombolysis is not performed at the time of the initial mild stroke presentation, this manifestation will have a poor outcome measure with a Modified Rankin Scale (MRS) score of less than or equal to 2 at three months after the stroke (9). It also carries a risk of having a full-blown stroke at any time. In addition, thrombolysis has been demonstrated to have positive results in cases of mild stroke, especially in cases of left hemisphere lesions, with an estimated 47% recovery rate with no lingering symptom s(10).

This patient is receiving thrombolytic therapy because, despite the NIHSS assessment indicating a mild stroke, greater attention should be paid to the evaluation of the patient's neurological deficiencies and how they affect functional impairment (11). According to research by Maas (2012), 57% of patients experienced a spontaneous improvement in their symptoms, which was followed by a 38% resolution. This kind of stroke has a recovery rate of about 90%, which raises doubts about the necessity of thrombolysis in certain situations (12). Nesi et al., however, conducted a prospective study on aphasic stroke patients with NIHSS scores below 6 who later received thrombolysis and reported a positive outcome and notable recovery after three months. This implies that thrombolysis should be administered to stroke patients with isolated aphasia in the early evaluation, irrespective of their NIHSS score (13). Additionally, this subgroup of patients showed improvements in their composite language score, language screening test, and NIHSS score following thrombolysis. Surprisingly, none of the thrombolysed patients experienced cerebral haemorrhage (14). Because of the extent of the neural network encompassing the language region, this subset of patients is at risk for a poor prognosis, which is why urgent treatment is necessary. Bridging the penumbra in a small infarct area enhances overall functional improvement. But, if conservatively handled, it can cause the infarcted area to spread into the language area, which would have a negative effect as it worsens (15).

Inlightof this data, in 2019 the American Heart Association (AHA) developed updated guidelines for treating hyperacute stroke patients who had mild symptoms. It has been proposed that, if qualified and within a reasonable time frame, patients with small strokes who exhibit incapacitating symptoms that could interfere with their ability to return to work or engage in everyday activities should receive thrombolysis treatment (16). In this instance, the patient's NIHSS score significantly improved after thrombolysis, going from 3 to 1 upon discharge. His clinic follow-up revealed a good recovery with few signs of aphasia. The severity of aphasia was assessed at clinic follow-up using the Western Aphasia Battery (WAB) score. The main clinical components of language function—content, fluency, auditory comprehension, repetition, naming, as well as reading, writing, and calculation—will be evaluated by this WAB score. With a score of 97, the patient's WAB score after one month was considered modest.

Conclusion

Information about the use of thrombolysis in treating acute mild stroke with isolated aphasia is currently scarce. However, thrombolysis has been shown to have a positive effect in isolated aphasia because of the language area's extensive neural network, which provides a chance for higher functional improvement because of its collateral blood supply. To determine the best course of treatment and the safety profiles of rTPA thrombolysis in this single aphasic patient, more research is required.

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