

Primary angioplasty followed by chemical thrombolysis for carotid and middle cerebral artery occlusion (multimodality treatment)

INTRODUCTION

Mortality rates associated with basilar artery occlusions, internal carotid artery (ICA) occlusions and middle cerebral artery (MCA)—M1 segment occlusions are particularly high despite the best available medical therapy. The recanalisation rate of a patient with carotid T occlusion is 10%^{1,2} with intravenous thrombolysis and 33% with intra-arterial (IA) thrombolysis.³ We report a case of acute stroke in whom primary angioplasty of the left internal carotid artery followed by IA thrombolysis of MCA was done with a favourable outcome in our centre. This is the first reported case of such a procedure in India.

CASE REPORT

A 65-year-old male subject who is a known diabetic and smoker presented with a history of blurring of vision of 6 h duration, followed by global aphasia and right-sided hemiplegia of 2 h duration. The patient had global aphasia, gaze deviation to left side and right-sided hemiplegia at admission. At presentation, National Institutes of Health Stroke Scale was 28. MRI brain showed restricted diffusion in basal ganglia, anterior cerebral artery/MCA and posterior cerebral artery/MCA watershed area (figure 1). Magnetic resonance angiogram showed complete occlusion of left internal carotid artery

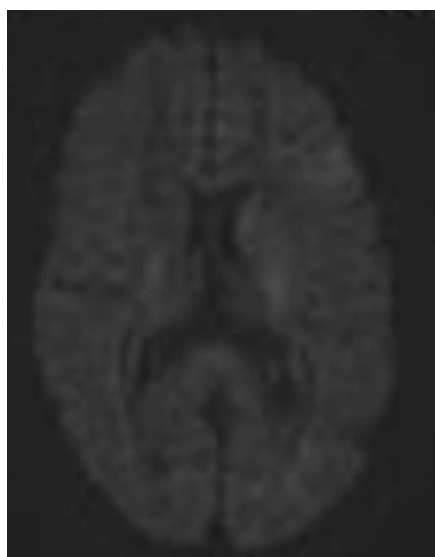


Figure 1 Diffusion image showing patchy restricted diffusion in left middle cerebral artery territory.

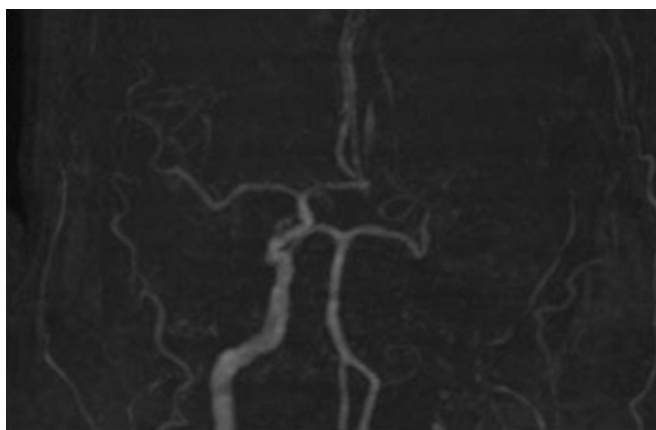


Figure 2 MR angiogram showing complete occlusion of left internal carotid artery (ICA) and middle cerebral artery.

from the origin with occlusion of left MCA and A1 segment of anterior cerebral artery (figure 2). As the patient had symptoms of 6 h duration and long segment occlusion, the patient was taken for intervention.

Under general anaesthesia, 6F guiding catheter was negotiated into the left common carotid artery (figure 3). The patient received 3000 U of heparin bolus. Micro catheter was then navigated into the thrombus distally into the MCA bifurcation. Using exchange length 014 wire, angioplasty was done using 2×12 voyager balloon in supraclinoid, cavernous and petrous segment of internal carotid artery (figure 4). Angiogram showed residual severe stenosis of petrous internal carotid artery segment. Using 4×20 balloon, repeat angioplasty was done in the petrous internal carotid artery segment. Angiogram showed good recanalisation

of entire internal carotid artery. Using micro catheter, recombinant tissue plasminogen activator (rtPA) infusion (20 mg) was performed in a small dose in M1 segment of MCA. Then, the internal carotid artery showed sluggish flow indicating reocclusion. So, 5 mg GP IIb/IIIa inhibitor (reopro) was injected slowly in the cervical internal carotid artery. Within 5 min, there was complete recanalisation of the entire internal carotid artery and MCA (figure 5). Following the procedure, the patient was sedated and ventilated for 12 h and postextubation, clinical examination showed complete recovery.

CT brain plain (figure 6) done 24 h after procedure showed hypo density in the left lentiform nucleus and watershed territory of left MCA as was seen in the preprocedure MRI-diffusion weighted imaging. There was no evidence of any reperfusion haemorrhage.



Figure 3 Left common carotid artery angiogram shows complete occlusion of left ICA.

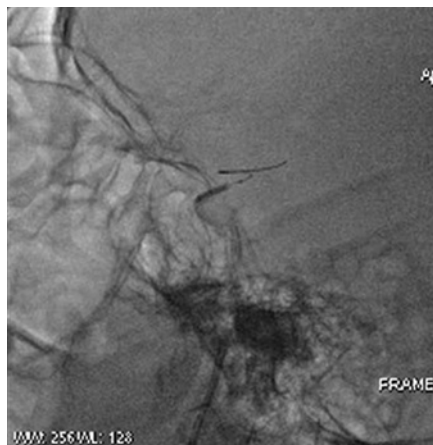


Figure 4 Angioplasty of supraclinoid ICA using 2×12 balloon.

DISCUSSION

Management of acute ischaemic stroke has always been a formidable challenge. Various treatment strategies available today lead to higher rates of recanalisation. The efficacy of intravenous thrombolysis in acute ischaemic stroke has been proven in National Institute of Neurological Disorders and Stroke trial. But, only 10% of patient with carotid T occlusion will have recanalisation with intravenous thrombolysis.^{1 2}

So, for patients with large vessel occlusion, IA thrombolysis is one of the treatment modalities available. But, even with IA thrombolysis for carotid T occlusion, the recanalisation rate with IA thrombolysis is only 33%. In the study by Gonner *et al*, the recanalisation rate was 63%. Twenty-one

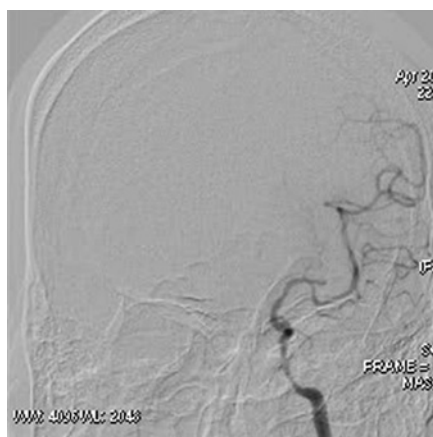


Figure 5 Final angiogram shows complete recanalisation of ICA and middle cerebral artery.



Figure 6 Twenty-four h postprocedure CT brain plain did not reveal any reperfusion haemorrhage.

percent recovered to modified Rankin Scale score (mRS) scores 0 or 1, and 40% to scores of 2 or 3. The outcome was good (mRS 0–3) in 80% with MCA occlusions, in 33% with ICA and in 50% with basilar artery occlusions.³

In a study of carotid T occlusion patients treated by IA thrombolysis, four patients (16.6%) had a favourable (mRS ≤ 2) and 10 patients (41.7%) a poor outcome (mRS 3 or 4) after 3 months. Ten patients (41.7%) died. One symptomatic intracerebral haemorrhage (4.2%) occurred. Partial recanalisation of the intracranial internal carotid artery was achieved in 15 (63%) of the MCA in four (17%), and of the anterior cerebral artery in eight patients (33%). Complete recanalisation never occurred.⁴

In a retrospective study of carotid T occlusion patients, the lowest recanalisation rates were observed with IA lytics alone (3/17, 17.6%). Mechanical embolus removal in cerebral ischaemia embolectomy alone achieved 46.2% recanalisation rates (6/13; $p=0.23$). Angioplasty or stenting and IA lytics achieved 25% (2/8; $p=0.65$) and 40% (4/10; $p=0.085$) recanalisation.⁵

The procoagulation activity may increase tremendously immediately post-thrombolysis with rtPA (peaks after 1–3 h and persists up to 72 h), indicating that thrombolysis may trigger the coagulation cascade and hence enhance thrombin formation at the site of occlusion. This may be the explanation for reocclusion after IA thrombolysis.⁶ So, GP IIb/IIIa inhibitors can be

used along with rtPA to have a synergistic effect.⁷

Thus, for a patient with a long segment occlusion, multimodality treatment with combination of mechanical and chemical treatment is necessary.⁸

CONCLUSION

Multimodality treatment is an option for patients who present with acute ischaemic stroke with a long segment (carotid and MCA) occlusion.

Vikram Huded, K N Rajesh

Department Of Neurology, Narayana Hrudayalaya Institute of Neurosciences, Narayana Health City, Bangalore

Correspondence to Dr Vikram Huded, Consultant Interventional Neurologist, Department of Neurology, Narayana Hrudayalaya Institute of Neurosciences, Narayana Health City, Bangalore, Karnataka 560099, India; drvikramhuded@gmail.com

Competing interests None.

Provenance and peer review Not commissioned; internally peer reviewed.

Heart Asia 2012;25–26. doi:10.1136/heartasia-2012-010096

REFERENCES

1. Del Zoppo GJ, Poeck K, Pessin MS, *et al*. Recombinant tissue plasminogen activator in acute thrombotic and embolic stroke. *Ann Neurol* 1992;**32**:78–86.
2. Wolpert SM, Bruckmann H, Greenlee R, *et al*. Neuroradiologic evaluation of patients with acute stroke treated with recombinant tissue plasminogen activator. The rt-PA Acute Stroke Study Group. *AJNR Am J Neuroradiol* 1993;**14**:3–13.
3. Gonner F, Remonda L, Mattle H, *et al*. Local intra-arterial thrombolysis in acute ischemic stroke. *Stroke* 1998;**29**:1894–900.
4. Arnold M, Nedeltchev K, Mattle HP, *et al*. Intra-arterial thrombolysis in 24 consecutive patients with internal carotid artery T occlusions. *J Neurol Neurosurg Psychiatry* 2003;**74**:739–42.
5. Lin R, Vora N, Zaidi S, *et al*. Mechanical approaches combined with intra-arterial pharmacological therapy are associated with higher recanalization rates than either intervention alone in revascularization of acute carotid terminus occlusion. *Stroke* 2009;**40**:2092–7.
6. Fassbender K, Dempfle CE, Mielke O, *et al*. Changes in Coagulation and fibrinolysis markers in acute ischemic stroke treated with recombinant tissue plasminogen activator. *Stroke* 1999;**30**:2101–14.
7. Gaikwad SB, Padma MV, Moses EJ, *et al*. Intra-arterial Thrombolysis of basilar artery occlusions combination of intraarterial thrombolytic and GP IIb/IIIa inhibitors in basilar artery thrombosis. *Neurol India* 2009;**57**:313–19.
8. Abou-Chebl A, Bajzer CT, Krieger DW, *et al*. Multimodal therapy for the treatment of severe ischemic stroke combining GPIIb/IIIa antagonists and angioplasty after failure of Thrombolysis. *Stroke* 2005;**36**:2286–8.