Intra-Arterial Thrombolysis Is the Treatment of Choice for Basilar Thrombosis

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Strokes attributable to basilar artery occlusion are fortunately uncommon but have a high risk of death or severe disability. Presentation is highly variable, and initial misdiagnosis by nonspecialists of patients with warning or progressive symptoms is common. Sometimes patients present at a late stage where intervention is unlikely to be successful. Hence, management of these patients is particularly challenging to vascular neurologists and stroke physicians.

What do we know about basilar artery occlusion? As in anterior circulation ischemic strokes, “time is brain” and outcome depends on time to treatment, clinical state at presentation and whether and how quickly recanalization occurs. Without recanalization good recovery virtually never occurs. The rarity of basilar artery occlusion is reflected by the paucity of randomized controlled trials. One small randomized controlled trial of intra-arterial urokinase against anticoagulation in 16 patients with posterior circulation stroke suggested intra-arterial urokinase was associated with a better outcome. However, the main evidence base available to decide on the most effective treatment approach comprises retrospective and prospective patient cohorts from different centers using a variety of protocols. Most case series report experience of using intra-arterial thrombolysis rather than intravenous thrombolysis or anticoagulation. That the management of intra-arterial thrombolysis is controversial is therefore not surprising, because interpretation of nonrandomized evidence is difficult, and “reasonable” people can draw different conclusions.

The key to effective management of basilar artery occlusion has to be rapid diagnosis and early achievement of recanalization. However, attempts at reperfusion are sometimes attempted many hours after symptom onset when extensive irreversible brain stem infarction is present and any action is heroic (ie, courageously undertaken in desperation as a last resort). Conventional treatment of basilar artery occlusion has traditionally been anticoagulants. A series of 82 patients from 3 centers, which excluded 11 patients treated with intravenous or intra-arterial thrombolysis, demonstrated a good outcome was achieved in only 21% patients. Thus, the case for more aggressive treatment with intravenous or intra-arterial thrombolysis, or other procedures such as mechanical clot removal or ultrasound intervention, appears strong.

The intra-arterial route appears to have become the preferred mode of delivering thrombolysis to patients with basilar artery occlusion for historical reasons rather than any belief that it would be more effective than the intravenous route. Some of the earliest pioneering studies of thrombolysis used the intra-arterial route in patients with vertebro-basilar occlusions. Similar effectiveness of intra-arterial and intravenous thrombolysis was reported in a comparison of intra-arterial reteplase and intravenous alteplase in a canine model of basilar artery thrombosis. Lindsberg and Mattle recently published a systematic analysis comparing treatment of basilar artery occlusion from 10 intra-arterial and 3 intravenous thrombolysis case series in 344 and 76 patients respectively. Fewer intravenous-treated patients had been treated very early, yet despite this, death and dependency outcomes were virtually identical in both groups with only 24% intra-arterial and 22% intravenous patients achieving a good outcome, very similar to the outcomes reported from conventional treatment with anticoagulation alone (Figure 2). Recanalization was achieved more frequently with intra-arterial therapy, but this did not translate into improved outcomes, perhaps because many patients achieved recanalization too late to salvage significant brain stem function. Mechanical thrombolysis may achieve recanalization earlier than intra-arterial thrombolysis in some cases.

The case for intra-arterial thrombolysis as the preferred treatment of basilar artery occlusion is far from established. In patients with minor deficits and basilar artery occlusion presenting beyond 6 hours conservative management with anticoagulation or antiplatelet drugs with close monitoring and repeat vascular imaging may be most appropriate. For older patients in coma presenting very late with evidence of extensive brain stem infarction the treatment of choice is likely to be palliative care. In most cases where patients present to centers without interventional radiology teams, an initial attempt at reperfusion with intravenous thrombolysis is most appropriate with transfer to a stroke center where intra-arterial intervention can be considered as a secondary procedure. Even when interventional radiologists are available, because of the inevitable delay of at least 30 minutes in commencing intra-arterial thrombolysis, initial treatment with intravenous thrombolysis may be the preferred approach. In patients who do not recanalize within 1 to 2 hours of
intravenous thrombolysis further intervention with intra-arterial or mechanical clot removal should be considered.

All centers should be recording the treatment and outcome of patients with basilar artery occlusion ideally in international prospective databases such as the Basilar Artery International Cooperation Study (BASICS). This will improve the design of future randomized controlled trials and increase our knowledge of the effectiveness of thrombolysis and evolving treatments such as mechanical clot retrieval and ultrasound. One thing is clear: we need more effective diagnostic and treatment strategies to improve the current very poor outcomes from basilar artery occlusion reported even from stroke centers of excellence.

Disclosures
None.

References

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