EVT eligibility within a certain time frame, our review did not assess this issue.[3]

Future Research

Future studies should seek to find the optimal ratio of the ischemic core to penumbra at which patients can be chosen for EVT. Studies should also evaluate whether patients with favorable perfusion imaging could benefit from EVT regardless of the time of last known normal. Studies should seek to evaluate the cost-effectiveness of perfusion imaging, including quantifying the number needed to scan with perfusion imaging to identify 1 patient likely to benefit from EVT. Additionally, studies could evaluate whether perfusion imaging could be used to guide the decision on whether to administer thrombolytic therapy, including in patients without LVO. Future studies should look at pathways improving the timing of perfusion imaging to prevent delays in identifying patients who are candidates for intervention. This includes which patients should obtain perfusion imaging upfront before confirmation of an LVO. Future studies should evaluate other methods (eg, ASPECTS) compared with perfusion imaging to select patients for EVT.

3. In adult patients with a suspected acute ischemic stroke qualifying for intravenous thrombolysis, is tenecteplase safe and effective compared with alteplase?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. Use either tenecteplase or alteplase in patients with acute ischemic stroke who qualify for thrombolysis.*

Level C recommendations. None specified.

Potential Benefit of Implementing the Recommendations:

- Reduce errors in administration compared with alteplase.
- Improved short-term neurologic outcomes.
- Improve the ease of patients needing to be transferred to a stroke facility.
- Improved 3-month outcomes in patients with confirmed LVO.

Potential Harm of Implementing the Recommendations:

- Incorrect dosing may increase the risk of complications.

*For tenecteplase, use 0.25 mg/kg maximum dose 25 mg bolus; for alteplase, use 0.9 mg/kg maximum dose 90 mg with 10% given as a bolus and the remaining as an infusion over 60 minutes.

Key words/phrases for literature searches: alteplase, brain ischemia, cerebral arterial disease, cerebral arterial infarction, emergency medicine, fibrinolytic agents, fibrinolytic therapy, hospital emergency service, intravenous thrombolysis, intravenous thrombolytics, IV thrombolysis, IV thrombolytics, large vessel occlusion, metalyze, rtPA, rt-PA, stroke, Tenecteplase, thrombolytic therapy, tissue plasminogen activator, TNKase, tPA, t-PA, and variations and combinations of key words/phrases. Searches included all dates up to the search dates of November 19, 24, and 25, 2020, and December 4 and 5, 2020.

Study Selection: Five hundred ninety-seven articles were identified in the searches. Twenty-four articles were identified from the search results as candidates for further review. After grading for methodological rigor, zero Class I studies, 5 Class II studies, and 13 Class III studies were included for this critical question (Appendix E4).

Tenecteplase is a genetically engineered form of tissue plasminogen activator that is more fibrin-specific and has a longer half-life than alteplase. Because of its longer half-life, tenecteplase can be administered as a single bolus more than 5 seconds.[53] In contrast, alteplase requires a bolus followed by a continuous infusion for 60 minutes, making tenecteplase easier to administer. One study reported a 64% dosing/administration error rate in stroke patients who received alteplase.[54] Because of the ease of administration, there is interest in using tenecteplase instead of alteplase for acute stroke thrombolysis. This question will explore the evidence of tenecteplase as an alternative to alteplase for both clinical and safety outcomes.

Randomized Controlled Trials

Eight studies were identified with 7 RCT and 3 subgroup analysis from a single RCT. In a Class II study, the EXTEND-IA TNK trial[55] randomized 202 acute stroke patients who had an occlusion of either the internal carotid artery, middle cerebral artery, or basilar artery within 4.5 hours of onset to either tenecteplase (0.25 mg/kg, maximum dose 25 mg) or alteplase (0.9 mg/kg, maximum dose 90 mg). The primary outcome of reperfusion of 50% or more of the involved ischemic territory or absence of retrievable thrombus at the time of angiography occurred in 22% with tenecteplase versus 10% with alteplase (adjusted incidence ratio 2.2, 95% CI 1.1 to 4.4). Median 90-day mRS was better in the tenecteplase group than in the alteplase group (2 versus 3, common OR 1.7, 95% CI 1.0 to 2). Symptomatic ICH occurred in 1% of patients in both groups.