Thrombolytic therapy for acute ischemic stroke by tenecteplase and alteplase in terms of safety and efficacy.

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Introduction

Thrombolytic therapy has revolutionized the treatment of acute ischemic stroke (AIS) by dissolving clots and restoring blood flow to the affected area of the brain. Two commonly used thrombolytics for AIS are Tenecteplase and Alteplase. Both of these drugs have proven to be effective in treating AIS, but they differ in terms of their safety and efficacy profiles. Tenecteplase, a genetically modified version of Alteplase, is a more fibrin-specific and potent thrombolytic agent. It has a longer half-life and requires only a single bolus injection, making it more convenient to administer than Alteplase. In addition, Tenecteplase has a higher thrombolytic efficacy, which means that it is able to dissolve clots more rapidly than Alteplase. A study published in The New England Journal of Medicine showed that Tenecteplase was associated with better functional outcomes than Alteplase at 90 days after AIS onset. However, this study had some limitations, and more research is needed to confirm these findings. Despite its advantages, Tenecteplase is also associated with a higher risk of bleeding than Alteplase. A systematic review and meta-analysis of randomized controlled trials showed that Tenecteplase was associated with a higher incidence of symptomatic intracranial hemorrhage (ICH) than Alteplase. However, the overall risk of mortality was similar between the two drugs. This suggests that the increased bleeding risk associated with Tenecteplase may not necessarily translate into worse outcomes for patients [1].

Alteplase, on the other hand, has a longer track record of safety and efficacy in the treatment of AIS. It is the only thrombolytic drug approved by the FDA for use in AIS, and it has been extensively studied in clinical trials. A large randomized controlled trial published in The New England Journal of Medicine showed that Alteplase was associated with improved functional outcomes at 90 days compared to placebo. The study also found that Alteplase was associated with an increased risk of symptomatic ICH, but the overall risk of mortality was similar between the two groups. Overall, both Tenecteplase and Alteplase are effective thrombolytic agents for the treatment of AIS. Tenecteplase has a higher thrombolytic efficacy and requires a single bolus injection, which makes it more convenient to administer. However, it is associated with a higher risk of bleeding than Alteplase. Alteplase has a longer track record of safety and efficacy and is the only thrombolytic drug approved by the FDA for use in AIS. Ultimately, the choice of thrombolytic agent will depend on individual patient characteristics and the judgment of the treating physician [2].

Thrombolytic therapy is a time-sensitive treatment, and the earlier it is administered, the greater the potential benefit for the patient. Therefore, prompt recognition of stroke symptoms and quick activation of the emergency medical system is crucial for maximizing the effectiveness of thrombolytic therapy. Both Tenecteplase and Alteplase are associated with a risk of bleeding, particularly intracranial hemorrhage. Therefore, careful patient selection is necessary to ensure that the potential benefits of thrombolytic therapy outweigh the risks. Patients with a high risk of bleeding, such as those with a history of recent major surgery, active bleeding, or a known bleeding disorder, may not be suitable candidates for thrombolytic therapy [3].

In addition, close monitoring of patients receiving thrombolytic therapy is essential to detect and manage any adverse effects promptly. Patients receiving thrombolytic therapy should be monitored for signs of bleeding, including changes in mental status, headache, and neurologic deterioration. In case of bleeding complications, prompt intervention may be necessary, such as blood product transfusion, reversal of anticoagulation, or even surgical intervention [4].

Tenecteplase and Alteplase are both effective thrombolytic agents for the treatment of acute ischemic stroke. Tenecteplase has a higher thrombolytic efficacy and requires a single bolus injection, which makes it more convenient to administer. However, it is associated with a higher risk of bleeding than Alteplase. Alteplase has a longer track record of safety and efficacy and is the only thrombolytic drug approved by the FDA for use in AIS. Patient selection and close monitoring are essential for maximizing the benefits of thrombolytic therapy while minimizing the risks of adverse effects. Ultimately, the choice of thrombolytic agent should be made on a case-by-case basis, taking into account individual patient characteristics and the clinical judgment of the treating physician [5].

Conclusion

Thrombolytic therapy has revolutionized the treatment of acute ischemic stroke, and Tenecteplase and Alteplase are both effective thrombolytic agents for this condition. While Tenecteplase has a higher thrombolytic efficacy and requires a single bolus injection, it is associated with a higher risk of

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bleeding than Alteplase. Alteplase, on the other hand, has a longer track record of safety and efficacy and is the only thrombolytic drug approved by the FDA for use in AIS.

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