

COVENANT INPATIENT PHYSICIAN PRACTICES

Recorded Presentation

Tenecteplase vs. Alteplase in Stroke and Pulmonary Embolism

Course Overview / Description

This topic will highlight evidence for use of thrombolytics in patients with acute ischemic stroke and pulmonary embolism. This course will compare the pharmacology, efficacy, safety and formulary considerations of thrombolytic alteplase and tenecteplase.

Learning Objectives

At the end of this presentation, participants will be able to:

- Recognize the differences in pharmacology between alteplase and tenecteplase.
- Compare the literature surrounding thrombolytic use in stroke to choose an appropriate thrombolytic agent.
- Understand the literature surrounding thrombolytic use in pulmonary embolism to choose an appropriate thrombolytic agent.
- Identify thrombolytic medication characteristics to modify a medication formulary.

Speaker



Charles Lathrop, PharmD, CACP

Charles Lathrop, PharmD, CACP is a licensed clinical pharmacist employed at Covenant HealthCare. Charles completed his Doctorate in Pharmacy at Eugene Applebaum College of Pharmacy and Health Sciences at Wayne State University in Detroit, MI. In addition to being a clinical pharmacist, Charles is a clinical pharmacist specialist and Certified Anticoagulation Care Provider (CACP). Charles represents pharmacy on multiple committees at Covenant HealthCare, including, but not limited to: Residency Advisory Committee, Trauma Program

Operational Process Performance Committee, Venous Thromboembolism Committee, and more. Charles' involvement at Covenant HealthCare includes projects and medication guidelines/strategies for acute care needs at Covenant HealthCare.

Original presentation: February 13, 2024

Termination date: February 13, 2027

Covenant Critical Care Grand Rounds

Recorded Presentation Enduring Material

Activity Director / Course Planner / Speaker



Amjad Nader, MD, FCCP

Dr. Nader is a board-certified Critical Care Intensivist at Covenant HealthCare. Dr. Nader completed his Critical Care Fellowship training at Geisinger Medical Center where he serves as Chief Fellow. In addition to being a Critical Care Intensivist, Dr. Nader is the associate Medical Director of the Critical Care Physicians at Covenant HealthCare and Community Faculty at Central Michigan University College of Medicine. Dr. Nader is a member of numerous professional societies, including the Society of Critical Care Medicine. Dr. Nader represents Critical Care on multiple committees at Covenant HealthCare, including, but not limited to: Covenant Medical Group – Network Operating Council, Keystone Committee, Inpatient Physician Advisory Council, ICU Collaborative, Pharmacy and Therapeutics Committee, Sepsis Steering Committee, and more.

Target Audience: Physicians, Nurses, PAs, Advanced Clinical Practitioners, all healthcare professionals

Disclosure: Charles Lathrop, Pharm D. and Dr. Nader have no relevant financial relationships with ineligible companies.

Cost: None

Accreditation

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Central Michigan University College of Medicine and Covenant Hospital Critical Care. CMU College of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

Central Michigan University College of Medicine designates this enduring material for a maximum of 1.0 *AMA PRA Category 1 Credit™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The Michigan Board of Nursing, American Nurses Credentialing Center (ANCC), American Academy of Nurse Practitioners (AANP) and the National Commission on Certification of Physician Assistants (NCCPA) accept *AMA PRA Category 1 Credits™* from organizations accredited by the ACCME.

Original presentation: February 23, 2024

Termination date: February 23, 2027

Covenant Critical Care Grand Rounds

Recorded Presentation Enduring Material

References and Documentation:

1. Jilani T, Siddiqui A. Tissue Plasminogen Activator. [Updated 2023 Feb 20]. In StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK507917/>
2. Tanswell P, Modi N, Combs D, et al. Pharmacokinetics and pharmacodynamics of Tenecteplase in fibrinolytic therapy of acute myocardial infarction. Clin Pharmacokinet. 2022;41(15):1229-45
3. Tenecteplase: IBM Micromedex Solutions. Truven Health Analytics, Inc. Ann Arbor, MI. Accessed August 8, 2022. <http://www.micromedexsolutions.com>
4. Alteplase: IBM Micromedex Solutions. Truven Health Analytics, Inc. Ann Arbor, MI. Accessed November 30, 2023. <http://www.micromedexsolutions.com>
5. Activase. Package Insert. Genetech. South San Francisco, CA. 2015
6. Campbell B, Meretoja A, Donnan G, et al. Twenty-Year History of the Evolution of Stroke Thrombolysis With Intravenous Alteplase to Reduce Long-Term Disability. Stroke. 2015 Aug;46(8):2341-6
7. Brott T, Haley E, Levy D, et al. Urgent therapy for stroke. Part I. Pilot study of tissue plasminogen activator administered within 90 minutes. Stroke. 1992 May;23(5):632-40
8. Haley E, Levy D, Brott G, et al. Urgent therapy for stroke. Part II. Pilot study of tissue plasminogen activator administered 91-180 minutes from onset. Stroke. 1992 May;23(5):641-5
9. National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue Plasminogen activator for acute ischemic stroke. N Engl J Med. 1995 Dec 14;333(24):1581-7
10. Hacke W, Kaste M, Fieschi C, et al. Randomised double-blind placebo-controlled trial of thrombolytic therapy with intravenous alteplase in acute ischaemic stroke (ECASS II). Second European-Australasian Acute Stroke Study Investigators. Lancet. 1998 Oct 17;352(9136):1245-51
11. Hacke W, Donnan G, Fieschi C, et al. Association of outcome with early stroke treatment: pooled analysis of ATLANTIS, ECASS and NINDS rt-PA stroke trials. Lancet. 2004 Mar 6;363(9411):768-74
12. IST-3 collaborative group. The benefits and harms of intravenous thrombolysis with recombinant tissue plasminogen activator within 6 h of acute ischaemic stroke (the third international stroke trial [IST-3]): a randomized controlled trial. Lancet. 2012 Jun 23;379(9834):2352-63

Original presentation: February 23, 2024

Termination date: February 23, 2027

Recorded Presentation Enduring Material

13. Parsons M, Spratt N, Bivard A, et al. A randomized trial of Tenecteplase versus alteplase for acute ischemic stroke. *N Engl J Med*. 2012 Mar 22;366(12):1099-107
14. Huang X, Cheripelli B, Lloyd S, et al. Alteplase versus Tenecteplase for thrombolysis after ischaemic stroke (ATTEST): a phase 2, randomized, open-label, blinded endpoint study. *Lancet Neurol*. 2015 Apr;14(4):368-76
15. Logallo N, Novotny V, Assmus J, et al. Tenecteplase versus alteplase for management of acute ischaemic stroke (NOR-TEST): a phase 3, randomized, open-label, blinded endpoint trial. *Lancet Neurol*. 2017 Oct;16(10):781-788
16. Campbell B, Mitchell P, Churilov L, et al. Tenecteplase versus Alteplase before Thrombectomy for Ischemic Stroke. *N Engl J Med*. 2018 Apr 26;378(17):1573-1582
17. Ronning O, Logallo N, Thommessen B, et al. Tenecteplase Versus Alteplase Between 3 and 4.5 Hours in Low National Institutes of Health Stroke Scale. *Stroke*. 2019 Feb;50(2):498-500
18. Menon B, Buck B, Singh N, et al. Intravenous Tenecteplase compared with alteplase for acute ischaemic stroke in Canada (AcT): a pragmatic multicentre, open-label, registry-linked, randomized, controlled, non-inferiority trial. *Lancet*. 2022 Jul 16;400(10347):161-169
19. Bivard A, Zhao H, Churilov L, et al. Comparison of Tenecteplase with alteplase for the early treatment of ischaemic stroke in the Melbourne Mobile Stroke Unit (TASTE-A): a phase 2, randomized, open-label trial. *Lancet Neurol*. 2022 Jun;21(6):520-527
20. Becattini C, Agnelli G, Salvi A, et al. Bolus Tenecteplase for right ventricle dysfunction in hemodynamically stable patients with pulmonary embolism. *Thromb Res*. 2010 Mar;125(3):e82-6
21. Kline J, Nordenholz K, Courtney D, et al. Treatment of submassive pulmonary embolism with Tenecteplase or placebo: cardiopulmonary outcomes at 3 months: multicenter double-blind, placebo-controlled randomized trial. *J Thromb Haemost*. 2014 Apr;12(4):459-68
22. Meyer G, Vicaut E, Danays T, et al. Fibrinolysis for patients with intermediate-risk pulmonary embolism. *N Engl J Med*. 2014 Apr 10;370(15):1402-11
23. Konstantinides S, Vicaut E, Danays T, et al. Impact of Thrombolytic Therapy on the Long-Term Outcome of Intermediate-Risk Pulmonary Embolism. *J Am Coll Cardiol*. 2017 Mar 28;69(12):1536-1544
24. Javaudin F, Lascarrou J, Bastard Q, et al. Thrombolysis During Resuscitation for Out-of-Hospital Cardiac Arrest Caused by Pulmonary Embolism Increases 30-Day Survival: Findings From the French National Cardiac Arrest Registry. *Chest*. 2019 Dec;156(6):1167-1175

Original presentation: February 23, 2024

Termination date: February 23, 2027

Recorded Presentation Enduring Material

25. Konstantinides S, Meyer G, Becattini C, et al. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). *Eur Heart J*. 2020 Jan 21;41(4):543-603
26. Powers W, Rabinstein A, Ackerson T, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. 2019 Dec;50(12):e344-e418
27. Zhang Z, Xi L, Zhang S, et al. Tenecteplase in Pulmonary Embolism Patients: A Meta-Analysis and Systematic Review. *Front Med (Lausanne)*. 2022; 9: 860565
28. Sharifi M, Bay C, Skrocki L, et al. Moderate pulmonary embolism treated with thrombolysis (from the "MOPETT" Trial). *Am J Cardiol*. 2013 Jan 15;111(2):273-7
29. Chatterjee S, Chakraborty A, Weinberg I, et al. Thrombolysis for pulmonary embolism and risk of all-cause mortality, major bleeding, and intracranial hemorrhage: a meta-analysis. *JAMA*. 2014 Jun 18;311(23):2414-21
30. Konstantinides S, Geibel A, Heusel G, et al. Heparin plus alteplase compared with heparin alone in patients with submassive pulmonary embolism. *N Engl J Med*. 2002 Oct 10;347(15):1143-50
31. Fasullo S, Scalzo S, Maringhini G, et al. Six-month echocardiographic study in patients with submassive pulmonary embolism and right ventricle dysfunction: comparison of thrombolysis with heparin. *Am J Med Sci*. 2011 Jan;341(1):33-9
32. Kucher N, Boekstegers P, Muller OJ, et al. Randomized, controlled trial of ultrasound-assisted catheter-directed thrombolysis for acute intermediate-risk pulmonary embolism. *Circulation*. 2014 Jan 28;129(4):479-86
33. Piazza G, Hohlfelder B, Jaff MR, et al. A Prospective, Single-Arm, Multicenter Trial of Ultrasound-Facilitated, Catheter-Directed, Low-Dose Fibrinolysis for Acute Massive and Submassive Pulmonary Embolism: The SEATTLE II Study. *JACC Cardiovasc Interv*. 2015 Aug 24;8(10):1382-92
34. Kuo W, Sista A, Faintuch S, et al. Society of Interventional Radiology Position Statement on Catheter-Directed Therapy for Acute Pulmonary Embolism. *J Vasc Interv Radiol*. 2018 Mar;29(3):293-297
35. Kuo W, Banerjee A, Kim P, et al. Pulmonary Embolism Response to Fragmentation, Embolectomy, and Catheter Thrombolysis (PERFECT): Initial Results From a Prospective Multicenter Registry. *Chest*. 2015 Sep;148(3):667-673

Original presentation: February 23, 2024

Termination date: February 23, 2027

Recorded Presentation Enduring Material

Disclosure Policy

It is the policy of CMU College of Medicine to adhere to Accreditation Council for Continuing Medical Education (ACCME) policies and Standards in order to ensure fair balance, independence, objectivity, and scientific rigor in all its accredited activities. Planners and speakers are expected to disclose any relevant financial relationships with commercial interests as well as any discussion of off-label or investigational uses of FDA approved commercial products or devices, or products or devices not yet approved in the United States.

Disclaimer

The information provided in this educational activity is for general medical education purposes only and is not meant to substitute for the independent medical judgment of a physician relative to diagnostic and treatment options of a specific patient's medical condition. The viewpoints expressed in this CME activity are those of the authors/faculty. They do not represent an endorsement by Central Michigan University College of Medicine. In no event will Central Michigan University College of Medicine be liable for any decision made or action taken in reliance upon the information provided through this CME activity.

Post-Test and Claiming Credit Directions

- You must complete the post-test to obtain *AMA PRA Category 1 Credit™*
- 75% of the questions must be answered correctly
- Once you have completed viewing the video, close the video window tab to proceed to the Post Test
- Upon passing the Post Test (75%), you will automatically be taken to the evaluation
- Complete the evaluation and receive your credit
- You can either print your CME certificate, save it to your files as a pdf, or the Office of Continuing Medical Education can email it to you.

For any questions regarding content, the post-test, CME / MOC credit or matters involving continuing medical education, please contact:

Office of Continuing Medical Education

Central Michigan University College of Medicine

1632 Stone Street, Suite 2200, Saginaw, Michigan 48602

Website: med.cmich.edu/cme Email: CMEDCME@cmich.edu

Office: 989-746-7555 CME Administrator: 989-746-7602

***Thank you for utilizing CMU College of Medicine's eLearning materials.
Let us know your opinion of this session and what you would like us to
provide in the future by going to: [COMMENTS & SUGGESTIONS](#)***

Original presentation: February 23, 2024

Termination date: February 23, 2027

Covenant Critical Care Grand Rounds