

# Tenecteplase for Stroke

## Learning Outcomes:





At the completion of this activity, you will be able to:

- Review thrombolytic treatment practice change for stroke
- Recognize treatment options for stroke
- Review how to mix, dose, and administer IV tenecteplase

# Tenecteplase for Stroke

Alteplase **HAS BEEN** the drug we used for treating eligible patients since 1996.

**NOW current evidence suggests TENECTEPLASE...**

-  is equivalent to alteplase for treatment of AIS.
-  is included as an appropriate option for thrombolytic treatment by the ASA.
-  showed superiority in treatment of large vessel occlusion (LVO) strokes with better recanalization rates.
-  has equivalent or less bleeding complications compared to alteplase

**T-SINGLE-BOLUS** 

# Tenecteplase for Stroke

## **Situation:**

- Tenecteplase is included in the most recent American Stroke Association (ASA) guideline update for treatment of eligible acute ischemic stroke (AIS) patients (class IIb, level of evidence B-R). In head-to-head trials, tenecteplase showed noninferiority when compared to alteplase, and superior recanalization rates patients with large vessel occlusions (LVO).
- Through governance, extensive literature review, stroke expert and pharmacy consensus PSJH decided to make the switch to tenecteplase for treating AIS.

# Tenecteplase for Stroke

## Background:

- IV alteplase has been the mainstay treatment recommended by the ASA for treatment of eligible AIS patients since 1996.
- A growing body of evidence shows superiority of tenecteplase versus alteplase in patients with large vessel occlusion, results in less bleeding complications, and better 90-day outcomes.

# Tenecteplase for Stroke

## Assessment:

- Tenecteplase is easier to administer than alteplase and only requires a single bolus given over 5 seconds.
- Some hospitals who have made the switch to tenecteplase have seen dramatically faster door-to-needle times. Overall time for the tenecteplase dose to be completed is faster with tenecteplase due to single bolus dosing.
- Faster stroke treatment times result in better patient outcomes.
- Tenecteplase for stroke maximum dose is 25mg (5mL), is different than STEMI dosing, and is NOT compatible with IV dextrose.

**— SINGLE-BOLUS —▶**

# Tenecteplase for Stroke

## Recommendations:

Use tenecteplase 0.25mg/kg for treating AIS with a **max dose of 25 mg (5mL) for stroke.**

Use the same workflow for giving tenecteplase that was used for alteplase:

- BP parameter remains 180/105
- Timeout/dual sign off required
- Frequency of VS & Neuro Check/SNAP
- Check for bleeding and angioedema

# Tenecteplase for Stroke

<b>Key Differences:</b> Tenecteplase is NOT compatible with IV dextrose	<b>Tenecteplase for Stroke:</b>	<b>Compare Alteplase:</b>
BP parameter	< 180/105	< 180/105
Weight-range based dosing	~0.25 mg/kg <i>see dosing table</i>	0.9mg/kg
Maximum dose	<b>25mg (5ml)</b>	90 mg (9ml bolus)
Concentration	<b>5mg/mL</b>	1mg/mL
Half life	20-25 min	5 min
Pharmacy mix/deliver?	Yes	Yes
Timeout/dual sign off?	Yes	Yes
Goal door-to-needle	30 min or less	30 min or less
<b>Bolus administration</b> Not compatible with dextrose	<b>Over 5 sec</b> <b>Flush before and after with NS</b>	Over 1-2 min
Infusion post bolus?	<b>No, bolus only</b>	Yes for 1 hour
Signs and sx to watch for after administration	Bleeding, angioedema, neuro changes	Bleeding, angioedema, neuro changes
SNAP & VS frequency	q15min x 2hrs, q30min x 6hrs, q1hr x 16 hrs	q15min x 2hrs, q30min x 6hrs, q1hr x 16 hrs
Brain bleeding risk	<b>Equivalent or less than alteplase<sup>2-5</sup></b>	6%



**American  
Stroke  
Association.**

*A division of the  
American Heart Association.*

The American Stroke Association (ASA) recommends use of a thrombolytic for treatment of acute ischemic stroke (AIS)

- Benefit of thrombolytic therapy remains  
**TIME DEPENDENT.**



- The faster a person is treated, the better their outcome!



# Acute Stroke Treatment

- If your patient has any signs or symptoms of a stroke activate your hospital's **EMERGENCY RESPONSE** process FOR STROKE STAT.
- In Emergency Department, triage all stroke and TIA patients as **ESI level 2** unless hemodynamically unstable.

# Acute Stroke Treatment

## 1- Tenecteplase for Stroke

**T-SINGLE-BOLUS** ▶

## 2- Thrombectomy



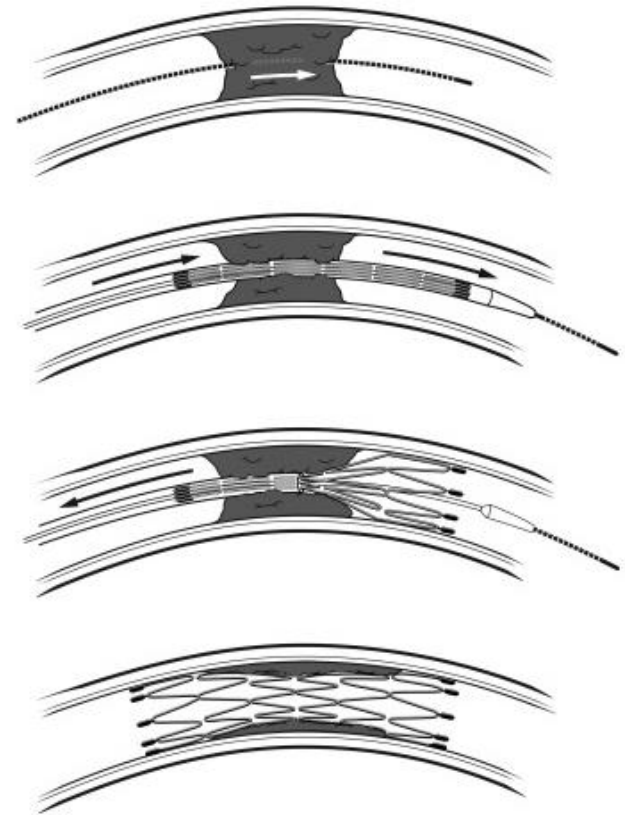
Image Credit: Medtronic

# Acute Stroke Treatment

## Thrombectomy

when there is a **Large Vessel Occlusion**:

- Can be done with or without IV thrombolytic.
- Catheter is advanced to the cerebral artery that is occluded and clot is removed!

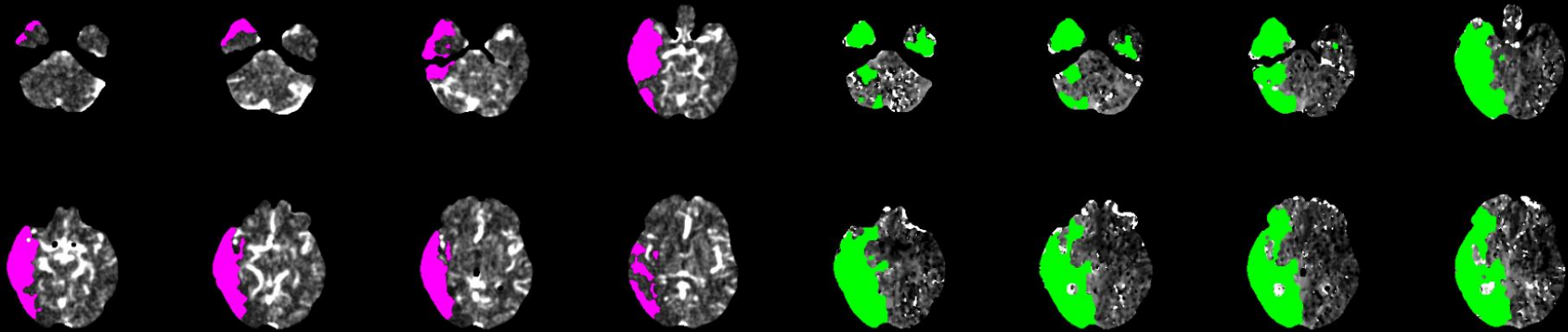


<https://www.sciencedirect.com/science/article/pii/S0010865016000060>

**Studies show treating large vessel occlusion with thrombectomy up to 24 hours after symptom onset can decrease long term disability.**

# Acute Stroke Treatment

CT Perfusion scan might be done to evaluate for salvageable brain (penumbra) prior to thrombectomy in patients up to 24 hours from last known well time.



CBF<30% volume: 65 ml

Mismatch volume: 95 ml  
Mismatch ratio: 2.5

Tmax>6.0s volume: 160 ml

Ischemic core

Possibly salvageable penumbra  
beyond the core infarct.

# Acute Stroke Treatment

- ABCs & Vitals signs
- Glucose
- BE FAST exam
- STAT CT HEAD!
- Ensure CODE STROKE has been called
- Labs – need Platelets, INR
- Thrombolytic order requires weight entered in Epic!
- Obtain weight ASAP!



**NOTHING SHOULD DELAY THE HEAD CT!**

# Acute Stroke Treatment

- IV Fluids- Normal Saline only
- Ensure IV access – if unable to obtain prior to CT
- Ensure labs drawn – if unable to obtain prior to CT
- Perform Full NIHSS
- EKG might be needed at this time
- NPO – including ALL Medications: wait until everything else is done then do Yale Bedside Swallow Screen

**DO NOT DELAY** giving the thrombolytic for further assessments or tests. If Stroke MD has evaluated and criteria is met, then give IV Tenecteplase STAT!



# Acute Stroke Thrombolytic

## Contraindications:

- Intracranial blood visible on CT
- Suspicion of subarachnoid hemorrhage, “worst headache of life”
- Active internal bleeding
- Intracranial, intraspinal surgery or serious head trauma within 3 months
- Presence of conditions that may increase risk of intracranial bleeding (some cerebral AVM, tumors, aneurysms)
- Bleeding disorders,  $INR > 1.7$  or Platelets  $< 100K$

# Acute Stroke Treatment

## Goal Times

*from arriving at door of ED*

- Door to Stroke physician < STAT
- Door to STAT CT < 20 min
- Door to Lab results < 45 min
- Door to IV thrombolytic < 30 min
- Door to Device (thrombectomy) < 90 min

Head CT is required before any treatment decision!



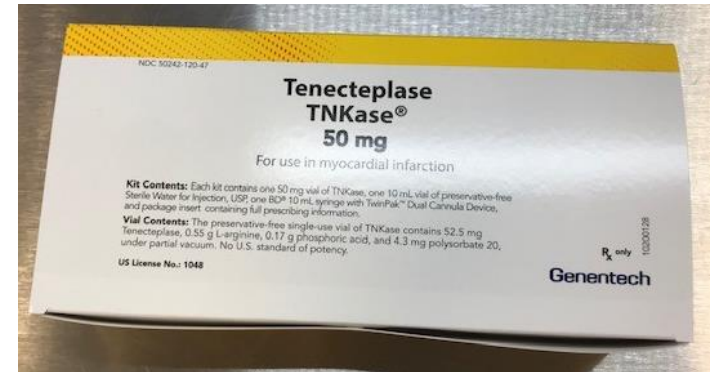
# Tenecteplase Dosing

**Stroke Provider calls pharmacy to order and mix\***  
– need to have accurate patient weight!

**Verify patient weight and dose of tenecteplase**  
– **Dual signature on MAR**

**TENECTEPLASE DOSING: 0.25mg/kg IV**

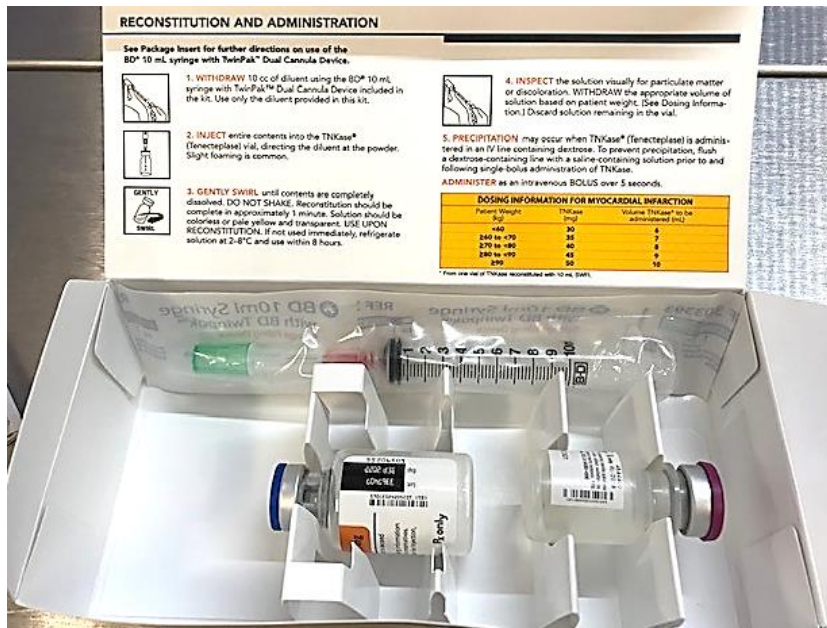
- **Maximum of 25mg**
- **Give IV Tenecteplase over 5 seconds**



\* Some hospitals may have the nurse reconstitute tenecteplase at the bedside.

# Tenecteplase Reconstitution

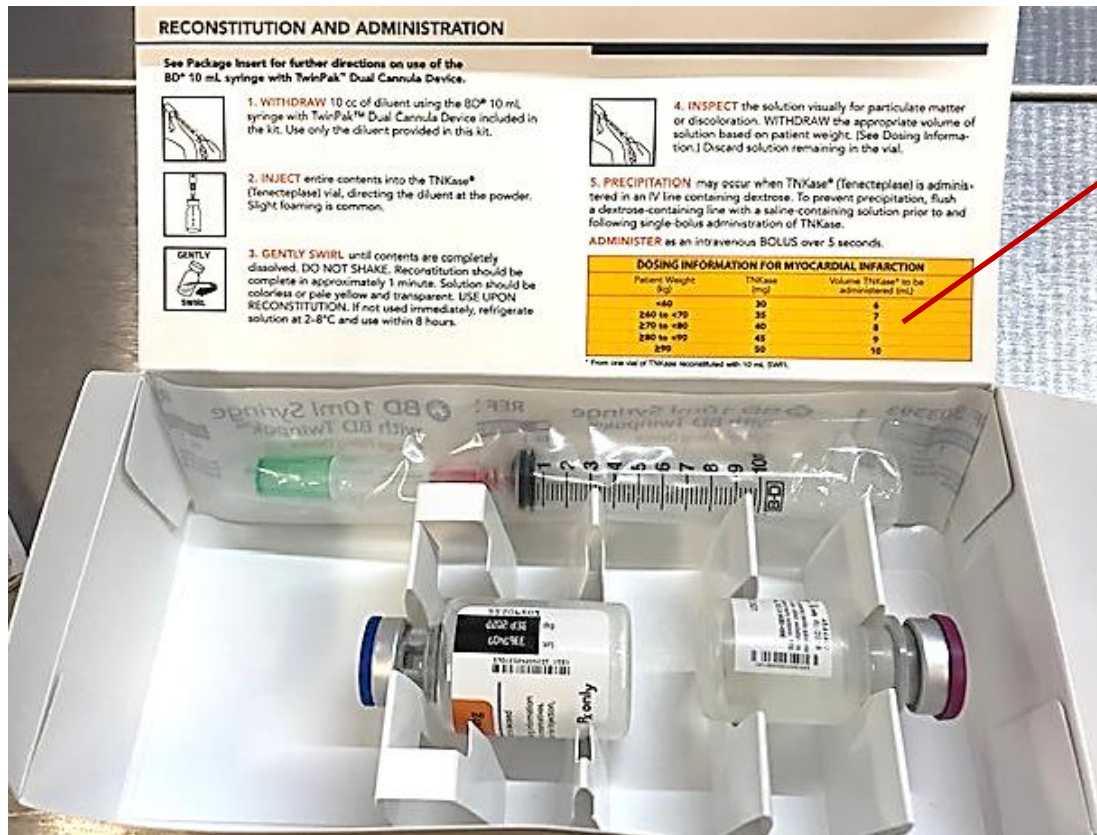
1. Use 10cc syringe with blunt fill needle to aseptically withdraw 10 mL of Sterile Water for Injection from the supplied dilutant vial.
  - DO NOT use Bacteriostatic Water for Injection, USP



2. Inject 10 mL into the tenecteplase vial. Direct the stream of dilutant into the powder.

# Tenecteplase Reconstitution

## Validate and Verify!

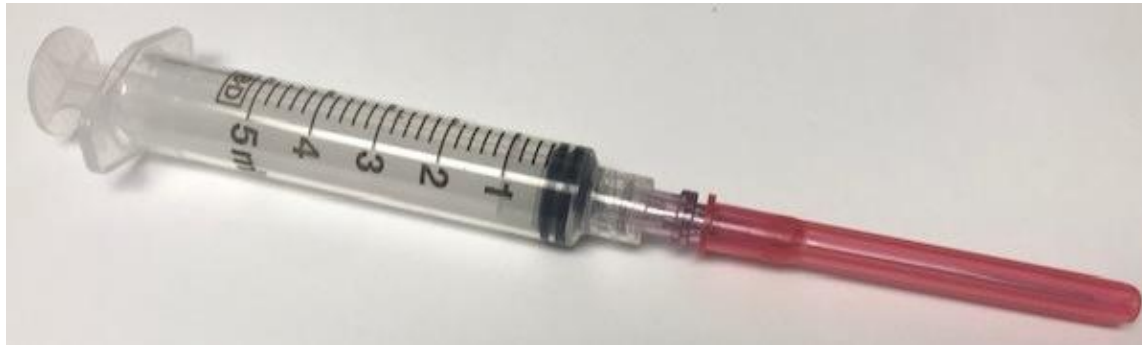


\*\*\*WARNING\*\*\*

DO NOT use MI dosing listed on the box!

# Tenecteplase Reconstitution

3. Gently swirl until contents are completely dissolved.
  - DO NOT SHAKE.
  - Should be transparent, colorless, pale to yellow.
  - Final solution is 5mg/mL tenecteplase.
4. TIMEOUT: Max dose is 25 mg or 5mL for stroke.



**Best practice: use a 5mL syringe to draw up final dose to avoid exceeding max dose of 25mg for stroke (5mL).**

# Tenecteplase Dosing

1. Inspect solution
2. Calculate dose according to patient's weight  
0.25 mg per kg (Use Providence weight-based dosing table – see next slide)
3. Dosing is rounded to the nearest 0.2 mL
4. Withdraw the appropriate dose/volume of tenecteplase solution based on weight

**Max dose is 25 mg (5 mL) for stroke!**



# Tenecteplase Dosing

Providence is rounding dose to the nearest mg to simplify dosing.

Example 1: patient is 103 kg  
 $103 \text{ kg} \times 0.25 \text{ mg} = 25.75 \text{ mg}$

**MAX DOSE IS 25 mg!**

**Give 25 mg or 5 mL**

Example 2: patient is 67 kg  
Concentration is 5 mg per mL

**MAX DOSE IS 25mg!**

**Give 17 mg or 3.4 mL**

Tenecteplase Dosing Acute Ischemic Stroke		
Concentration: 5 mg/mL		
Dose: 0.25 mg/kg (rounded to nearest mg)		
MAX DOSE: 25mg (5mL)		
Patient's Acutal Weight in KG	Dose (mg)	Dose (mL) (*round to nearest 0.2 mL)
26.0 - 29.9	7	1.4
30.0 - 33.9	8	1.6
34.0 - 37.9	9	1.8
38.0 - 41.9	10	2
42.0 - 45.9	11	2.2
46.0 - 49.9	12	2.4
50.0 - 53.9	13	2.6
54.0 - 57.9	14	2.8
58.0 - 61.9	15	3
62.0 - 65.9	16	3.2
66.0 - 69.9	17	3.4
70.0 - 73.9	18	3.6
74.0 - 77.9	19	3.8
78.0 - 81.9	20	4
82.0 - 85.9	21	4.2
86.0 - 89.9	22	4.4
90.0 - 93.9	23	4.6
94.0 - 97.9	24	4.8
98.0 - 100.0	25	5



# Tenecteplase Dosing

- ED Provider to order thrombolytic (order requires accurate patient weight)
- Safety Check (3 ✓'s in 30 seconds) = Time OUT prior to dose being given

(This is in addition to the 5 rights of medication administration)

1. Right Patient
2. Right Drug (Tenecteplase \* or Alteplase)
3. Right Dose

TENECTEPLASE DOSING: Single Dose  
Approx. 0.25mg/kg IV over 5 seconds  
**Maximum of 25mg**  
\*Weight range dosing will be used.  
See dosing table



DUAL SIGN OFF REQUIRED

# Tenecteplase Dosing

<b>Key Differences:</b> <small>Tenecteplase is NOT compatible with IV dextrose</small>	<b>Tenecteplase for Stroke:</b>	<b>Compare Alteplase:</b>
<b>Weight based dosing</b>	<b>~0.25 mg/kg</b>	0.9mg/kg
<b>Maximum dose</b>	<b>25mg (5ml)</b>	90 mg (9ml bolus)
<b>Concentration</b>	<b>5mg/mL</b>	1mg/mL
<b>Timeout/dual sign off?</b>	Yes	Yes
<b>Bolus administration</b>	<b>Over 5 sec.</b> Flush before and after with normal saline	Over 1-2 min
<b>Infusion post bolus?</b>	<b>No, bolus only</b>	Yes for 1 hour

- Tenecteplase solution can precipitate if given in a line containing dextrose
- Flush the line before and after tenecteplase with normal saline
- Discard vial (expect at least 5ml of extra medicine in the discarded vial)



# Tenecteplase Dosing



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# Before and After Tenecteplase

Key Differences:	Tenecteplase for Stroke:	Compare Alteplase:
BP parameter	< 180/105	< 180/105
Signs and symptoms to watch for after administration	Bleeding, angioedema, neuro changes	Bleeding, angioedema, neuro changes
SNAP & VS frequency	q15min x 2hrs, q30min x 6hrs, q1hr x 16 hrs	q15min x 2hrs, q30min x 6hrs, q1hr x 16 hrs
Brain bleeding risk	<b>Equivalent or less than alteplase<sup>2-5</sup></b>	6%

# After Tenecteplase

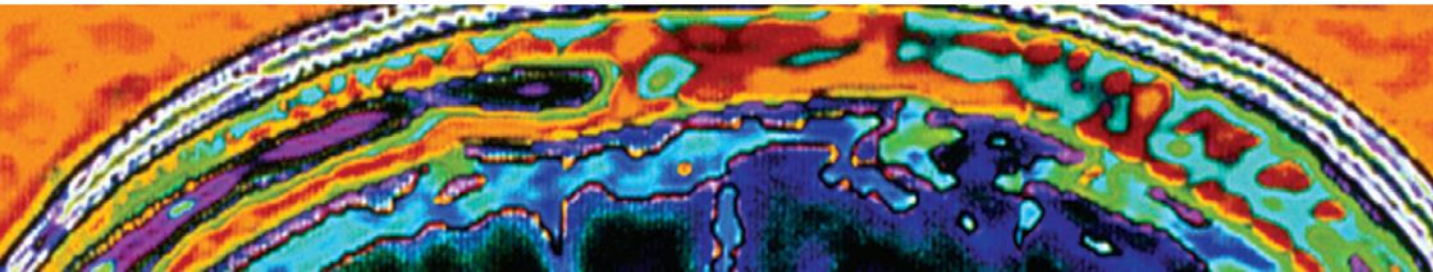
- Do NOT give any anticoagulant or antiplatelet agents for 24 hours after thrombolytic therapy
- AVOID placing any lines or tubes that are not needed.
- DELAY placing necessary lines and/or tubes for at least 60 minutes post thrombolytic
- Monitor for bleeding

# Acute Stroke Treatment

**Faster treatment saves lives and reduces disability!**

*For every 15 minutes saved:*

- Fewer patients die
- Fewer patients bleed
- More patients go home
- More patients are walking independently at discharge



**Tenecteplase for Stroke**

**THANK YOU!**

# References

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