



Medication Alert

Alteplase or tenecteplase?

For the attention of: Lead stroke physicians, stroke resource nurses and chief pharmacists
For information to: Quality and risk managers

Purpose of this alert

To highlight the need to clearly differentiate between stroke thrombolysis and myocardial infarction thrombolysis. Although both require a tissue plasminogen activator, the activator and doses used are different. Confusing them can cause fatalities.

- **Stroke thrombolysis uses alteplase.**
- **Myocardial infarction thrombolysis uses tenecteplase.**

REQUIRED ACTION

1. Never use abbreviations, such as tpa, to describe these medicines. Check all clinical pathways, guidelines and protocols that include thrombolysis describe in full which thrombolytic to use.

Alteplase – stroke thrombolysis

2. Ensure a current clinical pathway, guideline or protocol for stroke thrombolysis is readily available in the hospital. The pathway should include:
 - who can prescribe and administer stroke thrombolysis. NB: The Stroke Network recommends that thrombolysis should occur only under the guidance of experienced stroke clinicians, who should check the dose prescribed and ideally visualise the drug before administration
 - where stroke thrombolysis can be administered in the hospital
 - dosing and administration guidelines.
3. Ensure a stroke kit clearly labelled for stroke thrombolysis is available in the hospital area(s) where this is carried out. The kit should contain, as a minimum:
 - stroke thrombolysis management clinical pathway, guideline or protocol
 - alteplase injection.

Other items recommended: needles, syringes, stationery (eg, checklist, monitoring form, sticker if using a paper chart) and other medicines (eg, labetalol).
4. Establish a reliable process for managing the stroke kit, including refilling, ongoing content checks for expiry and use, and review of the contents.
5. Check smart pump software describes alteplase in full.

Tenecteplase – myocardial infarction thrombolysis

6. Review where tenecteplase is held as imprest (stock) and remove from areas where it is not used or used rarely.
7. Ensure tenecteplase injection that is held as imprest (stock) is clearly labelled for myocardial infarction thrombolysis only.

Background to this alert

Two fatal and one serious harm adverse events have been reported to the Health Quality & Safety Commission in the last two years:

- One when tenecteplase was administered when alteplase was prescribed.
- One when tenecteplase was prescribed and administered but the dose used was the alteplase dose because of confusion over the abbreviation tpa and use of another hospital's protocol.¹
- One when tenecteplase was prescribed and administered because alteplase was unavailable in the clinical area. The dose used was the tenecteplase dose but the administration method was for alteplase (10% bolus followed by an infusion).²

Other incidents and near misses have occurred with these medicines in DHB hospitals.

Adverse event scenario

This scenario is imaginary but resembles the situations that occurred in the adverse events reported to the Commission.

Midnight (*0 hours*): Mrs Smith noticed her husband wasn't quite right and called the ambulance. The couple lived on a rural property and Mr Smith wasn't admitted to the emergency department (ED) until 2.30am.

The hospital had no dedicated stroke physician on call. The emergency physicians did not use stroke thrombolysis but usually transferred patients to intensive care if patients met the criteria. By contrast, myocardial infarction thrombolysis was done in the ED.

3.00am (*3 hours*) The ED house officer (HO) was stabilising a patient with serious injuries following a road traffic accident (RTA) admitted at 2.25am. Upon Mr Smith's arrival in ED the HO assessed and diagnosed him as having a stroke. A CT scan was requested but the radiographer was busy with the RTA case.

3.30am (*3 hours 30 minutes*) The CT scan was done. At this point the ED was very busy following a fight outside the local club.

3.45am (*3 hours 45 minutes*) The scan result was received, with no contraindication to thrombolysis noted. The HO had prescribed stroke thrombolysis at a different hospital's ED and was aware there was a narrow time window for thrombolysis. At this point the charge nurse in the ED called the HO to urgently see a new admission.

4.10am (*4 hours 10 minutes*) The HO checked the hospital's intranet 10-page stroke management guideline for the dose and prescribed alteplase. An ED nurse heard a second nurse ask for tenecteplase and because of the time pressure there was no second check procedure (neither nurse had ever given stroke thrombolysis before). Mr Smith received tenecteplase and suffered a fatal intracerebral haemorrhage.

Further clinical information

- Early and successful thrombolysis treatment with alteplase may significantly increase the chance of recovery following a stroke.
- The intracranial bleeding caused by overdose during stroke thrombolysis is likely to be catastrophic and often fatal.
- Stroke thrombolysis is a time-dependant operation that puts pressure on staff to diagnose, prescribe and administer rapidly and accurately. It should only be provided in the setting of an established stroke thrombolysis service under the guidance of a physician experienced in acute stroke therapy.

¹ Health and Disability Commissioner Decision 11HDC01434. URL: www.hdc.org.nz/media/253702/11hdc01434.pdf

² Health and Disability Commissioner Decision 13HDC01676. URL: www.hdc.org.nz/media/296932/13hdc01676.pdf

Further background to this alert

- Prescription and administration of stroke thrombolysis occur in different locations in different DHBs, for example, ED, radiology, intensive care/high dependency units or care of the elderly wards.
- The same errors have occurred internationally due to the use of the abbreviation tpa.³

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or contact Charmaine Pene: Charmaine.pene@hqsc.govt.nz**

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These recommendations are based on a review of currently available information in order to assist practitioners. Recommendations are general guidelines only and are not intended to be a substitute for individual clinical decision-making in specific cases.

³ ISMP FDA Advise-ERR Avoid using the error-prone abbreviation, TPA 2015. URL: <https://www.ismp.org/newsletters/acutecare/showarticle.aspx?id=120>