Thrombolysis in Acute ST Elevation Myocardial Infarction (STEMI)

Thrombolysis can be administered in the community to eligible patients after discussion with the Coronary Care Unit at Aberdeen Royal Infirmary/Raigmore Hospital, to confirm diagnosis and treatment pathway. Note that primary Percutaneous Coronary Intervention (PCI) is the preferred treatment, and patients should be conveyed to the cardiac catheterisation laboratory (Cath Lab) as quickly as possible after diagnosis is established. Thrombolysis should only be used in those who will not be able to be presented to the Cath Lab within the recommended time frame (PCI within 120 minutes of first medical contact)[1]. For the purposes of practical time limits, any patient who will require >60minutes travel time (from point of ECG diagnosis to Cath Lab) should be considered for thrombolysis after discussion with the Coronary Care Unit at Aberdeen Royal Infirmary/Raigmore Hospital.

Fibrinolysis is recommended to be administered within 10 minutes of first medical contact where this is the optimal treatment course[1].

In order to blunt the increased risk of intracranial bleeding with fibrinolytic treatment, a 50% dose reduction is recommended in the dose of tenecteplase in those over 75 years of age[1].

Contraindications to thrombolysis from European Society of Cardiology (ESC) Acute Coronary Syndromes (ACS) Guidelines 2023[1]

Absolute
Previous intracranial haemorrhage or stroke of unknown origin at any time
Ischaemic stroke in the preceding 6 months
Central nervous system damage or neoplasms, or arteriovenous malformation
Recent major trauma/surgery/head injury (within the preceding month)
Gastrointestinal bleeding within the past month
Known bleeding disorder (excluding menstrual)
Aortic dissection
Non-compressible punctures in the past 24 h (e.g. liver biopsy, lumbar puncture)
Relative
Transient ischaemic attack in the preceding 6 months
Oral anticoagulant therapy
Pregnancy or within 1-week post-partum
Refractory hypertension (systolic blood pressure >180 mmHg and/or diastolic blood pressure >110 mmHg)
Advanced liver disease
Infective endocarditis
Active peptic ulcer
Prolonged or traumatic resuscitation

Dosing And Administration Of Tenecteplase & Dalteparin For Thrombolysis In STEMI

Dosing recommendations based on age and weight are given in the table below. This is based on the Summary of Product Characteristics (SmPC) for the products and the 2023 European Society of Cardiology Clinical Guideline for Acute Coronary Syndromes. Dalteparin has been the Low Molecular Weight Heparin (LMWH) of choice on NHS Grampian Area formulary for over 20 years, and the dosing table below reflects this historical dosing pattern[2]. Note that dalteparin is not licensed for co-administration with tenecteplase in this setting.

Thrombolysis treatment includes intravenous tenecteplase given with intravenous dalteparin, followed by subcutaneous dalteparin.

Patient Weight	Age (half dose ≥75yrs[1])	TENECTEPLASE[3] 10,000 units/10mL powder and solvent solution for injection* Weight & age adjusted dose	DALTEPARIN SODIUM[2] 10,000 units/4mL vial (for IV use) 10,000 units/mL Graduated pre-filled syringe (for Subcutaneous use)	
		Administered as single IV bolus over 5-10 seconds (after reconstitution)	Intravenous bolus injection 30 IU/kg** (administer with Tenecteplase) Use 10,000 units/4mL vial.	Subcutaneous injection 90 IU/kg (administer 15 mins post thrombolysis) Use graduated pre-filled syringe.
< 60kg	<75yrs	6,000 IU (6mL)	2,000 IU (0.8mL)	5,000 IU (0.5mL)
	≥75yrs	3,000 IU (3mL)	OMIT	
60 – 69kg	<75yrs	7,000 IU (7mL)	2,000 IU (0.8mL)	6,000 IU (0.6mL)
	≥75yrs	3,500 IU (3.5mL)	OMIT	
70-79kg	<75yrs	8,000 IU (8mL)	2,000 IU (0.8mL)	7,000 IU (0.7mL)
	≥75yrs	4,000 IU (4mL)	OMIT	
80-89kg	<75yrs	9,000 IU (9mL)	3,000 IU (1.2mL)	8,000 IU (0.8mL)
	≥75yrs	4,500 IU (4.5mL)	OMIT	
≥90kg	<75yrs	10,000 IU (10mL maximum dose)	3,000 IU (1.2mL)	9,000 IU (0.9mL)
	≥75yrs	5,000 IU (5mL maximum dose)	OMIT	

***Tenecteplase**
Use 0.9% sodium chloride to flush the cannula. Tenecteplase is incompatible with glucose solutions. A flush should be administered after the dalteparin IV injection. Summary of Product Characteristics (SmPC) is available for detailed information via Home - electronic medicines compendium (emc).

****Note:** that dalteparin dosing has been rounded to the most appropriate weight category to match tenecteplase dosing bands and give an appropriate to administer dose.

References:

1. European Society of Cardiology Clinical Guidelines on Acute Coronary Syndromes, 2023. 2023 ESC Guidelines for the management of acute coronary syndromes (escardio.org)
2. Wallentin et al. The Low Molecular Weight Heparin Dalteparin as Adjuvant Therapy in Acute Myocardial Infarction: The ASSENT PLUS study. 2001 Clin Cardiol Vol 24 (Suppl. I) I12-I14.
3. SmPC for Tenecteplase [accessed online 27/9/23]. Metalyse 10,000 units - Summary of Product Characteristics (SmPC) - (emc) (medicines.org.uk)

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