King's College Hospital NHS
NHS Foundation Trust

Protocol for the Management of Massive Pulmonary Embolism (PE) with Thrombolysis (Denmark Hill + PRUH Site)

Document Information			
Version Number:	2.1	**Date:**	Oct 2018
Is this an update of an existing guideline? (If yes, please state the title of the guideline being replaced) (please also state the key changes from previous guideline)	Yes (same title) Key changes – change in enoxaparin dosing and CrCl limits for when to use LMWH/UFH. Option for VA ECMO and slight amendments to contraindications table. Location of stock and contact numbers updated.		
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Author(s): (Responsible for updating guideline) (Please state Full Name and Job Title)	Alison Brown (Senior Pharmacist) Lara Roberts (Haematology Consultant)		
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Target audience:	Doctors, Pharmacists and Nurses trust wide		
Site: (Please state which site(s) this guidelines applies to, e.g., DH, PRUH, All sites)	Denmark Hill, PRUH		
Specialty:	Thrombosis		
Summary: (In under 250 characters)	Guideline for use of thrombolysis in massive PE		
Medicines usage – *Preparation of guidelines including drug information should involve a pharmacist*	Does this document include information on how to use a medicine?	Yes	
	If a pharmacist has been involved, have they been listed in the authorship?	Yes	
Nursing Care – Preparation of guidelines for nursing care should involve a nurse	If a nurse has been involved, have they been listed in the authorship?	n/a	
Therapies – Preparation of guidelines for Therapies should involve a therapist	If a therapist has been involved, have they been listed in the authorship?	n/a	
Technical aspects – Preparation of guidelines for equipment use should involve a technician	If a technician has been involved, have they been listed in the authorship?	n/a	
Lab based guidelines – Preparation of guidelines for in association with laboratories should involve a clinician or scientist	If a laboratory clinician or scientist has been involved, have they been listed in the authorship?	n/a	
Risk & Governance – Incidences	Has this document been drafted as a result of an incident?	No	
Triage checklist completed by:		Alison Brown	
Date completed:	February 2019		

Protocol for the Management of Massive Pulmonary Embolism (PE) with Thrombolysis

Thrombolysis is **NOT** first line treatment for non-massive PE (SBP>90mmHg). For treatment of PE without refractory hypotension, refer to 'Diagnosis and management of non-massive pulmonary embolism'.

PATIENT ASSESSMENT

Follow directions in table below for patients with a history consistent with PE who are peri-arrest/PEA arrest or have refractory hypotension (SBP <90mmHg OR fall greater 40mmHg for > 15 minutes not due to hypovolemia, sepsis or arrhythmia). Consider referral to critical care and/or cardiology.

CLINICAL SCENARIO	INVESTIGATIONS	THROMBOLYSE IF EVIDENCE OF;	ALTEPLASE (rt-PA) REGIMEN
Peri-arrest/PEA arrest due to PE	ECHO (bedside echo acceptable, bleep 111) NOT FOR CT	RV enlargement RV impairment Pulmonary hypertension (if possible to measure) DO NOT DELAY decision making if timely investigations are not possible	1 (see table below)
PE with refractory hypotension	ECHO CTPA	RV enlargement RV impairment PE confirmed/likely Discuss with cardiothoracic surgeons (bleep 946)	2 (see table below)

ASSESS FOR POSSIBLE CONTRA-INDICATIONS before administering (see table below)

Selected normotensive patients but with clinical evidence of instability (see indicators below) and a low bleeding risk may derive benefit from thrombolysis:

- Clinical evidence of poor tissue perfusion or right ventricular compromise
- Severe hypoxaemia
- Failure to improve on anticoagulant therapy
- Elevated troponin
- Right ventricular dysfunction on echocardiogram
- Right ventricular enlargement/dysfunction on chest CT

CONTRAINDICATIONS TO THROMBOLYSIS

Note that in an immediately life threatening PE, "absolute" contraindications may become "relative."

ABSOLUTE CONTRAINDICATIONS	RELATIVE CONTRAINDICATIONS
- Intracranial bleed or haemorrhagic stroke at any time - Ischaemic stroke in the past 3 months - CNS neoplasm - Recent major trauma/surgery/head injury (within preceding 3 months) - GI bleeding within the past 3 months - Known bleeding disorder - Recent major haemorrhage - Allergy to gentamicin	- Oral anticoagulant therapy if INR >1.5 - Pregnancy or within 4 weeks post partum - Non-compressible blood vessel puncture in past 10 days - Traumatic resuscitation in past 10 days - Advanced liver disease - Active peptic ulcer disease - Severe uncontrolled hypertension (systolic BP >200mmHg diastolic BP>100mmHg) - Endocarditis - Haemorrhagic pancreatitis

Note - this is an abridged version of contraindications from the company's Summary of Product Characteristics (SPC)

In the presence of absolute contraindications to systemic thrombolysis, consider catheter-directed embolectomy/thrombolysis (discuss with cardiology/interventional radiologists as appropriate).Consider emergency salvage VA ECMO where catheter directed thrombectomy not appropriate – contact on call ECMO consultant via Denmark Hill switchboard.

THROMBOLYSIS TREATMENT

ALTEPLASE (rt-PA) DOSAGE REGIMENS	
(1) Massive PE with imminent cardiac arrest	Alteplase 50mg IV bolus[1]. Reconstitute 50mg vial with 25ml water for injection provided and give as a bolus over 1-2 minutes Repeat after 30 minutes if patient still critical* Consider emergency VA ECMO in case of persistent shock or refractory cardiac arrest despite initial thrombolysis – contact on call ECMO consultant via Denmark Hill switch board *The total dose should not exceed 1.5mg/kg in patients with actual body weight <65kg
(2) All other patients who meet criteria for thrombolysis for PE	Reconstitute each 50mg vial with 25ml water for injection provided and give alteplase 10mg (5ml) IV bolus over 1-2 minutes then 90mg* (45ml) as an IV infusion over 2 hours using a syringe driver *The total dose should not exceed 1.5mg/kg in patients with actual body weight <65kg

Thrombolysis should be delivered in a setting with adequate monitoring facilities ie A&E resus, critical care (iMobile bleep 809, LITU pager via switchboard 'LITU Reg') or coronary care unit (bleep 111).

SUBSEQUENT ANTICOAGULATION THERAPY

Check APTR immediately post alteplase and 4 hours post dose.

APTR < 2.0 – start an unfractionated heparin (UFH) infusion as per trust guidance (see anticoagulation chart under tools on EPMA)

If an UFH infusion has previously been started and suspended during thrombolysis, restart the infusion without the bolus dose

****Refer all patients to the anticoagulation MDT ward round on EPR****

When patient is clinically stable;

- If CrCl >30ml/min switch to enoxaparin 1mg/kg twice daily (round dose to nearest syringe size where possible) (see anticoagulation chart~~)~~
- If CrCl 15-30ml/min continue UFH or switch to enoxaparin 1mg/kg ONCE daily with anti-Xa monitoring (refer to 'Anticoagulation Quick Reference Guide' on anticoagulation guidelines kwiki page)
- If CrCl <15ml/min continue UFH infusion (see anticoagulation chart)

Location of Alteplase (rt-PA) 50mg Vials

Pls use the Location of stock on wards - Denmark Hill or Location of stock on wards - PRUH

*It is also kept in the pharmacy emergency drug cupboard (at Denmark Hill, PRUH & Orpington) which can be accessed out of hours by bleeping the on-call pharmacist via switchboard.

Please contact the coagulation registrar (KCH bleep 736 266, PRUH bleep 629) or haematology oncall via switchboard afterhours if further advice is required

References

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4. ACC: Update of Pulmonary Embolism Management J Am Coll Cardiol 2016; 67:976-990Chatterjee 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;311:2414-21.
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