Management of acute pulmonary embolism – a team approach

PE management pathway overview

Dr Siobhain Mulrennan
Respiratory Consultant, Sir Charles Gairdner Hospital
Clin A/Prof, School of Medicine and Pharmacology, UWA
Management of acute pulmonary embolism – a team approach

- PE working group SCGH 2015
- ED, ICU, Respiratory, Cardiothoracics & Interventional Radiology

- Outcome – Pulmonary Embolism Advanced Care Pathway
Massive v Submassive

• Acute PE with sustained hypotension (systolic BP < 90 mmHg for at least 15 mins requiring inotropic support – not due to any other cause (arrhythmia, hypovolaemia, sepsis, LV dysfunction or profound bradycardia)

• Acute PE without systemic hypotension (systolic BP > 90 mmHg) but with either RV dysfunction or myocardial necrosis
• RV dysfunction = 1 of the following – ECHO, CT, Elevation of BNP, Elevation N-terminal pro-BNP, ECG changes
• Myocardial necrosis - elevation of Troponin
• Submassive – Minor or Mod/Severe RV dysfunction
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Pulmonary Embolism Advanced Care Pathway

Non massive & Low risk submassive PE

- Not clinically compromised

Low molecular weight heparin / anticoagulation

Consider discharge if no concerning features (see list under high risk submassive PE)
Ensure appropriate follow up – anticoag nurse / resp / +/- haematology
Otherwise generally admit respiratory medicine

High risk submassive PE

- Features from at least 2 of the below categories:
  1. Clinical: looks unwell or compromised, deteriorating, severe hypoxia, syncope hx
  2. Imaging: large clot burden, concerning echo
  3. Laboratory: Elevated lactate, BNP, troponin

Options include:
- Standard anticoagulation
- Catheter directed lysis
- TPA dose systemic thrombolysis
- Discuss with appropriate specialty:
  - Central clot - Resp & Cardiothoracic
  - Peripheral clot – Resp & Interventional radiology
- Plus make ICU aware

• Decision based on:
  - Clot burden and location
  - High versus low bleeding risk
  - Clinical state and comorbidities
  - Resource availability
  - Patient preference

Massive PE

- Ongoing hypotension with significant clinical compromise
  (<90mmHg or > 40 mmHg drop in systolic BP)

\[ HDU / Resp HDU \]

Low bleeding risk

- Accessible PE
  - (2 lobar PA involved)
  - Surgical embolectomy

Peripherial PE
- Full dose tPA

\[ ICU or HDU / Resp HDU \]

High bleeding risk

- Accessible PE
  - (2 lobar PA involved)
  - Surgical embolectomy

Catheter directed lysis

Low molecular weight heparin / anticoagulation

Consider discharge if no concerning features (see list under high risk submassive PE)
Ensure appropriate follow up – anticoag nurse / resp / +/- haematology
Otherwise generally admit respiratory medicine

Designed in collaboration and with agreement from Emergency Medicine, Respiratory Medicine, Interventional Radiology and Cardiothoracic Surgery
James Rippey

For Review 2017
High bleeding risk and contraindications to thrombolysis

**Absolute**
- Known allergy / hypersensitivity / adverse reaction to thrombolytics or allergy to Gentamicin (a trace residue from the manufacturing process)
- Active or recent internal bleeding within 14 days (excludes menstruation)
- Significant closed head, facial or other severe trauma within 3 months
- Suspected acute disseminated pericarditis
- Frac intracranial haemorrhage within past 6 months
- Ischaemic stroke within 3 months or previous haemorrhagic stroke
- Known structural intracranial vascular lesion (AVM or aneurysm)
- Known malignant intracranial or intraspinal neoplasm
- Known severe bleeding disorder
- Recent (within past 2 months) intracranial or intraspinal surgery

**Relative**
- Age more than 75 years
- Current anticoagulant use (if on warfarin only thrombolise if INR <2.0)
- Non compressible vascular puncture within past 10 days
- Recent major surgery (within 3 weeks)
- Traumatic or prolonged CPR (for more than 10 minutes)
- History severe chronic poorly controlled hypertension
- Systolic >180 or diastolic >110mmHg
- Ischaemic stroke over 3 months ago
- Dementia or known intracranial pathology
- Pregnancy or recent delivery
- Reduced GCS
- Haemorrhagic ophthalmic conditions
- Active peptic ulcer or other ulcerative conditions (i.e. Crohn’s disease)
- Advanced kidney or liver disease
- Prior Streptokinase / Alteplase / Reteplase

Consideration of imaging for source of PE and need for IVC filter
- In patients with suspected massive or high risk submassive PE, CTPA with concurrent CTV down Where CTV is not prospectively performed ultrasound of the lower limbs is an alternative and strongly recommended if considering major Rx (lysis, cath, embolectomy).
- IVC filter is placed in patients who have undergone surgical pulmonary embolectomy and in whom there remains significant lower limb thrombus.
- IVC filter is considered in patients with submassive PE in whom there remains significant lower limb thrombus, particularly if it appears unstable.
- Advice on the use of TED stockings is available on the SCGH ED DVT pathway

Administration of thrombolysis for pulmonary embolism

**Full dose thrombolysis**
Alteplase (tPA)
- > 65kg: 10mg IV bolus, followed by 90mg IV infusion over 2 hours
- < 65kg: adjust dose so it does not exceed 1.5mg/kg; give 10mg IV bolus then the remainder of the dose over 2 hours

**Half dose thrombolysis**
Alteplase (tPA)
- > 65kg: 10mg IV bolus, followed by 40mg IV infusion over 2 hours
- < 65kg: adjust dose so it does not exceed 0.75mg/kg; give 10mg IV bolus then the remainder of the dose over 2 hours

Following the Alteplase 2 hour infusion with anticoagulation with unfractionated heparin via IV infusion as per anticoagulation chart protocol.

**Catheter directed thrombolysis**
- Alteplase (tPA): as directed by interventional radiology.
Pulmonary Embolism Advanced Care Pathway

- Guide the management from ED
- Categories of non massive and low risk submassive, high risk submassive and massive PE determine management path
- Gives information regarding high bleeding risk and contraindications to thrombolysis, thrombolysis dose and IVC use
- Helpful to have these guidelines however it is recognised that patients are unique, there is a broad and complex spectrum of presentation partic in high risk submassive, and definitive evidence may not be available.
Do you have access to the following in your institution?

A. Haematologist with a special interest in thrombosis/Thrombosis clinic
B. Echocardiography after hours
C. Interventional Radiology
D. Cardiothoracic Surgery
E. Pulmonary Embolism Response Team
OUR MDT TODAY

• **Ross Baker** - Novel oral anticoagulants for acute PE – inpatient to outpatient care

• **Fiona Lake** - Systemic thrombolysis

• **Shaun Samuelson** - Endovascular PE Intervention

• **Mark Newman** - "Resurrection!" – the role of surgical embolectomy
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