3 Cardiology

ACUTE CORONARY SYNDROME

Biomarkers

- Specificity (*TIC*): TnT > TnI > CK
- Δ more sensitive: 100% ↑ = significant
- DDx ↑ Tn
  - ***PE*** - Contusion - Renal failure
  - Stroke - Vasculitis - Valvular disease
  - ICH - HCM/DCM - Ao dissection
  - Shock - Arrhythmia - Burns
  - Hypoxia - False +ve

Risk Scores

TIMI, GRACE, HEART, EDACS, CRUSADE

TIMI

AAASK3 | 1pt each, MACE 1 = 3%, 7 = 19%

- Age ≥ 65
- Aspirin last 7 days
- Angina ≥ 2 x 24hrs
- ST ↑ ≥ 0.5mm 2 contiguous leads
- Known ≥ 50% stenosis
- 3RF: smoker, low HDL, DM, FHx < 55yo

GRACE

Complicated, ≤ 100 = low risk, ≥ 171 high risk

- Age - Ix: Crea, STΔ, ↑ Tn
- Hx: CCF class - Arrest at admission
- Ex: HR, SBP

Killip Classification (Heart Failure)

I	No CCF	III	APO
II	Crackles, S3, ↑JVP	IV	Cardiogenic shock

ACS Risk Management

Pre-hospital/Preliminary

- 12 lead ecg - ***GTN*** - ***O_2***
- ***Morphine*** - ***Aspirin***

Low Risk

- < 40, atypical, no CAD, normal Tn/ECG
- Risk factor modification
- No follow up – ***30-day MACE < 4%***

Intermediate Risk

- Neither high nor low
- ***Provocative testing 7-14 days***
- Risk factor modification

High Risk

- Ongoing pain, unstable, syncope, ***New MR***
- ↑Tn, ECG ST ↑↓ ≥ 0.5mm, new TWI, VT
- ***MACE risk 33%***
- ***Inpatient provocative testing or Angiogram***
- LVEF < 40%

NSTEMI

- ↑Tn with non-STEMI ecg or CP > 12hrs

Management

- ***O_2*** > 93%
- ***Aspirin*** 300mg
- ***Enoxaparin*** 1mg/kg SC or 5000u IV ***UFH***
- ***Ticagrelor*** 180mg (CI in ICH hx or severe liver disease)
- ***GTN*** infusion 50mg in 50ml 3-20ml/hr
- ***Atorvastatin*** 80mg
- ~~***Abciximab*** peri-PCI (ie ***not in ED***)~~

STEMI

Criteria

Typical CP + ECG Δs > 20min
- ST ↑ ≥ 2 contiguous leads
  - V2-3 m < 40 ≥ 2.5mm - V2-3 f ≥ 1.5mm
  - V2-3 m ≥ 40 ≥ 2.0mm - All other leads ≥ 1mm
- New ***LBBB*** or ***modified Scarbossa criteria***

General STEMI Management

- ED therapy same as NSTEMI
- Main Mx decision is ***PCI vs Lysis vs 1ry CABG***
- Cocaine/Spasm: ***BZDP, CCB, Aspirin/GTN, Phentolamine***

Complications of AMI

Early
- arrythmias
- shock: valvular, ischaemia/infarct

Late
- Death
- Cardiac: CCF, Arrhythmia, Pericarditis/***Dressler's***
- Thromboembolism
- Mech: aneurysm, prolapse, rupture, tamponade

Specific
- ***Inferior:*** mobitz I, vagal++, papillary rupture
- ***RCA: Brady***
- ***Ant:*** ↓BP, ***rupture***

Thrombolysis in STEMI

- PCI > 90min, Lysis < 2hrs (still need TF post PCI)
- Immediate TF if lysis doesnt work:
  - < 50% ST recovery after 60-90m or unstable
- No contra-indications (***ST.ABCD***)

Tenectaplase (metalyse, rtPA)

- bolus dose only: < 60kg 6K IU
  ≥ 60 to < 70 kg 7K IU
  ≥ 70 to < 80 kg 8K IU
  ≥ 80 to ≤ 90 kg 9K
  ≥ 90 10K

Retaplase

- 10u bolus + 10u 30min later

Alteplase (tPA)

Also used for Massive PE & Stroke in diff doses
- 0.9mg/kg (max 90mg)
- 10% as bolus, remainder over 1hr

PCI in STEMI

Gold standard

Indications

- < 90min of 1st med contact
- Lysis contra indicated or failed (unstable)
- Within 24hrs of successful lysis

Complications

- Local: bleed, haem, false aneurysm, dissection
- Contrast: allergy, AKI
- Cardiac: AMI, arrhythmia, perf
- Anaesthetic: aspiration, I&V
- Unable to perform
- Type 4 MI

APO

- Fluid maldistribution
- 1yr mortality 40%
- Hypotension = cardiogenic shock

AHFS Types

1. SOB + ↑ SBP: sudden onset, most common
2. SOB + ⟷ SBP: slower onset, peripheral > pulm oedema
3. SOB + ↓ SBP: cardiogenic shock, most fatal
4. SOB + signs ACS
5. RV failure without APO

Causes

Cardiogenic: ↑ SVR → Pulmonary back flow
- Sympathetic surge ie ***'hypertensive APO'***
- Arrhythmia or DCCV
- Acute valvular dysfunction
- Infarct, ischaemia, myocarditis
- Fluid overload

-Non-cardiogenic: ↑ pulmonary vasc permeability
- Sepsis - Airway obst, asthma, asp, inh inj
- Shock - Trauma: head, lung, major
- Eclampsia - Pancreatitis
- Emboli - Near drowning
- HBOT - Re-expansion
- Toxins

Management

- Position upright
- Aim ***SaO_2 88-92%***
- ***GTN*** 50mg in 50ml, 3-20ml/hr, SBP > 110 (offload LV)
- ***Frusemide***: 1mg/kg
- ***NIV: 10/5 → 15/5 (or just CPAP)***
  - CPAP ↓ need to intubate & mortality
  - BPAP ↓ need to intubate but NOT mortality
- ***Cardiogenic shock***
  - ***Adrenaline*** or ***Dopamine***
  - IABP
  - Tx reversible causes eg AMI, valve

Cardiogenic Shock

- ***Early reperfusion*** is key
- Early I&V
- Correct arrhythmia, volume, acidosis
- ***Perfusion adjuncts*** to achieve MAP 60
  - Drugs: ***nor/adrenaline, dopamine***
  - ***IABP***/LVAD/ECMO

Cardiogenic Shock Management in ED

- 80% mortality
- Ensure adequate volume
- Inotropes: ***norad, adr, dopamine***
- Mx underlying cause

No Further testing

Need all for d/c without follow up
- <40yo
- Normal ecg
- Normal serial Tn
- No ongoing pain/sx
- Atypical pain

ARRHYTHMIAS

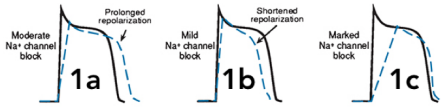
Causes

- AMI - Drugs eg ***antiarrythmics/TCA/LA***
- Conduction scarring - Electrolyte disturbance
- Infiltrative eg sarcoid

Antiarrhythmic Agents

Class I Na block - 1a ***TCA, Quinine, Procainemide***
- 1b ***Lignocaine, phenytoin***
- 1c ***Flecainide***

Class II ***β blocker***
Class III K block eg ***Sotalol, Amiodarone***
Class IV ***CCB eg verapamil, diltiazem***



Arrhythmia Management

1. Bradycardia

- ***Atropine*** 0.6mg aliquots (0.02 mg/kg)
- External/Internal pacing → PPM

2. Tachyarrythmias

- **Supraventricular Tachycardia** (*see APLS for kids*)
  1. Vagal manoeuvres incl ***REVERT***
  2. ***Adenosine 6mg→12→18 (0.1,0.2,0.3 mg/kg)***
  3. ***Verapamil*** 1mg/min max 20mg
  4. ***DCCV***

*NB WPW AF use **procainmide** or **flecainide** (since **adenosine**, CCB or Dig = 3HB)*

- **TdP**: ***$MgSO_4$*** 2g, ***Isoprenaline***, ***OD pacing, DCCV***
  DO NOT use amiodarone, sotalol, procainmide
- **Conscious VT**
  - ***Amiodarone*** 300mg/30min, 900mg/24hr
  - ***Sotalol*** 1mg/kg
  - ***Lignocaine*** 1mg/kg
- **VF or unstable VT:** ***DCCV***

3. Heart Block

Unstable, Mobitz II or 3 need treatment, rest conservative

- Drugs - ***Atropine*** 0.6mg aliquots
  - ***Adrenaline*** 5-20 ml/hr (6mg in 100ml)
  - ***Isoprenaline*** 2-10mcg/min
- External/Internal pacing, PPM

Atrial Fibrillation

Precipitants

Pirates
- **P**ulmonary (COPD, PE), **P**ericarditis
- **I**diopathic, **i**atrogenic, **i**nfarction, **i**nfection
- **R**heumatic, **r**egurge, **r**ecurrence/**r**efractory
- **A**lcohol, **A**naemia
- **T**hyrotoxicosis, **T**oxins
- **E**lectrolytes, **e**ndocarditis, **e**ctopic focus
- **S**epsis, **S**timulants, **S**tructural

Management

1. Conservative (***80% revert < 48hrs***)
2. Rate control (better for older)
   - ***Metoprolol*** 25-50mg PO - ***Amiodarone if sick***
   - ***Verapamil*** - ***Digoxin if old/sedentary***
3. Rhythm control (better for younger)
   - Drugs: ***Amiodarone or Flecainide*** (pill-in-pocket)
   - DCCV (if > 48hrs needs Echo); sync ***100J → 200J***
4. Other
   - Treat underlying precipitant
   - Anticoagulation
     - ***CHA2DS2-VASc/HASBLED*** ≥ 2 = high risk for both
     - CCF, HTN, **Age² 75**, DM, **Stroke²**, Vasc, Age >65, ♀
     - HTN, Abnormal renal/liver tests, stroke, bleeding, labile INR, elderly, drugs/alcohol

Torsades De Points & Long QT

Causes

- Congenital long QT, Hypothermia, AMI
- ↓Mg or ↓K (rarely ↓ Ca) (common in malnourished/etoh++)
- Intracranial haemorraghe ie ↑ ICP
- Drugs: ***Anti-BAD PH*** (see tox)

ELECTRICAL THERAPY

Pacemakers

Nomenclature

NBG Pacemaker code: XYZ(AB)

	FCN	Set	Legend
X	Chamber paced	O,A,V,D	O = None
Y	Chamber sensed	O,A,V,D	A = Atrium
Z	Response	O,I,T,D	V = Ventricle
A	Programability	O,R	D = Dual (A + V)
B	Multisite pacing	O,A,V,D	I = Inhibited
			T = Trigger

Complications

- Sensing: under, over (random spikes)
- Pacing: output, capture failure (no QRS after spike)
- ***PM mediated tachycardia***, sensor induced tachycardia
  - atria sense inappropriately
- Runaway PM: low battery = ↑ & ↓ HR
- PM syndrome
- Lead displacement dysrhythmia

Defibrillators

Indications

Unsynchronised	*Synchronised*
- VF	- AF/flutter
- Unstable VT	- SVT
- Unstable TdP	- Conscious VT

Energy Level

NB 200J = 30 mA for avg body size

- Unsynchronised	200J → 360J (or max for machine)
- Synchronised	100J → 200J
- Paed unsync	4J/kg
- Paed sync	1J/kg → 2J/kg
- AED:	variable, some automate escalation

Complications

Complications x20 PM

- Failed DCCV	- Infection
- Inappropriate discharge	- Thrombosis/***Stroke***
- Complication of procedure	- Fibrosis
- Burns	- Explosion
- Bystander shock	

Failed DCCV

- Set to synchronised	- Charge dumped
- Flat battery	- Pad not on skin
- Lead fracture	

Transcutaneous Pacing

Indications

- Refractory bradycardia
- Decompensated Mobitz II or 3° HB

Technique

- Pads AP
- Mode ***Demand*** (ie not ***overdrive pacing***)
- Rate ***> 30 above ventricular intrinsic***
- Amps ***start at 70 mA***
  ↑ until captures then go ***10 above*** (max 120-130)
  Ensure capture

Overdrive Pacing

- Pacing > native rate
- Can cause VT/VF ∴ have pads on

Indications

- Failed drug therapy	- DCCV contraindicated eg ***dig*** tox
- VT vs SVT	- Recurrent arrythmia (esp AF, TdP)

Controllable Rhythms

- TdP	- AV junctional tachycardia
- SVT	- Paroxysmal re-entrant SVT
- VT	- A Flutter (not A Fib)

Technique

- Pads AP
- Mode Asynchronous
- Rate Until capture (usually 10-20 BPM above native)

PM/ICD Magnets

- PM: puts into ***a-synch pacing*** ie no sensing
- ICD: ***disables tachy*** detection (no Δ pacing)

SYNCOPE

DDx

- **CVS:** AMI, valvular, CM, Tamponade, Ao dissection
  - Arrhythmias: ***WPW, Brugada, RV CM, HOCM, Long QT***
- **Shock:** sepsis
- **Neuro:** SAH, seizure, neuropathy, VB insufficiency
- **Rx:** CCBs, β-block, nitrates, diuretics, antiarrythmics
- **Vasovagal:** orthostatic, carotid sinus, situational
- **Psychiatric:** major depression, panic, somatisation
- Other: Snakebite, ↓ Glc

San Francisco Syncope Rules (CHESS)

Any = high risk vs –ve = 1.4% 7-day risk

- **C**CF, **H**ct < 30%, **E**CG abnormal, **S**OB, **S**BP < 90mmHg

Other High-Risk Features

- Supine	- Repetitive
- During/after ***exercise***	- FHx sudden death
- No/brief prodrome	- CP or palpitations

Arrythmogenic Syncope

See ECG interpretation for description

- **WPW (Δ wave)**
- **Brugada (coved or saddle-back ST)**
- **RV cardiomyopathy (epsilon wave)**
- **HOCM (dagger Q)**
- **Long QTc**
- **Catecholaminergic Polymorphic VT (CPVT)**

PERICARDIUM

Pericarditis

Causes

- Idiopathic 25%	- Infection
- Malignancy 25% (or post XRT)	- Trauma
- Systemic illness: uraemia (renal), myxoedema	
- Vascular: ***dissection, AMI, Rheumatoid***	
- Autoimmune: SLE, sarcoidosis	
- ***Dressler's syndrome*** (post AMI)	

Pericardial Effusion

Same causes as pericarditis + anticoagulants, dissection, AMI ± rupture

- ECG: narrow QRS, flat T waves, ***electrical alternans***

Tamponade

- ***Beck's triad***: ↓ BP, ↑ JVP, muffled heart sounds
- ECG: ↑PR, ***Low voltage QRS***, ***electrical alternans***

Pericardiocentesis

- Gold standard: sub-xiphoid approach in cath lab
- USS guided in-plane technique also option
- ***Atropine*** premed (vasovagal common)
- NG to decompress stomach

Parasternal

- L 5th IC space lat to sternal edge
- Safest

Sub-xiphoid

- Just under xiphoid, next to L costal margin
- ***Aim for L shoulder***

Apical Approach

- 1cm lat/below apex beat
- Least used, easier in large with USS

Complications

- arrhythmia, arrest, death
- Haemo/Pneumopericardium, thorax
- Laceration: chamber, vessels, lung, abdo

MYOCARDIUM

Cardiomyopathy

Dilated (DCM)

- Most common
- Cause: AMI, idiopathic, familial, post viral, etoh, autoimmune, ***pregnancy (peripartum CM)***
- Bi-ventricular thickening → ***Systolic*** dysfunction
- ECG non-specific: hypetrophy, BBB, abnormal Q waves

Hypertrophic Obstructive (HOCM)

- Most ***inherited*** (dom, var penetrance)
- ***Death in young athletes***
- Global enlargement → ***Diastolic*** dysfunction
- ECG
  - ↑ precordial voltages
  - LVH
  - ***Dagger Q waves lat/inf (ie V5,6, I, aVL)***
  - ***33% WPW*** *(as well as AF, SVT)*

Restrictive

- Least common
- ***Infiltrative aetiology***: Amyloid, eosinophilic
- Global enlargement → ***Diastolic*** dysfunction
- ECG: ***non-specific***, low voltage, BBB/HB, Q waves, arrythmia (esp AF)

Myocarditis

- Usually viral esp coxsackie, adeno, flu, diphtheria
- ECG: ***STE, low volt, prolong QTc, AV block, T2MI***
- TTE: diffuse wall motion abnormality
- Treatment
  - Underlying cause
  - Long term: VAD, ECMO, transplant

ENDOCARDIUM

Endocarditis

- ***S Aureus*** > Viridians (other: *s. epidermidis, bovis, HACEK*)

HACEK: haemophilus, actinobacillus, cardiobacterium, eikenella, kingella

- Prosthetic valves 20-30%
- Aortic most common native valve

Risk Factors

- Host	- ***RHD*** (most common in developing world)
	- Poor oral hygiene
	- IVDU, ESRF, DM, MVP, Regurge
	- Immunosuppression: etoh++, HIV, chemo
- Procedure	- Prosthetic: Valve, CVLs
	- High risk surgery: dental, GIT, GUT, Resp

Complications

- Embolic: stroke, PE, splenic infarct, limbs
- Cardiogenic shock: AMI, valvular incompetence, CF
- Other: Arrythmia, Sepsis, Glomerulonephritis

Duke's Criteria

a) Major

1. BC	+ve 2 sites with IE pathogens
2. BC	+ve 1 site with Coxiella or IgG > 1:800
3. Echo	IE, abscess, dehisced valve, new regurgitation

b) Minor

1. Risk	Heart condition eg ***RHD or IVDU***
2. Temp	> 38C
3. Vasc	Septic emboli, infarct, mycotic aneurysm, ICH, ***conj haem, Janeway***
4. Imm	***GN, Osler's nodes, Roth spots,*** Rheum factor
5. Micro	BC not meeting criteria of major

NB Osler's = tender, Janeway = palmar/non-tender

c) Path

- Micro in vegetations or histo

Duke's Interpretation

Definite 1P or 2Ma or 1Ma/***3Mi*** or 5Mi
Possible 1Ma/1Mi or ***3Mi*** ← *best we can do in ED*

Management

- Consider valve replacement if unstable
- Treat other complications
- Antibiotics depend on valve type

	Native	Prosthetic/PM Lead
1st Line	GB F	GV F*
Hypersensitive	GV C	GV C
Anaphylaxis	GV	GV

**also in MRSA, fulminant endocarditis in native valves*
F flucloxacillin; G gentamicin; B Benzylpenicillin; C cephazolin; V vancomycin

VALVULAR DISEASE

Murmurs

Grades

1/6 sometimes heard	4/6 loud, palpable thrill…just
2/6 soft	5/6 very loud, palpable thrill
3/6 mod, no thrill	6/6 no stethoscope needed

Dynamic Manoeuvres

- Inspiration = R side louder
- Expiration = left side louder
- ↑ preload eg squat = louder R side (not MVP, HOCM)
- ↓ preload eg valsalva = louder MVP, HOCM
- ↑ afterload eg hand grip = louder AR
- ↓ afterload eg GTN = louder MVP/HOCM

Valves

Murmur Characteristics

	Sound	Rad	Manouvres
Systolic			
AS	Mid-sys ejection	***R neck***	S2 quiet in severe ***paradox split S2***
MR	Holo-sys	Axilla	> with brach a. Occ
MVP	Mid-sys click	Apex cresc-decresc	[1]> with Valsalva < with squatting
Diastolic			
AR	Early-sys, diast decres	R sternum → neck[2]	> with hand grip or isometric ex
MS	decresc pan-diast[3]	apex, non-radiating	> with L lat decubitus

1 HCM only other with same manoeuvres
2 Austin flint: soft late diastolic over apex
3 Opening snap if severe

Aortic Stenosis

- Sx from outflow obstruction (***SOB, CCF, syncope***)
- Worse with high demand eg *sepsis, exercise, sedation*
- Severe = Vmax < 4ml, AVA < 1.02cm², Grad > 40

Mitral Regurgitation

- Causes ***APO*** (usually from AF)

Mitral Valve Prolapse

- ***Most common valvular lesion*** (3% population)
- Seen in young female psych

Aortic Regurgitation

- Clinically head-bopping, water hammer pulse, femoral bruit
- Poorly tolerated = ***replaced often***
- Causes ***CCF, hypotension, Marfans***

Mitral Stenosis

- Causes ***APO***, Caused by rheumatic fever

Rheumatic Fever

- Non-infectious sx from pharyngeal **GAS** infection
- Common age 3-14yo, ATSI
- ***Mitral stenosis*** most common

Jone's Criteria

Major (J❤NES)

- **J**ts (polyarthritis)
- ❤ Carditis (clinical only)
- **N**odules (s/cut)
- **E**ryth marginatum
- **S**ydenham Chorea

NB ***high risk groups*** also have Echo findings ***carditis*** or ***aseptic monoarthritis*** or ***Polyarthralgia*** as criteria

Minor (PPPI)

- **P**olyarthralgia/aseptic monoarthritis
- **P**yrexia
- **P**rolonged PR (carditis)
- **I**nflamm labs (ESR>30s, CRP > 30)

NB ***high risk groups*** also have ***mono-arthralgia*** as criteria

Jone's Interpretation

- Need evidence of recent GAS via
  1. ASOT or
  2. Anti-DNAse B
  3. +ve throat culture
  4. Recent ***scarlet fever***

Def 1st	2Ma or 1Ma/***2Mi***
Def Recur	2Ma or 1Ma/1Mi or 3Mi
Probable	1Ma or 1Ma/1***Mi*** or no evidence of GAS

Management

- Fever: ***Paracetamol***
- Arthralgia: ***NSAIDs***
- Chorea: ***CBZDP*** 250mg TDS, ***Valproate***
- *Valve:* surgery
- *AF:* ***Digoxin*** 125 µg
- Carditis: RIB, TTE, ***diuretics***, fluid restrict, ***ACE-I***

THROMBOEMBOLISM

DVT

Well's Criteria

10 criteria (all 1pt except alt diagnosis = -ve 2pts)

1 Active Ca	6 Oedema: pitting
2 Hx DVT	7 Oedema: calf > 3cm
3 Immobile	8 Vein: local tender
4 Surg 4w	9 Vein: collateral sup
5 Oedema: entire leg	10 Alt diagnosis

NB immobile means paralysis, paresis, plaster cast of LL – acute immobilisation > 3 days is same category as surgery < 3m

Interpretation: < 2 = unlikely = d-dimer; ≥ 2 = likely = USS

Management

- BK DVT 5% embolisation rate
- UL DVT 30% embolisation rate

1 **BK DVT** - ***DOAC*** or ***LMWH*** 6wks re-USS
or - Serial USS 2wks, ***DOAC*** or ***LMWH*** if extension
2 **AK & UL DVT**: ≥ 3m ***DOAC*** or ***LMWH***
3 **Massive DVT** (***phlegmasia cerulean dolens***)
- thrombolysis, cath directed lysis, thrombectomy
- high risk embolisation, ischaemia

± ***IVC filter***: usually temp device

Anticoagulation

- DOAC
  - ***Rivaroxaban*** 15mg BD 3wk → 20mg OD
  - ***Apixaban*** 10mg BD 7d, 5mg BD 6m, 2.5mg BD
  - ***Dabigatran*** off label
- ***LMWH***: If pregnant, oncology, failed oral, ***warfarin***
- ***Warfarin***: If lupus anticoagulant, poor ***DOAC*** clearance

Pulmonary Embolism

Well's Criteria

3D; 1.5H; 1C

3 pts	*1.5 pts*	*1 pt*
- **D**VT signs	- **H**x Surg ≤ 4w	- **C**a (active)
- **D**x no alt	- **H**x DV/PE	- **C**ough blood
	- **H**R > 100	

Interpretation:

< 2	Low	1.3%
2-6	Int	16.2%
> 6	High	37.5%

PERC

1 **D**VT signs	5 **O**lder than 50
2 **H**x Surg ≤ 4w	6 **O**estrogen (exogenous)
3 **H**x DV/PE	7 O_2 Sat < 95%
4 **H**R > 100	

Interpretation: Low-Int risk only
NPV approaches 100% if all -ve

ECG

- Sinus tachycardia (most common)
- S1Q3T3
- RV strain: ST↓/TWI V1-3, II, III, aVL
- P Pulmonale: peaked P wave II
- RAD (or LAD)
- RBBB
- Atrial arrythmia
- Non-specific ST-T Δs

Investigations

- USS - helpful if +ve in preg
- VQ - need ***normal lungs***
  - ***contraindicated in early preg***
  - ≥ intermediate risk result → CTPA
- CTPA - gold standard
  - high dose radiation on breast tissue
- TTE - diagnose ***submassive*** PE

Types

- Massive: arrest, SBP < 90 for 15min or inotropes
- Sub-massive: ↑ Tn, ↑ BNP, RV strain on CT/TTE
- Non-massive: all else

Management

- Prevention: - mobilisation, prophylaxis
- Non-massive - Rx as per DVT
- Sub-massive - Mx controversial
  - Full dose vs ½ dose lysis vs Like DVT
- **Massive** - Prolonged CPR
  - ***Alteplase*** (100mg total)
    10mg bolus then if
    ≥ 65kg 90mg over 2hr
    < 65kg 1.5mg/kg – bolus over 2hr
  - ***Heparin*** infusion after

*NB **MOPPET trial** suggests lysis for: R & L trunk embolism or > 2 lobes with > 70% involvement*