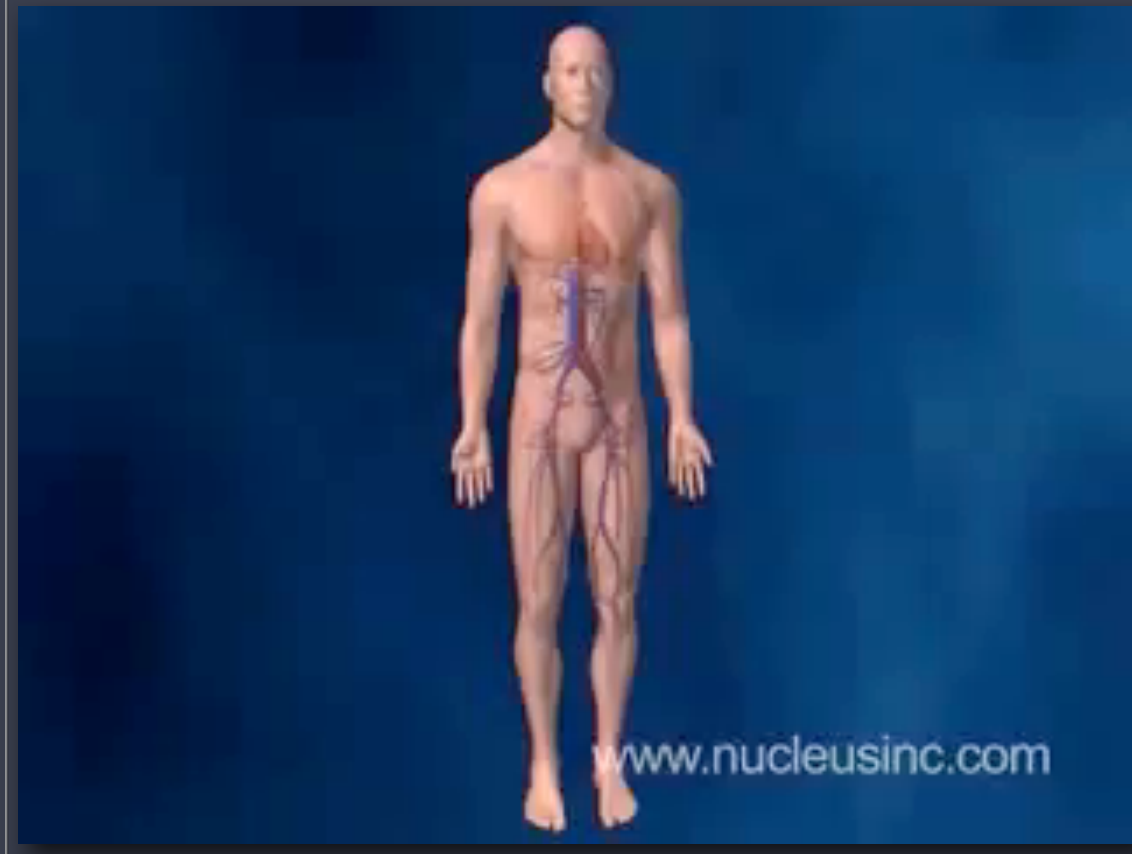




DVT & PE

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- ▶ DVT Features
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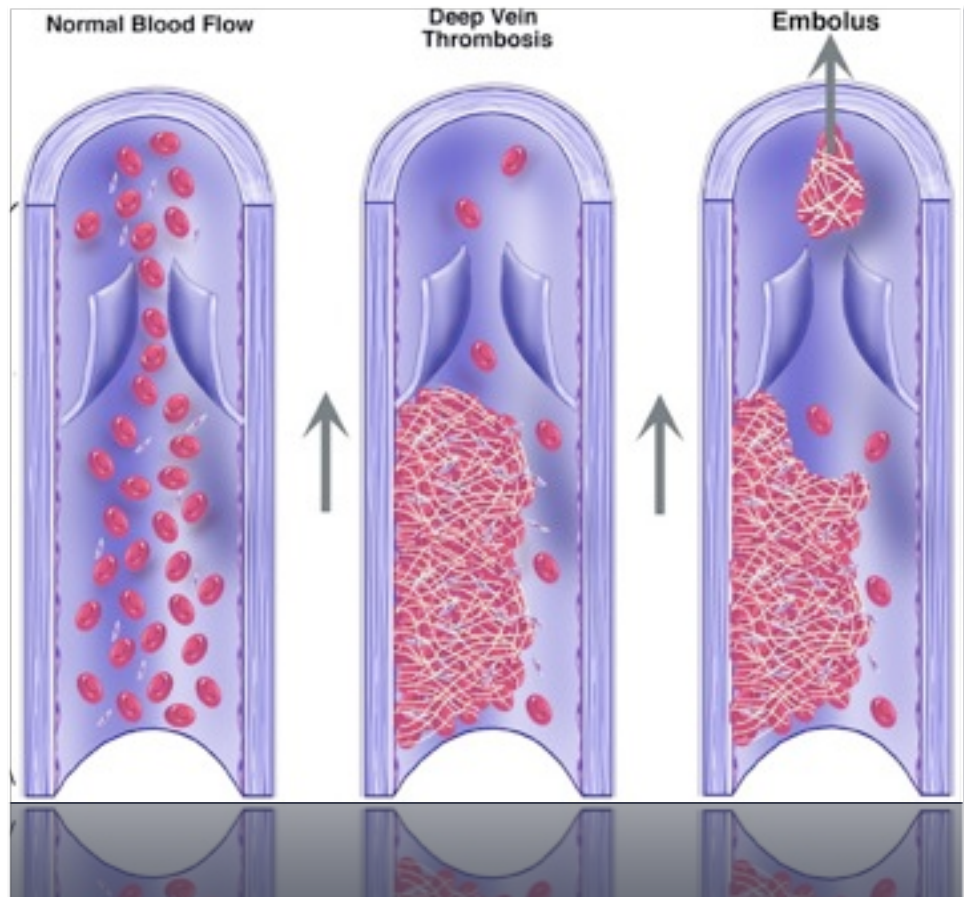


Introduction

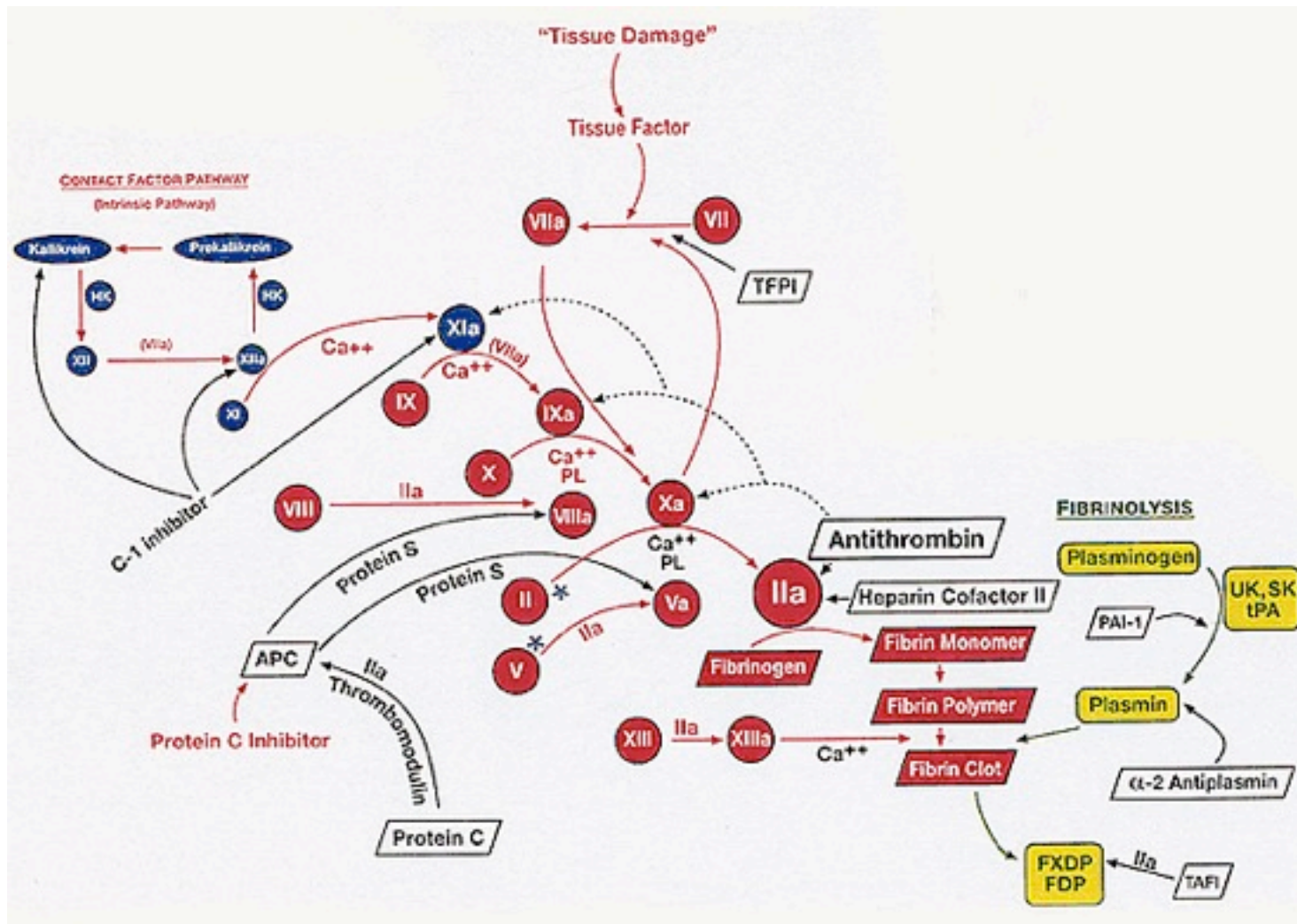
- ▶ Occurs in 20% of surgical patients
- ▶ <25% ?DVT confirmed
- ▶ Risk of PE, mainly above knee DVT's, conflicting evidence

Introduction

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Thromboembolic Pathophysiology



Thromboembolic Pathophysiology

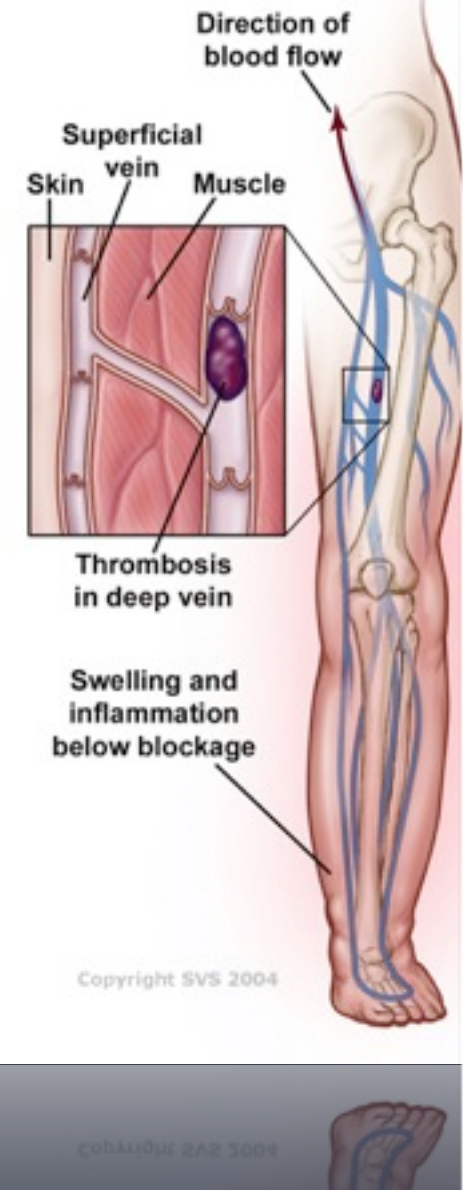
- ▶ Virchows Triad (stasis, vessel wall injury, hypercoaguable state)
 - ▶ Stasis: Immobility, surgery, casts
 - ▶ Vessel wall injury: trauma, sepsis, IVDA
 - ▶ Hypercoaguable state:
 - ▶ Primary- Antithrombin and heparin cofactor II deficiencies, Protein C and Protein S deficiencies, Factor V Leiden, Disorders of the fibrinolytic system, Dysfibrinogenemias, Lupus anticoagulant and anticardiolipin antibody syndrome, Prothrombin gene variant
 - ▶ Secondary- dehydration, pregnancy, OCP, malignancy, HONK
- ▶ Usually in valve cusps of calf veins, only 20% propagate proximally
- ▶ Spontaneous lysis/recanalisation <10%

DVT Features

- ▶ 65% below knee DVT's asymptomatic
- ▶ Calf swelling & tenderness in 75 & 80% DVTs respectively
- ▶ Mild fever
- ▶ Pitting oedema, redness
- ▶ Increased visible superficial veins
- ▶ Young active men, recent physical exertion with swollen sore arm=axillary vein DVT

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Wells Score

- ▶ Active cancer =1
- ▶ Paralysis, paresis, recent POP =1
- ▶ Recently bedridden >3d or major Sx <12/52 =1
- ▶ Localised deep vein tenderness =1
- ▶ Entire leg swelling =1
- ▶ Calf >3cm swelling of other leg =1
- ▶ Unilateral Pitting oedema =1
- ▶ Collateral superficial veins =1
- ▶ Other diagnosis?=-2

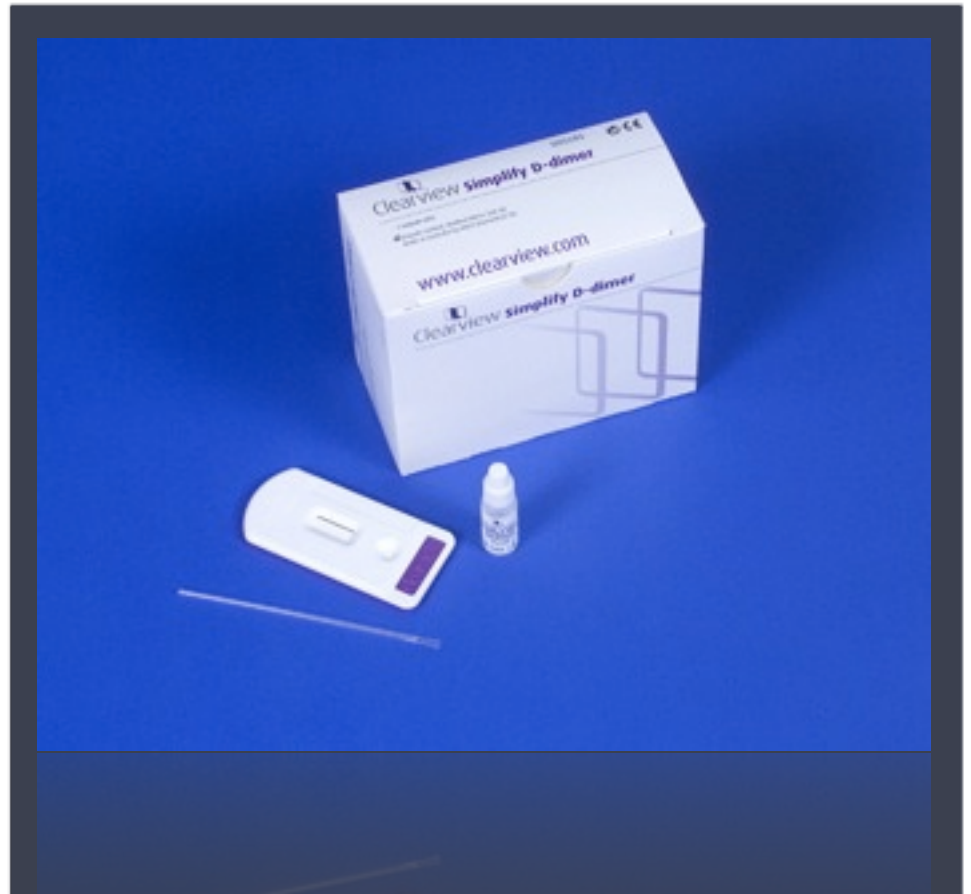
Score: Low=0 (3%), Mod=1-2 (17%), High=3+ (75%)

D-dimer test

- ▶ ONLY useful in low risk patients
- ▶ Previous DVT/PE =high risk
- ▶ Non-specific, but sensitive
i.e. good rule out test

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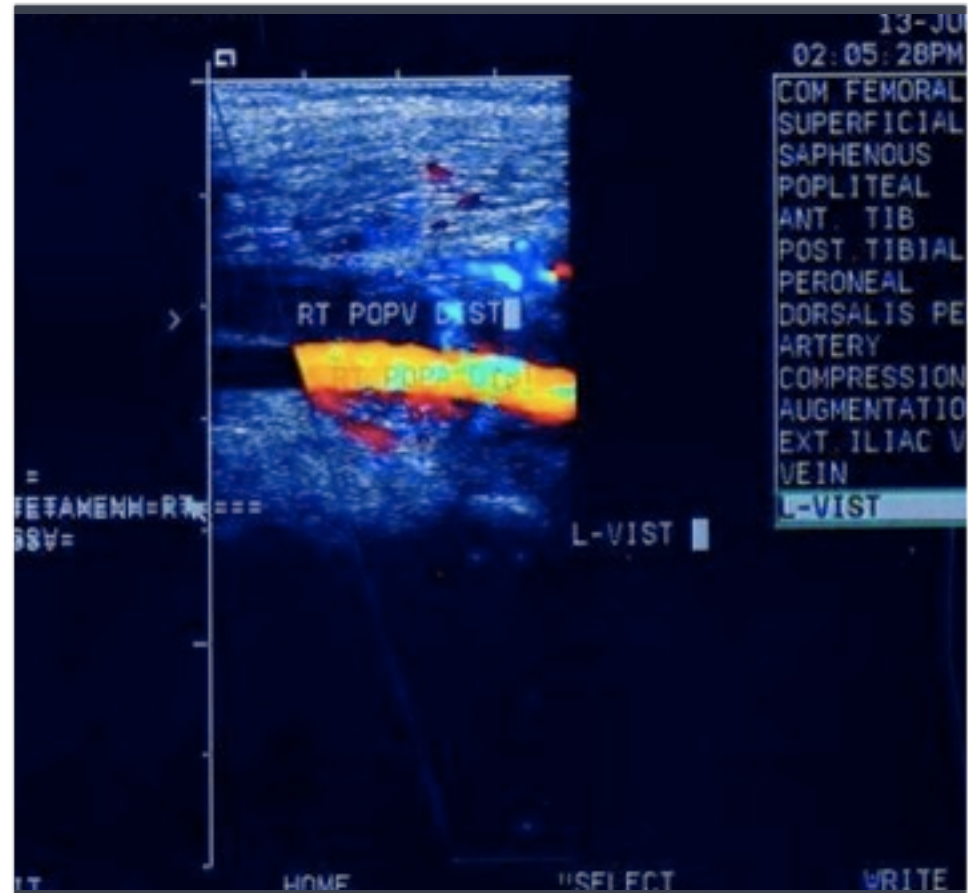


Diagnosis

- ▶ Gold standard venography- rarely done
- ▶ Compression Doppler ultrasound scan

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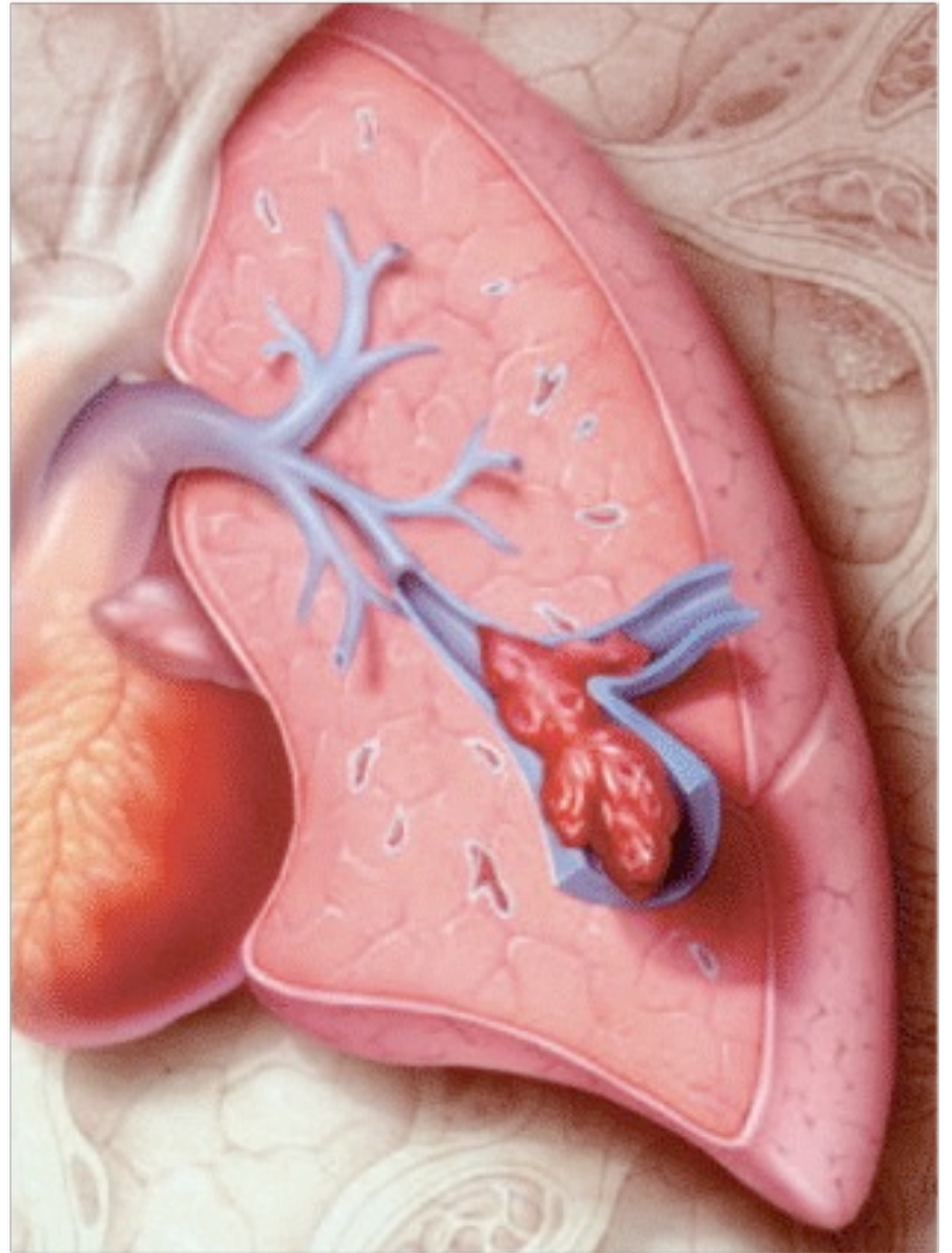
Treatment

- ▶ Dalteparin or Enoxaparin while being investigated
- ▶ If high risk, refer Medics, do not need D-Dimer (or bloods)
- ▶ If confirmed: Warfarin for 6 months if no cause found and 3 months if post operative
- ▶ Recurrent- vena caval umbrella



Pulmonary Embolism

Pulmonary Embolism



Introduction

- ▶ Common and lethal, third commonest cause of death in USA
- ▶ A third of people who survive a PE die from a subsequent embolism
- ▶ Most secondary to DVT, nearly everyone with proximal leg vein DVT will have a PE, less so with calf DVT
- ▶ Diagnosis often missed
- ▶ If very small ?risk of further PE or mortality

Clinical Features

- ▶ None: may have no features if small.
- ▶ May have pleuritic chest pain, SOB, haemoptosis, signs and symptoms of DVT, abdo pain, or syncope.
- ▶ Mild fever, tachycardia, pleural rub
- ▶ Massive: PEA arrest, tachycardia, hypotension and hypoxia with cyanosis. Prominent JVP ('a' waves), pulmonary area murmur

Thromboembolic risk factors



- ▶ IN PATIENTS WHO HAVE FEATURES COMPATIBLE WITH A PE: i.e. a PE is a 'reasonable diagnosis' after careful assessment and after a CXR;
- ▶ PE more likely than alternative = +1
- ▶ Any MAJOR risk factor = +1
- ▶ Probability: 2=high, 1=intermediate, 0=low
- ▶ Do D-dimer to rule out PE only in low/intermediate probability. High: treat and VQ or CTPA via medics

Major risk factors (relative risk 5–20):

- | | |
|---------------------|--|
| Surgery* | <ul style="list-style-type: none">• Major abdominal/pelvic surgery• Hip/knee replacement• Postoperative intensive care |
| Obstetrics | <ul style="list-style-type: none">• Late pregnancy• Caesarian section• Puerperium |
| Lower limb problems | <ul style="list-style-type: none">• Fracture• Varicose veins |
| Malignancy | <ul style="list-style-type: none">• Abdominal/pelvic• Advanced/metastatic |
| Reduced mobility | <ul style="list-style-type: none">• Hospitalisation• Institutional care |
| Miscellaneous | <ul style="list-style-type: none">• Previous proven VTE |

Thus the scoring system and the 'rule out' process only starts AFTER you have already considered that a PE is a REASONABLE diagnosis

Wells Score for PE

- ▶ Clinical Symptoms of DVT =3
- ▶ Malignancy =1
- ▶ Other diagnosis less likely than PE =3
- ▶ Heart Rate greater than 100/min =1.5
- ▶ Immobilisation/Surgery in previous 4 weeks =1.5
- ▶ Previous DVT/PE =1.5
- ▶ Haemoptosis =1

Low risk: <2 (3.4%)

Moderate risk: 2-6 (27%)

High risk: >6 (78.4%)

12-18-02

62 yr
Male
Room:3
Loc:1 Option:0

Vent. rate 85 BPM
PR interval 148 ms
QRS duration 94 ms
QT/QTc 334/397 ms
P-R-T axes 53 124 -46

Normal sinus rhythm
Incomplete right bundle branch block
Cannot rule out inferior infarct, age undetermined
ST & T wave abnormality, consider anterolateral ischemia
Right axis deviation
Abnormal ECG
No previous ECGs available
, consider Right ventricular hypertrophy

Investigations



CXR, ABG's



ECG: sinus tachy, S1T3Q3, RBBB, RAD



ECHO



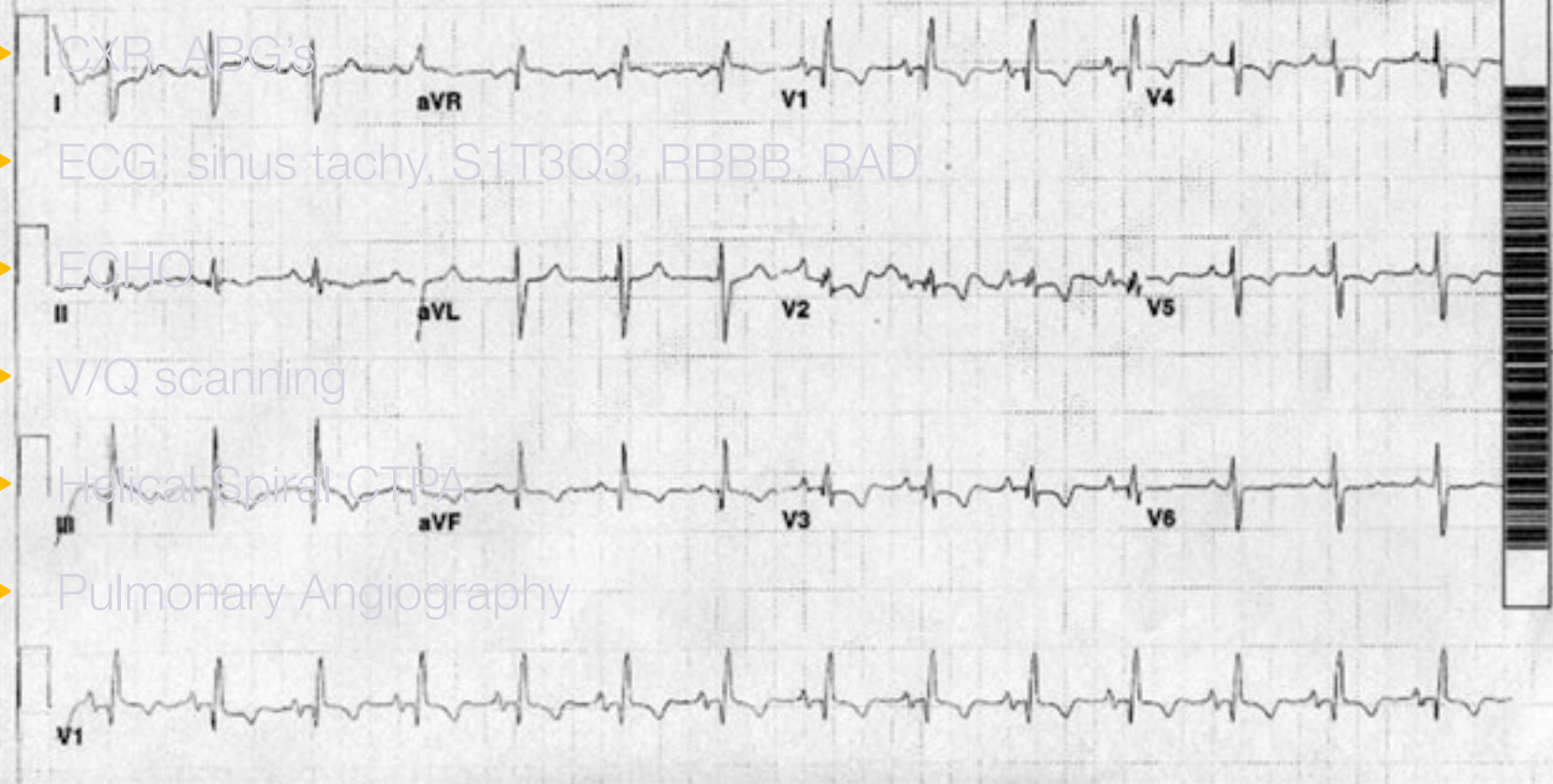
V/Q scanning



Helical Spiral CTPA



Pulmonary Angiography



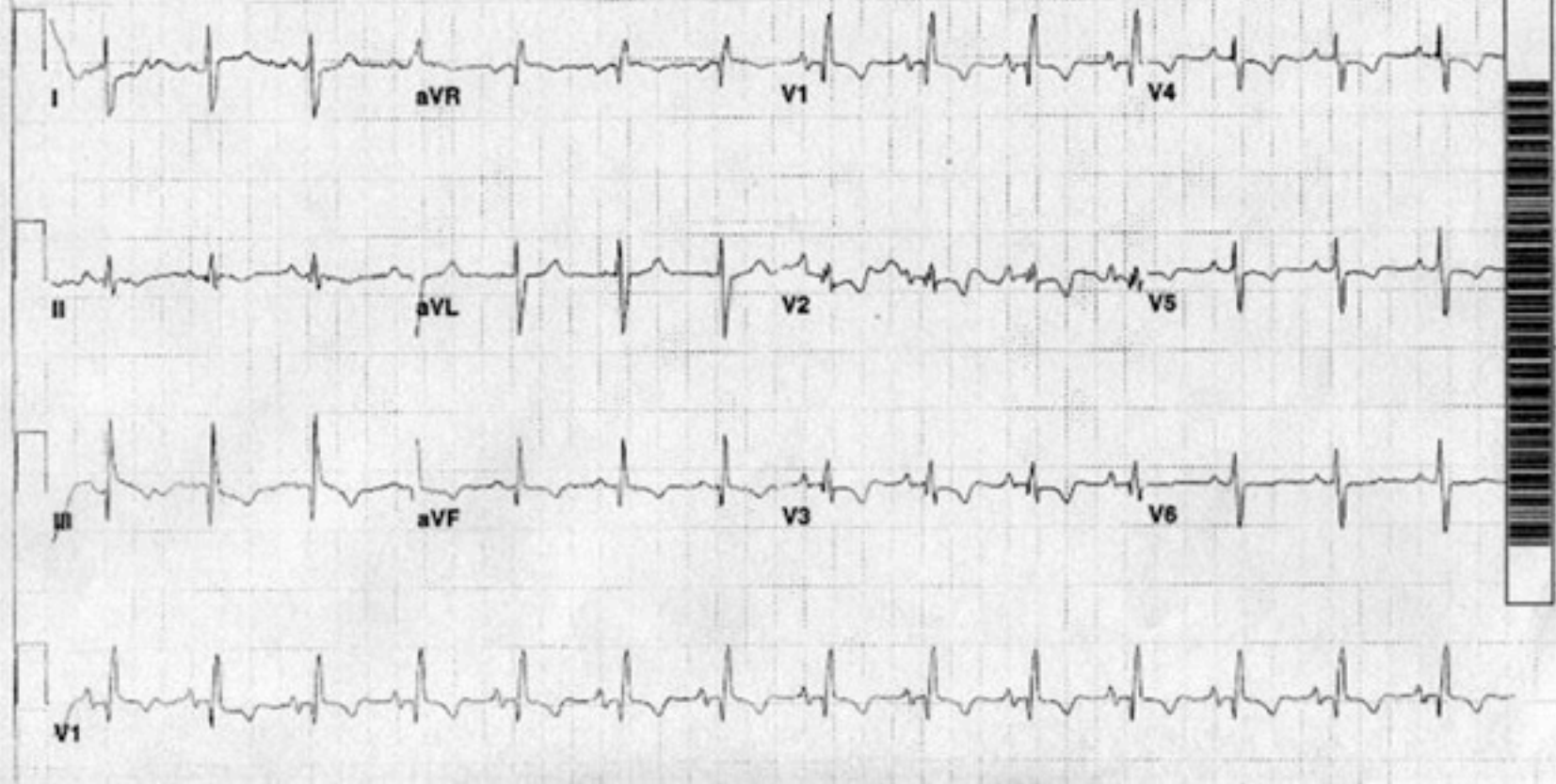
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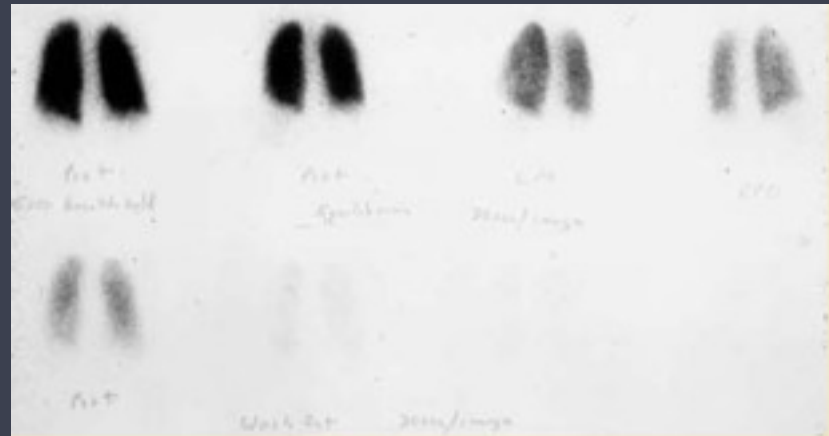
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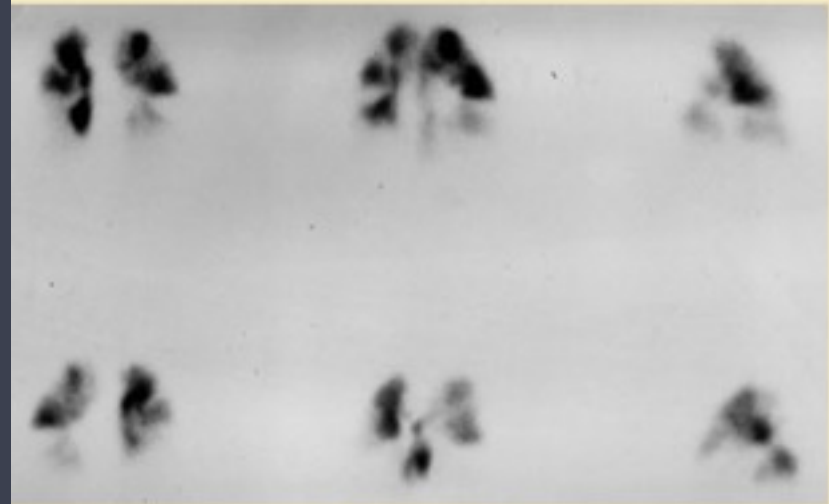




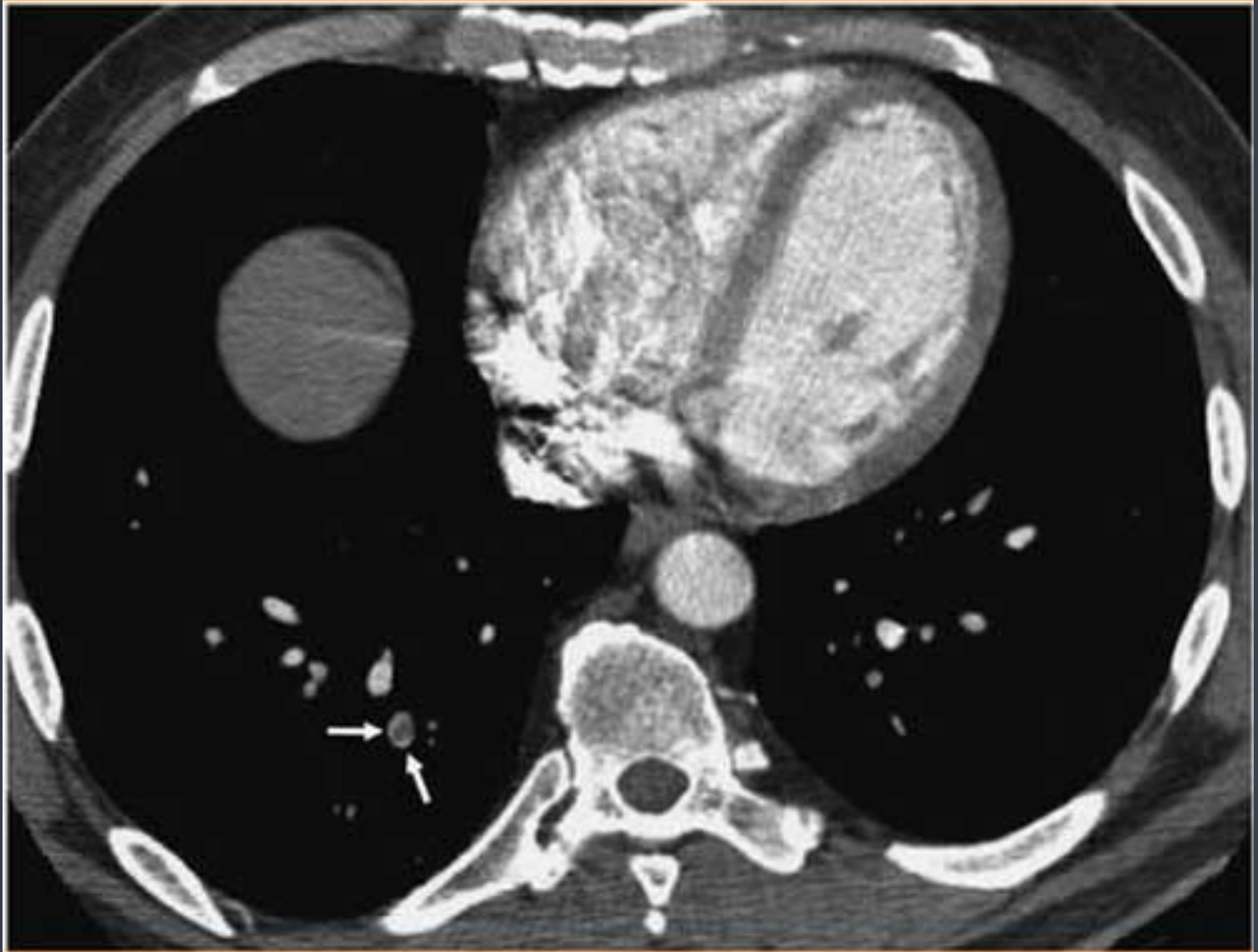




Ventilation

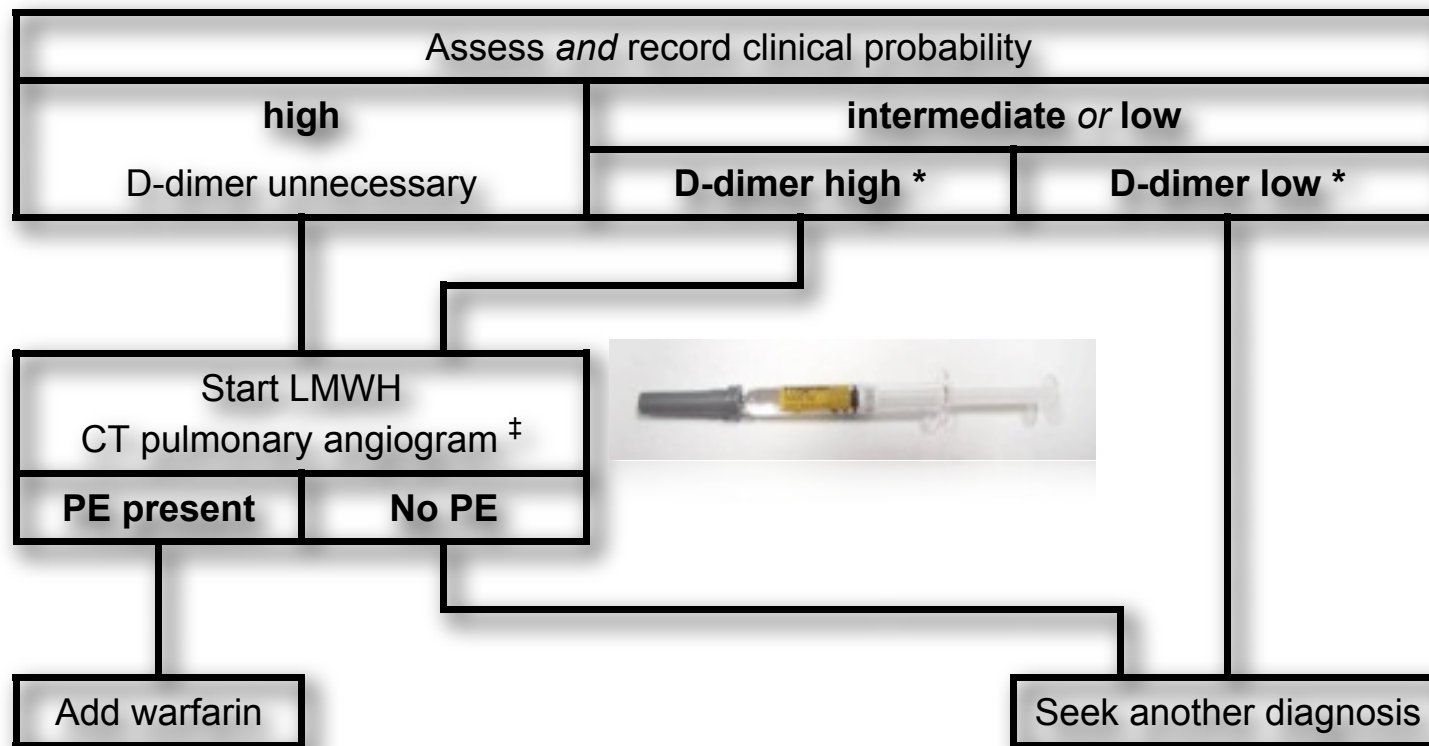


Perfusion



Source: Curr Opin Pul Med © 2003 Lippincott Williams & Wilkins

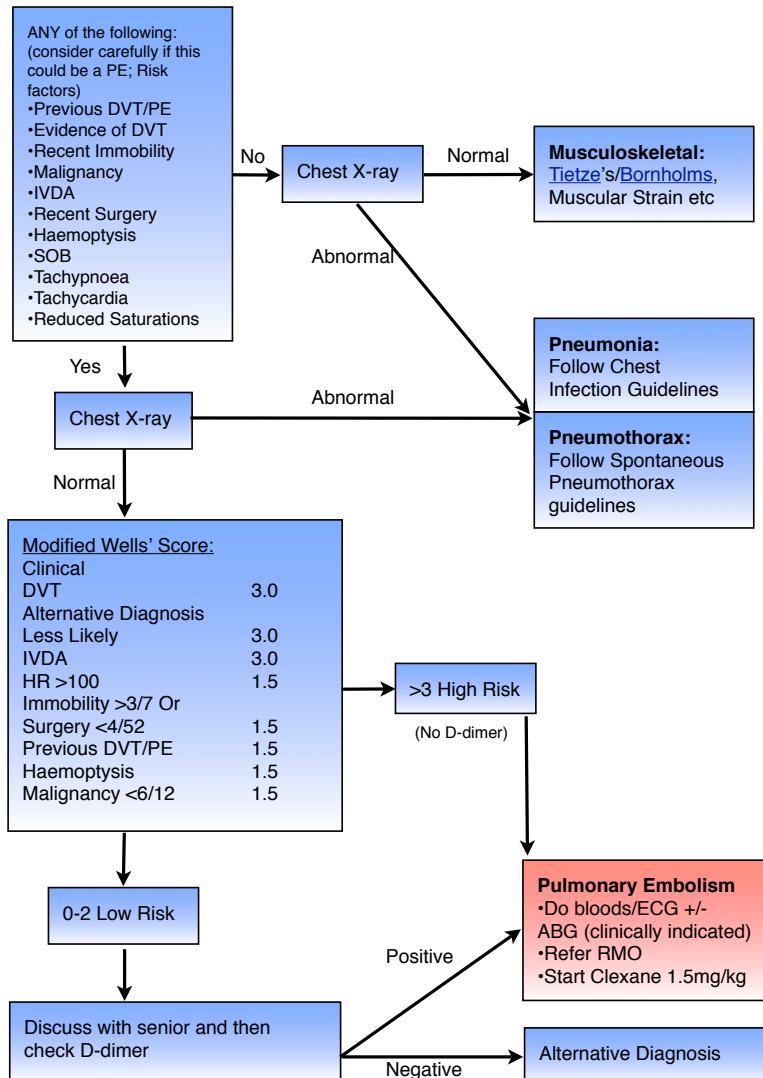
Management-minor PE



Emergency Department Clinical Guidelines

Pleuritic Chest Pain (non-traumatic)

Based on BTS Guidelines for PE & D-dimer statement & K Hogg, D Dawson, and K Mackway-Jones 'Outpatient diagnosis of pulmonary embolism: the MIOPED (Manchester Investigation Of Pulmonary Embolism Diagnosis) study' *Emerg. Med. J.*, Feb 2006; 23: 123 - 127.



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- ▶ If suspect PE and d-dimer positive give LMWH
- ▶ Refer Medics
- ▶ Do ABGs if spO₂ low (<92%), not if normal. Evidence is that ABG are non-contributory to the diagnosis
- ▶ ECG in all, CXR in all, routine bloods
- ▶ If high risk, d-dimer not required, ?need any bloods?

Management-major

- ▶ CPR as per standard ALS guidelines
- ▶ 'Vigorous' cardiac massage
- ▶ Thrombolysis if strongly suspected in arrest/peri-arrest;
 - ▶ Alteplase (tPA) 10mg iv over 1-2 mins the infusion 90mg over 2 hours
 - ▶ Streptokinase 250 000u/30mins then 100 000u/hr 12-72 hours



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