VENOUS THROMBOEMBOLISM

• Common cause of death and disability

• 50% hospital-acquired

• Largely preventable

• Largely treatable, if promptly diagnosed
VENOUS THROMBOEMBOLISM (VTE)

- Deep vein thrombosis (DVT)
- Pulmonary embolism (PE)
- Post-thrombotic leg syndrome
VENOUS THROMBOEMBOLISM

Trauma / surgery / medical illness

↓

Activation of blood clotting

↓

Stasis in leg veins

↓

Calf vein thrombosis
CALF VEIN THROMBOSIS

• Only becomes symptomatic if occludes most of 6 deep calf veins, or main venous trunk (popliteal, femoral or iliac)

• Symptoms / signs due to reduced venous return – pain / tenderness, swelling / oedema, increased skin temperature / distended superficial veins
PULMONARY EMBOLISM

• 50% prevalence at routine lung scanning in patients with symptomatic DVT; often asymptomatic

• Minor PE may present with pleurisy, fever, haemoptysis (infarction)
PULMONARY EMBOLISM

- Major PE may present with dyspnoea, faintness, “ischaemic” chest pain, tachycardia, tachypnoea, bronchospasm

- In 80% of fatal PE, previous DVT / minor PE not clinically recognised
“If I wasn’t at death’s door, I was at least on his patio”.

Paul Merton (Comedian and PE survivor)
Prophylaxis of Venous Thromboembolism

A National Clinical Guideline recommended for use in Scotland by the Scottish Intercollegiate Guidelines Network

Pilot edition September 1995

SIGN
Getting validated guidelines into local practice
SIGN GUIDELINES ON VTE

1995, 2002  Prophylaxis

1999  Antithrombotic therapy

2010  Both updated

10/12/10, www.sign.ac.uk
VTE PROPHYLAXIS IN ACUTE MEDICAL PATIENTS

- Chest infection, heart failure, etc.

- 25% have asymptomatic DVT; reduced to 8% by low-dose heparin (Belch et al, Scott Med J 1980)

- Heparin also reduces symptomatic DVT, PE and fatal PE (Mismetti et al, JTH 2006)

- Only 50% receive in UK and worldwide (ENDORSE, Lancet 2009)

- UK risk assessment tool
VTE PROPHYLAXIS IN ACUTE MEDICAL PATIENTS

• Start on admission!
CLINICAL SCORE FOR DVT

• Cancer 1.0
• Immobility 1.0
• Recent bedrest / surgery 1.0
• Calf tenderness 1.0
• Unilateral oedema 1.0
• Alternative diagnosis - 2.0

(Wells et al, Lancet 1997)
SUSPECTED DVT

- Clinical score
- D-dimer
- If low clinical score and normal D-dimer, can discharge from A and E
- Otherwise, daily S/C low molecular weight heparin until ultrasound to exclude / confirm
DIAGNOSIS OF DVT BY COLOUR DOPPLER ULTRASOUND

Flow around femoral vein thrombus
DIAGNOSIS OF DVT BY COMPRESSION ULTRASONOGRAPHY
15. Diagnosis of deep vein thrombosis (venogram)

Episodes of deep vein thrombosis are often silent and clinical diagnosis is unreliable, therefore a high level of suspicion is necessary. Venography is considered to be the gold standard for diagnosis. However, investigation using a non-invasive ultrasound technique is often regarded as sufficient.
# CLINICAL SCORE FOR PE

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical DVT</td>
<td>3.0</td>
</tr>
<tr>
<td>No alternative Dx</td>
<td>3.0</td>
</tr>
<tr>
<td>Heart rate over 100</td>
<td>1.5</td>
</tr>
<tr>
<td>Immobilisation / surgery</td>
<td>1.5</td>
</tr>
<tr>
<td>Previous DVT/PE</td>
<td>1.5</td>
</tr>
<tr>
<td>Haemoptysis</td>
<td>1.0</td>
</tr>
<tr>
<td>Cancer</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SUSPECTED MINOR PE

• If low clinical score and normal D-dimer, diagnosis excluded
• Otherwise, daily S/C low molecular weight heparin until lung scan or CT pulmonary angiography (CTPA)
11. Diagnosis of pulmonary embolism (perfusion and ventilation scans)

In another patient with pulmonary embolism, a perfusion scan shows that an embolus has stopped the blood flow to part of one lung. The ventilation scan shows that this area is ventilated normally.

DIAGNOSIS OF PE BY VENTILATION / PERFUSION LUNG SCANNING
13. Diagnosis of pulmonary embolism (spiral CT scan)

Spiral CT is one of the more recently introduced methods for the diagnosis of pulmonary embolism. The entire circulation of both lungs can be visualised in less than half a minute. Here, a large embolus can be seen in the major vessels of both the right and the left lung.

DIAGNOSIS OF PE BY CT PULMONARY ANGIOGRAPHY
WARFARIN AND VENOUS THROMBOEMBOLISM

• Start when diagnosis confirmed
• Continue heparin until INR > 2.0 for 2 days
• Target INR 2.0 – 3.0
• Duration 3 - 6 months (longer if PE, idiopathic, continuing risk factors e.g. active cancer, elevated D-dimer at end of course)
D-Dimer titer (ng/ml)

Heparin

Oral anticoagulant therapy

decision-making threshold
CONTINUED S/C HEPARIN INSTEAD OF WARFARIN

- Pregnancy (warfarin crosses placenta and teratogenic)
- Active cancer
OTHER MANAGEMENT

• Massive DVT (venous gangrene)
  • Thrombolysis/PCI?

• Massive PE
  • Resuscitation (O₂, IV fluids, heparin)
  • ECHO (CCU) / CTPA
  • thrombolysis / PCF / embolectomy?
OTHER MANAGEMENT

• IVC filter (anticoagulants contraindicated or failed)

• Compression stockings (symptomatic DVT)
FUTURE MANAGEMENT OF VTE

- New oral anticoagulants
- Direct thrombin inhibitors (e.g. dabigatran)
- Factor Xa inhibitors (e.g. rivaroxaban)
NEW ORAL ANTICOAGULANTS

• Licenced in UK for prophylaxis in major orthopaedic surgery
• Probable licence in 2011-12 for prophylaxis in atrial fibrillation (RE-LY, dabigatran, NEJM 2009)
• Prophylaxis in medical patients
• Treatment of VTE (e.g. EINSTEIN – DVT, rivaroxaban, in preparation)
FUTURE MANAGEMENT OF VTE

- Improved management of warfarin

- Education and follow-up (thrombosis nurses)

FUTURE MANAGEMENT OF VTE

• General practice, after diagnosis

• Patients will still bleed

• Thrombosis service and nurses still needed