Mandatory Training Workbook

VTE

Checklist

- ***Read through this section of the workbook.***
- ***If further information is required please contact the Risk Manager on 1051***

Introduction to Venous Thromboembolism

Rationale for Policy

- Political
- Clinical
- Economic

A Government Issue

Following the publication of the House of Commons Health Select Committee 2005 *Report on the Prevention of Venous Thromboembolism in Hospitalised Patients*, The All-Party Parliamentary Thrombosis Group (APPTG) was formed raise awareness among parliamentarians about risk and management of VTE. The National VTE Prevention Programme was established and the NICE guidelines for surgical patients produced.

Epidemiology

VTE accounts for 25000 deaths in England. This is more than the total number of deaths due to AIDS, breast cancer and RTAs combined, and greater than 25 times the number of deaths due to MRSA.

DVT affects 20% of major surgery patients, including 40% of major orthopaedic surgery patients. 5% of high risk patients have fatal PEs, but less than 1 in 10 fatal PEs is diagnosed before death. The risk of death from hospital-acquired PE is over a thousand-fold greater than the much more publicised air travel. Indeed, VTE accounts for 10% of in-hospital deaths.

The full Impact of post-thrombotic syndrome is still not well known.

Financial burden

The total cost to the NHS for managing Deep Vein Thrombosis is estimated at £640 million. Accordingly, there are hospital reimbursements are driven by Commission for Quality and Innovation (CQUIN) targets:

- VTE risk assessment completed and staff aware of protocol: 90%
- Appropriate prophylaxis prescribed: 90%
- Written/verbal information given to patient: 90%.

PATHOGENESIS

As with the genesis of any intravascular clot, VTE is the product of factors comprising Virchow's triad:

- Hypercoagulability
- Haemodynamic disturbance (stasis, turbulence)
- Endothelial injury.

Patient-related Risk Factors for Thromboembolism

There are numerous risk factors for VTE development, including:

- Age - there is an exponential increase in risk of age which largely reflects greater immobility and coagulation activation.
- Obesity - there is a 3 times increased risk in patients with a body mass index of greater than 30kg/m2.
- Previous VTE - there is an increase recurrence rate of 5% per year.
- Immobility (e.g. paralysis, limb in plaster) - bed rest for longer than 3 days increases the risk by factor of 10.
- Hospitalisation due to acute illness - increases risk by a factor of 10.
- Thrombophilia - such as high coagulation factors, antiphosphid lipid syndrome, high homocystine, low coagulation inhibitors (antithrombic, protein C or S) activated protein C resistance (e.g. factor 5 Leiden).
- Active cancer or cancer treatment – 7 times risk.
- Active cardiac or respiratory failure
- Acute medical illness
- Behcet's disease
- Central venous catheter in situ
- Continuous travel of more than 3 hours approximately 4 weeks before and after surgery
- Irritable bowel disease (e.g. Crohn's disease or ulcerative colitis)
- Myeloproliferative diseases
- Nephrotic syndrome
- Paraproteinaemia
- Paroxysmal nocturnal haemoglobinuria
- Pregnancy or puerperium
- Recent myocardial infarction or stroke
- Severe infection
- Use of oral contraceptives or hormonal replacement therapy
- Varicose veins with accompanied phlebitis

Procedure-related Risk Factors for Venous Thromboembolism

Any major operative procedure poses a risk for developing venous thromboembolism, but in particular:

- Major orthopaedic, especially hip replacement
- Major gynaecological
- Abdominal

The longer the procedure, the greater the risk of developing venous thromboembolism, related mainly to the associated immobilisation, with at-risk durations being greater than 30 minutes.

Regional anaesthesia reduces DVT risk by 38%, PE risk by 43% and proximal DVT risk by 70%, compared with general anaesthesia. Because of the risk of spinal haematoma, the timing of insertion and removal of epidural/spinal catheters in the presence of pharmacological prophylaxis.

DIAGNOSIS OF PRIMARY OUTCOMES

Clinical diagnosis alone is unreliable, and investigative confirmation is required.

DVT

- Radionuclide (125I)fibrinogen uptake
- Venography
- Doppler ultrasound
- Magnetic resonance imaging (MRI)

PE

- Pulmonary angiogram
- Ventilation/Perfusion scan (pulmonary scintigraphy)
- CT pulmonary angiogram (CTPA) – currently the standard investigation
- Autopsy

On electrocardiography, the classical S1 Q3 T3 actually has low sensitivity (20%) and specificity.

Major Bleeding
Results in death
Decrease in haemoglobin by 2 g.dl-1 or more
Transfusion of at least 2 units of blood
Retroperitoneal, intracranial or intraocular
Resulting in a serious or life-threatening clinical event
Requires surgical or medical intervention.

VTE PROPHYLAXIS

Mechanical Prophylaxis

- Graduated compression stockings (GCS)
- Intermittent pneumatic compression (IPC)
- Foot impulse device (FID, foot pump)
- Electrical stimulation

Mechanical methods individually reduce DVT incidence by similar magnitudes (relative risk of DVT 0.49, 95%CI 0.43-0.57). Combining mechanical methods has no significant beneficial effect. However, mechanical methods as an adjuvant to pharmacological prophylaxis reduces the risk of DVT by 50% (RR 0.50, 95% CI 0.35-0.72) and the risk of PE by 60% (RR 0.40, 95% CI 0.25-0.62) but although there is no significant impact on proximal DVT.

Contraindications to GCS include

- Massive leg oedema
- Pulmonary oedema
- Severe peripheral arterial disease
- Severe peripheral neuropathy
- Major leg deformity
- Dermatitis or any other superficial skin condition

Pharmacological Prophylaxis

- Heparins
  - UFH (5000-40000 Da)
  - LWMH (3000 Da)
- Danaparoid
- Warfarin
- Aspirin
- Fondaparinux
- Factor Xa inhibitors

UFH and LMWH reduce risk of DVT and PE but increase risk of major bleeding.
Any heparin is more effective than aspirin or oral anticoagulants in preventing DVT. There is no preferential dose for LMWH and the timing of its commencement relative to operation is inconclusive. While extension of use of LMWH beyond discharge reduces post-discharge DVT, this presents logistical problems.

Aspirin is associated with a 24% reduction of DVT and 39% reduction of proximal DVT, without significant risk of major bleeding. As an adjuvant to heparin there is no significant thromboprophylactic benefit but there is a 47% increased risk of major bleeding. Compared to heparin, it is an inferior DVT prophylactic, and is inferior to mechanical prophylaxis for DVT.

Fondaparinux is a synthetic pentasaccharide, based on antithrombin binding site of heparin, acting as catalyst to antithrombin inhibition of coagulation factor Xa. It is the single most effective thromboprophylactic agent, reducing DVT risk by 48% compared to LMWH. However, because of its significantly greater bleeding risk (RR 1.49, 95% CI 1.16-1.92 compared with LMWH), it is *not licensed for use in cardiac or thoracic surgical patients.* Post-discharge use reduces risk of DVT by 96% and of PE by 89%.

Vena caval filters

Vena caval filters are recommended for patients with recent (<1 month) or current DVT in whom anticoagulation is contraindicated. In a randomised controlled clinical trial of 400 at-risk hospitalised patients, there were more PEs in the no-filter group and more symptomatic PEs in no-filter group at 2 years, with the difference remaining statistically significant at 8 years. There

were significantly more recurrent DVTs in filter group. There was no difference in major bleeding.

Patients' perspective
4% of LMWH patients complained of side effects compared with 26% of patients with external mechanical compression complaining of discomfort, inconvenience, problems and/or side effects (most commonly perspiration).

General Measures
- Early mobilisation / leg exercises
- Leg elevation.
- Continuous passive movement.
- Oral hydration.
- Patient information.

NATIONAL STANDARDS
National standards have been set to produce a quality benchmark for health institutions.

NICE Quality Standards
1. All patients, on admission, receive an assessment of VTE and bleeding risk.
2. Patients are re-assessed within 24 hours of admission for risk of VTE and bleeding.
3. Patients assessed to be at risk of VTE are offered VTE prophylaxis in accordance with NICE guidance.
4. Patients/carers are offered verbal and written information on VTE prevention at the time of admission.
5. Patients/carers are offered verbal and written information on VTE prevention as part of the discharge process.
6. Patients provided with anti-embolic stockings have them fitted and monitored in accordance with NICE guidance.
7. Patients receive extended postoperative VTE prophylaxis in accordance with NICE guidance.

NHSLA Standards
1. Process/risk assessment for identifying patients at risk of a venous thromboembolism
2. Prophylactic treatment regime for high risk patients
3. Procedure to be followed if venous thromboembolism is suspected
4. Management of the patient once a positive diagnosis has been made
5. Organisations expectations in relation to staff training

To help achieve and maintain these continuous medical education, including being versed with the Liverpool Heart and Chest Hospital VTE Policy, is key.

LHCH VENOUS THROMBOEMBOLISM RISK ASSESSMENT AND PROPHYLAXIS ALGORITHM