

Prevention of Venous Thromboembolism in Medical and Surgical Patients.

The House of Commons Health Committee 2004-05 - 'The prevention of venous thromboembolism in hospitalised patients' opens with the statistic that each year 25,000 people in England die from venous thromboembolism.

The particular tragedy for these patients is that many have gone into hospital for a planned operation such as joint replacement, gynaecological surgery or gall bladder removal to improve their quality of life, or a cancer operation with the hope of cure or palliation. Most commonly, postoperative PEs occur a few days to a week or two after operation, when recovery is well underway.

DVT occurs in more than 20% of patients having major surgery and more than 40% of patients having major orthopaedic surgery. It is commonly asymptomatic. However, the condition can lead to sudden death due to PE, or cause long-term morbidity due to chronic venous insufficiency, potentially leading to venous ulceration and development of post-thrombotic syndrome (PTS). The estimated risk of fatal pulmonary embolism following high-risk surgery is said to be between 1 and 5% .

EVERY hospitalised patient should have a documented, mandatory, VTE risk assessment on admission to identify any individual risk factors (in addition to any proposed surgery) that are known to increase the risk of developing venous thromboembolism.

Patient related risk factors for venous thromboembolism

- Personal or family history of venous thromboembolism
- Acquired or inherited thrombophilias
- Chemotherapy agents
- Combined oral contraceptives (consideration should be given to stopping oral contraceptives 4 weeks before elective surgery)
- Hormone replacement therapy
- Pregnancy and puerperium (seek obstetrician advice)
- Varicose veins in association with phlebitis or a history of venous thromboembolism
- Obesity (body mass index ≥ 30 kg/m²)
- Immobility (e.g. bed rest >4 days, or limb in plaster)
- Prolonged travel before or after surgery (continuous travel of more than 3 hours approximately 4 weeks before or after surgery may increase the risk of VTE)
- Age over 60
- Central venous catheter in situ

Disease states that increase the risk of VTE

- IBD
- Nephrotic syndrome
- Cancer
- Myeloproliferative diseases
- Heart or respiratory failure
- Recent MI
- Trauma / surgery
- Paralysis of lower limbs (eg. Hemiplegic stroke, paraplegia)
- Severe infection
- Polycythaemia
- Paraproteinaemia
- Paroxysmal Nocturnal Haemoglobinuria
- Antiphospholipid syndrome
- Behcet's disease

Salzman and Hirsh Classification of risk of VTE

Low Risk	Minor surgery (<30mins) and no risk factors other than age Major surgery (>30mins) and age <40, no other risk factors Minor trauma or medical illness Where expected immobility is greater than 4 days treat as moderate risk.
Moderate Risk	Major surgery (>30mins), age >40 or other risk factors Minor surgery (<30mins) with risk factors other than age Major medical illness, cancer, IBD Major trauma or burns Minor surgery trauma or illness in patients with a history of VTE or thrombophilia
High Risk	Fracture or major orthopaedic surgery (e.g. pelvis, hip or lower limb) Major pelvic/abdominal surgery for cancer Major surgery, trauma or illness in patients with history of VTE or thrombophilia Major lower limb amputation Lower limb paralysis (eg hemiplegic stroke, paraplegia)

**Low risk patients should be encouraged to mobilise early.
Moderate and High risk patients should receive LMWH prophylaxis in addition to early mobilisation.**

In patients undergoing hip fracture surgery or elective hip surgery LMWH prophylaxis should be continued for 4 weeks after surgery. The total amount of prophylaxis required should be supplied by the hospital on discharge to complete the course. The GP should NOT be asked to prescribe prophylactic LMWH.

Inpatients having surgery should be offered thigh-length graduated compression/anti-embolism stockings from the time of admission to hospital unless contraindicated (for example, in patients with established peripheral arterial disease or diabetic neuropathy). If thigh-length stockings are inappropriate for a particular patient for reasons of compliance or fit, knee-length stockings may be used as a suitable alternative. The stocking compression profile should be equivalent to the Sigel profile, and approximately 18 mmHg at the ankle, 14 mmHg at the mid-calf and 8 mmHg at the upper thigh. Healthcare professionals should encourage patients to wear their graduated compression/anti-embolism stockings until they return to their usual level of mobility. Patients should be informed that this will reduce their risk of developing VTE.

Patients using graduated compression/anti-embolism stockings should be shown how to wear them correctly by healthcare professionals trained in the use of that product. Stocking use should be monitored and assistance provided if they are not being worn correctly. Intermittent pneumatic compression or foot impulse devices may be used as alternatives or in addition to graduated compression/antiembolism stockings while surgical patients are in hospital. Mechanical methods of prophylaxis have not to date been appropriately evaluated in acutely ill medical patients, and thus are not recommended at present

Aspirin should not be considered as an effective preventive treatment after surgery.

Healthcare professionals should not allow patients having surgery to become dehydrated during their stay in hospital. Healthcare professionals should encourage patients to mobilise as soon as possible after surgery. Healthcare professionals should arrange for immobilised patients to have leg exercises.

Low Molecular Weight Heparin Prophylaxis of Venous Thromboembolism in Non- Pregnant Patients

The low molecular weight heparin (LMWH) for prophylaxis of venous thromboembolism used in East Lancashire hospitals for surgical and medical patients is tinzaparin.

Tinzaparin is also the LMWH of choice for treatment of pulmonary embolism and venous thrombosis. Prophylaxis and treatment regimes use different doses of the drug and selection of the dose for the appropriate indication is critical.

Prescriptions **must** include the indication when written on the inpatient prescription chart, i.e. Tinzaparin **prophylaxis** or Tinzaparin **treatment**.

Prophylactic dose: Tinzaparin dose is adjusted according to patients weight and is banded as follows:

Weight	Tinzaparin dose
< 50kg	2,500 units in 0.25ml
50 to 70kg	3,500 units in 0.35ml
> 70kg	4,500 units in 0.45ml

Route: Subcutaneous injection
Frequency: Once Daily, usually 6pm

Preparation: Tinzaparin 10,000 units /ml in prefilled syringes

Contraindications to use:

- Active bleeding
- INR > 1.5
- Patients who are receiving therapeutic anticoagulation e.g. warfarin
- Thrombocytopenia (platelets < 80 x 10⁹/L)
- History of heparin induced thrombocytopenia
- Renal failure (creatinine clearance <20mls/min) – seek advice
- Recent cerebral haemorrhage or acute cerebral infarct
- Oesophageal varices
- Active peptic ulcer disease
- Severe liver disease
- Recent neurosurgery/eye surgery
- Severe hypertension (BP >210/120)
- Endocarditis

Patients with ruptured cranial or spinal vascular malformations (for example, brain aneurysms) should not be offered pharmacological prophylaxis until the lesion has been secured.

Monitoring Requirements

- All patients who are to receive heparin of any sort should have a platelet count checked on the day of starting treatment.
- Patients exposed to heparin in the last 100 days should have a baseline platelet count and another check 24 hours after starting heparin.
- Platelet counts should be performed every 2-4 days from day 4 to day 14
- No monitoring is required after 14 days even if the treatment course is longer
- If the platelet count falls by 50% or more and the patient develops new thrombosis or skin allergy at injection sites between Day 4 and 14 consider a diagnosis of Heparin induced thrombocytopenia and discuss with a haematologist.

Precautions with Epidural Catheters, Spinal Anaesthesia and Lumbar Puncture

Epidural haematomas can develop when a patient undergoes an epidural, spinal anaesthesia or lumbar puncture whilst receiving LMWHs.

For patients receiving **prophylactic dose** LMWH :-

- delay the procedure for at least 12 hours after a prophylactic dose of LMWH has been given
- the next dose of LMWH should be given no earlier than 4 hours after the procedure

References:

- Guidelines on the use and monitoring of heparin. *British Journal of Haematol.* 2006; 133, 19-34
- Venous thromboembolism :NICE Clinical Guideline (April 2007)
- Risk of and prophylaxis for venous thromboembolism in hospital patients. Thromboembolic Risk Factors (THRIFT) Consensus Group
- BMJ 1992 ;305:567-74

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