Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital

NICE guideline
Draft for consultation, March 2009

If you wish to comment on this version of the guideline, please be aware that all the supporting information and evidence is contained in the full version.
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Introduction

Venous thromboembolism (VTE) is the formation of a blood clot in a vein (venous thrombosis), which may dislodge from its site of origin. Most thrombi (clots) occur in the deep veins of the legs; this is called deep vein thrombosis. A dislodged thrombus that travels to the lungs is known as a pulmonary embolism.

VTE ranges from asymptomatic calf vein thrombosis to symptomatic deep vein thrombosis that can lead to a potentially fatal pulmonary embolism. When symptomatic VTE occurs in hospital patients it brings a considerable burden of morbidity, including long-term morbidity. Non-fatal VTE can lead to chronic venous insufficiency. This in turn can cause venous ulceration and development of a post-thrombotic limb (characterised by chronic pain, swelling and skin changes).

VTE is an important cause of death in hospital patients, and treatment of non-fatal symptomatic VTE and related long-term morbidities is associated with considerable cost to the health service.

The risk of developing VTE depends on the condition and/or procedure for which the patient is admitted and on any predisposing risk factors (such as age, obesity and concomitant conditions).

This guideline makes recommendations on assessing and reducing the risk of VTE in patients in hospital. It offers guidance on the most clinically and cost effective measures for VTE prophylaxis in these patients. The recommendations take into account the potential risks of the various options for prophylaxis and patient preferences.
DRAFT FOR CONSULTATION

This guideline incorporates and updates the published NICE guideline ‘Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in inpatients undergoing surgery’ (NICE clinical guideline 46).

The guideline will assume that prescribers will use a drug’s summary of product characteristics to inform their decisions for individual patients.
Patient-centred care

This guideline offers best practice advice on reducing the risk of VTE in patients admitted to hospital.

Treatment and care should take into account patients’ needs and preferences. People admitted to hospital should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If patients do not have the capacity to make decisions, healthcare professionals should follow the Department of Health guidelines – ‘Reference guide to consent for examination or treatment’ (2001) (available from www.dh.gov.uk). Healthcare professionals should also follow the code of practice that accompanies the Mental Capacity Act (summary available from www.publicguardian.gov.uk).

Good communication between healthcare professionals and patients is essential. It should be supported by evidence-based written information tailored to the patient’s needs. Treatment and care, and the information patients are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

If the patient agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

Families and carers should also be given the information and support they need.
Key priorities for implementation

Assessing the risks of VTE and bleeding

- Assess all patients on admission to identify those who are at increased risk of venous thromboembolism. Risk factors to take into account are shown in box 1 for medical patients and box 2 for surgical patients. [1.1.1]

- Assess all patients for risk of bleeding before offering pharmacological VTE prophylaxis. Do not offer pharmacological VTE prophylaxis to patients with any of the risk factors for bleeding shown in box 3, unless the risk of VTE outweighs the risk of bleeding. [1.1.2]

- Reassess patients’ risk of bleeding and VTE within 24 hours of admission, regularly thereafter and whenever the clinical situation changes, to:
  - ensure that appropriate methods of VTE prophylaxis are used
  - ensure that VTE prophylaxis is being used correctly
  - identify adverse events resulting from VTE prophylaxis. [1.1.3]

Reducing the risk of VTE

- Encourage patients to mobilise as soon as possible. [1.2.2]

- Offer VTE prophylaxis to medical patients assessed to be at increased risk of VTE (see box 1) until they are no longer significantly immobile or are discharged from hospital. Use one of:
  - fondaparinux sodium
  - low molecular weight heparin (LMWH)
  - unfractionated heparin (UFH). [1.3.1]

- Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having surgery who are assessed to be at increased risk of VTE (see box 2). [1.4.14]
For patients with major trauma, offer VTE prophylaxis only when the benefits of reducing the risk of VTE outweigh the risks of bleeding (see box 3). Regularly reassess the patient’s risks of VTE and bleeding. [1.5.1]

Offer combined VTE prophylaxis with mechanical and pharmacological methods to patients with major trauma, based on clinical judgement.

- Start mechanical VTE prophylaxis at admission or as early as clinically possible and continue until the patient is no longer significantly immobile. Use one of:
  ◊ anti-embolism stockings (see 1.7.2–1.7.11)
  ◊ foot impulse devices
  ◊ intermittent pneumatic compression devices.

- When the patient’s risk of bleeding (see box 3) has been established as low, add pharmacological VTE prophylaxis and continue until the patient is no longer significantly immobile. Use one of:
  ◊ fondaparinux sodium
  ◊ LMWH
  ◊ UFH. [1.5.2]

Recommendations on the use of VTE prophylaxis

- Offer patients who are assessed to be at risk of VTE and for whom pharmacological VTE prophylaxis is contraindicated one of the following:
  - thigh-length anti-embolism stockings (see 1.7.2–1.7.11). Knee-length stockings may be substituted if thigh-length stockings are unsuitable for reasons of fit, adherence or surgical site
  - foot impulse devices
  - intermittent pneumatic compression devices. [1.7.1]

Patient information and support

- Before starting VTE prophylaxis, offer patients verbal and written information on:
  - the risks and possible consequences of VTE
the importance of VTE prophylaxis and its possible side effects
the correct use of VTE prophylaxis (for example, anti-embolism
stockings, intermittent pneumatic compression devices or foot impulse
deVICES). [1.8.2]

− As part of the discharge plan, offer patients verbal and written information on:
  − the signs and symptoms of deep vein thrombosis and pulmonary embolism
  − the correct use of VTE prophylaxis at home (if discharged with prophylaxis)
  − the implications of not using VTE prophylaxis correctly (if discharged with prophylaxis)
  − the signs and symptoms of adverse events related to VTE prophylaxis (if discharged with prophylaxis)
  − the importance of seeking medical help if deep vein thrombosis, pulmonary embolism or other adverse events are suspected. [1.8.3]
1 Guidance

The following guidance is based on the best available evidence. The full guideline (www.nice.org.uk/CGXX) gives details of the methods and the evidence used to develop the guidance.

1.1 Assessing the risks of VTE and bleeding

1.1.1 Assess all patients on admission to identify those who are at increased risk of venous thromboembolism (VTE). Risk factors to take into account are shown in box 1 for medical patients and box 2 for surgical patients.

Box 1. VTE risk assessment – medical patients

Regard medical patients as being at increased risk of VTE if they:

- are expected to be immobile for 3 days or more
  
or

- are expected to have ongoing reduced mobility relative to their normal state and have one or more of the following risk factors:
  
  - active cancer or cancer treatment
  
  - age > 60 years
  
  - critical care admission
  
  - dehydration
  
  - known thrombophilias
  
  - obesity (BMI > 30 kg/m²)
  
  - one or more significant medical comorbidities (such as heart disease, metabolic, endocrine or respiratory pathologies, or inflammatory joint diseases)
  
  - personal or family history of VTE
  
  - pregnancy or ≤ 6 weeks post partum
  
  - use of hormone replacement therapy
  
  - use of oestrogen-containing contraceptive therapy
  
  - varicose veins with phlebitis.
### Box 2. VTE risk assessment – surgical patients

Regard surgical patients as being at increased risk of VTE if they have one or more of the following risk factors:

- active cancer or cancer treatment
- acute admission for a surgical condition
- age > 60 years
- dehydration
- expected significant reduction in mobility
- known thrombophilia
- obesity (BMI > 30 kg/m²)
- one or more significant medical comorbidities (such as heart disease, metabolic, endocrine or respiratory pathologies, or inflammatory joint diseases)
- personal or family history of VTE
- pregnancy or ≤ 6 weeks post partum
- surgical procedure with a total anaesthetic and surgical time of more than 90 minutes, or 60 minutes if the surgery involves the lower limb
- use of hormone replacement therapy.
- use of oestrogen-containing contraceptive therapy
- varicose veins with phlebitis.

[This recommendation is adapted from ‘Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in inpatients undergoing surgery’ (NICE clinical guideline 46).]
1.1.2 Assess all patients for risk of bleeding before offering pharmacological VTE prophylaxis. Do not offer pharmacological VTE prophylaxis to patients with any of the risk factors for bleeding shown in box 3, unless the risk of VTE outweighs the risk of bleeding.

Box 3. Risk assessment – bleeding

Regard patients as being at risk of bleeding if they have any of the following risk factors:

- active bleeding or a risk of bleeding (for example, stroke)
- surgery expected within the next 12–24 hours (depending on the half-life of the anticoagulant used)
- surgery within the past 48 hours and/or a risk of clinically important bleeding
- concurrent use of anticoagulants known to increase the risk of bleeding
- already having therapeutic anticoagulation
- any spinal intervention (contraindicated for 12–24 hours before or after procedures such as epidural catheter insertion or lumbar puncture, depending on the half-life of the anticoagulant used)
- uncontrolled systolic hypertension (≥ 180 mmHg)
- new-onset stroke in line with ‘Stroke: diagnosis and management of acute stroke and transient attack (TIA)’ (NICE clinical guideline 68).

1.1.3 Reassess patients’ risk of bleeding and VTE within 24 hours of admission, regularly thereafter and whenever the clinical situation changes, to:

- ensure that appropriate methods of VTE prophylaxis are used
- ensure that VTE prophylaxis is being used correctly
- identify adverse events resulting from VTE prophylaxis.
1.2 Reducing the risk of VTE – general recommendations

1.2.1 Do not allow patients to become dehydrated unless clinically indicated.

1.2.2 Encourage patients to mobilise as soon as possible.

1.2.3 Consider offering temporary inferior vena caval filters to patients who are at increased risk of VTE and for whom mechanical VTE prophylaxis (such as anti-embolism stockings, intermittent pneumatic compression devices and foot impulse devices) and pharmacological VTE prophylaxis are contraindicated.

1.3 Reducing the risk of VTE in medical patients

1.3.1 Offer VTE prophylaxis to medical patients assessed to be at increased risk of VTE (see box 1) until they are no longer significantly immobile or are discharged from hospital. Use one of:

- fondaparinux sodium
- LMWH
- UFH.

Patients with stroke

1.3.2 For patients diagnosed with stroke offer mechanical VTE prophylaxis (thigh-length anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) from admission until the patient’s mobility is no longer increasing or until discharge.
1.3.3 Offer prophylactic-dose LMWH to patients in whom a diagnosis of haemorrhagic stroke has been excluded, the risk of bleeding (haemorrhagic transformation of stroke or bleeding into another site) is assessed to be low, and who have:

- major restriction of mobility
- previous history of VTE
- dehydration or comorbidities (such as malignant disease).

Continue LMWH until the patient’s mobility is no longer increasing.

Patients with cancer

1.3.4 For patients with cancer admitted to hospital who are assessed to be at increased risk of VTE (see box 1), offer pharmacological VTE prophylaxis with:

- fondaparinux sodium
- LMWH
- UFH.

Continue pharmacological VTE prophylaxis until the patient is no longer significantly immobile or is discharged.
1.3.5 Do not routinely offer VTE prophylaxis to patients with cancer having oncological treatment who are ambulant.

1.3.6 For patients with cancer having oncological treatment who are expected to be immobile for more than 3 days, consider offering VTE prophylaxis with fondaparinux sodium, LMWH or UFH.

Patients with central venous catheters

1.3.7 Do not routinely offer VTE prophylaxis to patients with central venous catheters who are ambulant.

1.3.8 Consider offering VTE prophylaxis with LMWH to patients with central venous catheters who are expected to be immobile for more than 3 days.

Patients in palliative care

1.3.9 Consider offering VTE prophylaxis with fondaparinux sodium, LMWH or UFH to patients in palliative care who have potentially reversible pathology. Take into account potential risks and benefits and the patient’s preferences.

1.3.10 Do not routinely offer VTE prophylaxis to patients admitted for terminal care or those commenced on an end-of-life care pathway (such as the Liverpool care pathway).

1.3.11 Regularly review decisions about VTE prophylaxis for patients in palliative care, taking into account the views of the patient and the multidisciplinary team.

1.4 Reducing the risk of VTE in surgical patients

Cardiac surgery

1.4.1 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having cardiac surgery who are not having other

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1 www.mcpcil.org.uk/liverpool_care_pathway

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anticoagulation therapy and are assessed to be at increased risk of VTE (see box 2).

**Gastrointestinal, gynaecological, thoracic and urological surgery**

1.4.2 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and one of fondaparinux sodium, LMWH or UFH to patients having gastrointestinal surgery who are assessed to be at increased risk of VTE (see box 2).

1.4.3 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having gynaecological surgery who are assessed to be at increased risk of VTE (see box 2).

1.4.4 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having thoracic surgery who are assessed to be at increased risk of VTE (see box 2).

1.4.5 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having urological surgery who are assessed to be at increased risk of VTE (see box 2).

**Neurosurgery**

1.4.6 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having neurosurgery who are assessed to be at increased risk of VTE (see box 2).
1.4.7 Do not offer pharmacological VTE prophylaxis to patients with ruptured cranial or spinal vascular malformations (for example, brain aneurysms) or acute traumatic haemorrhage until the lesion has been secured or the condition is stable.

Orthopaedic surgery
1.4.8 For patients having elective hip replacement surgery offer combined VTE prophylaxis with mechanical and pharmacological methods:

- Start mechanical VTE prophylaxis at admission and continue until discharge or until the patient is no longer significantly immobile. Use one of:
  - anti-embolism stockings (see 1.7.2–1.7.11)
  - foot impulse devices
  - intermittent pneumatic compression devices.

- Provided there are no contraindications, start pharmacological VTE prophylaxis\(^2\) after surgery and continue for 28–35 days. Use one of:
  - dabigatran etexilate in line with ‘Dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults’ (NICE technology appraisal guidance 157)
  - fondaparinux sodium (starting 6–12 hours after surgery)
  - LMWH (starting 6–12 hours after surgery)
  - UFH (starting 6–12 hours after surgery).

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\(^2\) NICE is developing the technology appraisal guidance ‘Rivaroxaban for the prevention of venous thromboembolism after elective orthopaedic surgery of the lower limbs’. Publication is expected in April 2009.
1.4.9 For patients having knee replacement surgery offer combined VTE prophylaxis with mechanical and pharmacological methods.

- Start mechanical VTE prophylaxis at admission and continue until discharge or until the patient is no longer significantly immobile. Use one of:
  - anti-embolism stockings (see 1.7.2–1.7.11)
  - foot impulse devices
  - intermittent pneumatic compression devices.

- Provided there are no contraindications, start pharmacological VTE prophylaxis after surgery and continue for 10–14 days. Use one of:
  - dabigatran etexilate in line with ‘Dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults’ (NICE technology appraisal guidance 157)
  - LMWH (starting 6–12 hours after surgery).

1.4.10 For patients having surgery for fracture of the proximal femur offer combined VTE prophylaxis with mechanical and pharmacological methods.

- Start mechanical VTE prophylaxis at admission and continue until discharge or until the patient is no longer significantly immobile. Use one of:
  - anti-embolism stockings (see 1.7.2–1.7.11)
  - foot impulse devices
  - intermittent pneumatic compression devices.

- Provided there are no contraindications, provide pharmacological VTE prophylaxis for 28–35 days. Use one of:

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3 NICE is developing the technology appraisal guidance ‘Rivaroxaban for the prevention of venous thromboembolism after elective orthopaedic surgery of the lower limbs’. Publication is expected in April 2009.
fondaparinux sodium, provided there is no increased risk of bleeding (see box 3), starting 6–12 hours after surgery (see 1.4.11)

- LMWH or UFH, starting at admission, stopping 12 hours before surgery and restarting 6–12 hours after surgery.

1.4.11 Fondaparinux sodium is not recommended for use preoperatively for patients having surgery for fracture of the proximal femur. If it has been used preoperatively it should be stopped 24 hours before surgery and restarted 6–12 hours postoperatively, provided there is no increased risk of bleeding (see box 3).

1.4.12 For patients having orthopaedic surgery (other than hip replacement, knee replacement and surgery for fracture of the proximal femur) who are assessed to be at increased risk of VTE (see box 2) offer combined VTE prophylaxis with mechanical and pharmacological methods.

- Start mechanical VTE prophylaxis at admission and continue until discharge, plaster cast removal (if applicable) or until the patient is no longer significantly immobile. Use one of:
  - anti-embolism stockings (see 1.7.2–1.7.11)
  - foot impulse devices
  - intermittent pneumatic compression devices.

- Start pharmacological VTE prophylaxis 6–12 hours after surgery and continue until discharge, plaster cast removal (if applicable) or the patient is no longer significantly immobile. Use either fondaparinux sodium or LMWH.

Vascular surgery

1.4.13 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having vascular surgery who are not having other
anticoagulation therapy and who are assessed to be at increased risk of VTE (see box 2).

Other surgery
1.4.14 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having surgery who are assessed to be at increased risk of VTE (see box 2).

1.4.15 Offer combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and either LMWH or UFH to patients having day-case surgery who are assessed to be at increased risk of VTE (see box 2).

General recommendations for all surgical patients
1.4.16 Advise patients to consider stopping oestrogen-containing oral contraceptives or hormone replacement therapy before elective surgery. [This recommendation is adapted from ‘Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in inpatients undergoing surgery’ (NICE clinical guideline 46)].

1.4.17 Assess the risks and benefits of stopping pre-existing established anticoagulation or antiplatelet therapy before surgery.

1.4.18 Consider regional anaesthesia for individual patients, in addition to other methods of VTE prophylaxis, as it carries a lower risk of VTE than general anaesthesia. Take into account the patient’s preferences, their suitability for regional anaesthesia and any other planned method of VTE prophylaxis.

1.4.19 If regional anaesthesia is used, plan the timing of pharmacological prophylaxis to minimise the risk of epidural haematoma.
1.5 Reducing the risk of VTE in patients with trauma

1.5.1 For patients with major trauma, offer VTE prophylaxis only when the benefits of reducing the risk of VTE outweigh the risks of bleeding (see box 3). Regularly reassess the patient's risks of VTE and bleeding.

1.5.2 Offer combined VTE prophylaxis with mechanical and pharmacological methods to patients with major trauma, based on clinical judgement.

- Start mechanical VTE prophylaxis at admission or as early as clinically possible and continue until the patient is no longer significantly immobile. Use one of:
  - anti-embolism stockings (see 1.7.2–1.7.11)
  - foot impulse devices
  - intermittent pneumatic compression devices.

- When the patient's risk of bleeding (see box 3) has been established as low, add pharmacological VTE prophylaxis and continue until the patient is no longer significantly immobile. Use one of:
  - fondaparinux sodium
  - LMWH
  - UFH.

1.5.3 For patients with a spinal cord injury, offer VTE prophylaxis only when the benefits of reducing the risk of VTE outweigh the risks of bleeding (see box 3). Regularly reassess the patient's risks of VTE and bleeding.
1.5.4 Offer combined prophylaxis with mechanical and pharmacological methods to patients with a spinal cord injury, based on clinical judgement.

- Start mechanical VTE prophylaxis at admission or as early as clinically possible and continue until the patient has achieved maximal mobility given their clinical condition. Use one of:
  - anti-embolism stockings (see 1.7.2–1.7.11)
  - foot impulse devices
  - intermittent pneumatic compression devices.

- When the patient's risk of bleeding (see box 3) has been established as low, add pharmacological VTE prophylaxis and continue until the patient has achieved maximal mobility given their clinical condition. Use one of:
  - fondaparinux sodium
  - LMWH
  - UFH.

1.5.5 Consider VTE prophylaxis for patients with lower limb plaster casts who are assessed to be at increased risk of VTE (see box 2) after carefully evaluating the risks and benefits. Offer either fondaparinux sodium or LMWH until plaster cast removal, based on clinical judgement.

1.6 Reducing the risk of VTE in other populations

Pregnancy and up to 6 weeks post partum

1.6.1 Consider offering VTE prophylaxis with LMWH to women who are pregnant or ≤ 6 weeks post partum who are admitted to hospital for reasons other than surgery and assessed to be at increased risk of VTE (see box 1).

1.6.2 Consider offering combined VTE prophylaxis with mechanical methods (such as anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices) and LMWH to
women who are pregnant or ≤ 6 weeks post partum who are having surgery, including caesarean section.

1.6.3 Offer VTE prophylaxis to women who are pregnant or ≤ 6 weeks post partum only after carefully assessing the risks and benefits and discussing these with the patient and with healthcare professionals who have knowledge of VTE prophylaxis during pregnancy and post partum. Plan the timing of VTE prophylaxis carefully to minimise the risk of bleeding.

**Critical care**

1.6.4 Assess all patients on admission to the critical care unit for their risks of VTE (see box 1) and bleeding (see box 3). Regularly reassess patients' risks of VTE and bleeding.

1.6.5 Offer VTE prophylaxis to patients admitted to the critical care unit based on the reason for admission, taking into account:

- any planned interventions
- the use of other therapies that may increase the risk of complications.

**Patients already having antiplatelet agents or anticoagulants on admission or needing them for treatment**

1.6.6 Do not regard aspirin or other antiplatelet agents as adequate prophylaxis for VTE.

1.6.7 Consider offering additional VTE prophylaxis to patients who are having antiplatelet agents to treat other conditions and who are assessed to be at increased risk of VTE (see box 1). Take into account the risk of bleeding (see box 3) and of comorbidities such as arterial thrombosis.

- If the risk of VTE outweighs the risk of bleeding, consider offering LMWH or UFH.
- If the risk of bleeding outweighs the risk of VTE, offer mechanical VTE prophylaxis (such as anti-embolism stockings,
intermittent pneumatic compression devices or foot impulse devices).

1.6.8 Do not offer additional pharmacological prophylaxis for VTE to patients who are taking vitamin K antagonists and who are within their therapeutic range, providing anticoagulant therapy is continued.

1.6.9 Do not offer additional pharmacological prophylaxis for VTE to patients who are having full anticoagulant therapy (for example, fondaparinux sodium, LMWH or UFH).

1.7 **Recommendations on the use of VTE prophylaxis**

**Mechanical VTE prophylaxis**

1.7.1 Offer patients who are assessed to be at risk of VTE and for whom pharmacological VTE prophylaxis is contraindicated one of the following:

- thigh-length anti-embolism stockings (see 1.7.2–1.7.11). Knee-length stockings may be substituted if thigh-length stockings are unsuitable for reasons of fit, adherence or surgical site
- foot impulse devices
- intermittent pneumatic compression devices.
Anti-embolism stockings

1.7.2 Do not offer anti-embolism stockings to patients who have:

- peripheral arterial disease
- peripheral neuropathy
- leg/foot ulcers
- fragile ‘tissue paper’ skin
- known allergy to material of manufacture
- cardiac failure
- massive leg oedema
- unusual leg size or shape
- major limb deformity preventing correct fit.
1.7.3 Ensure that patients who need anti-embolism stockings have their legs measured and that the correct size of stocking is provided. Stockings should be fitted and patients shown how to use them by staff trained in their use.

1.7.4 Ensure that patients who develop oedema or postoperative swelling have their legs re-measured and stockings refitted.

1.7.5 Pedal pulses should be detected by healthcare professionals trained in the technique before anti-embolism stockings are fitted.

1.7.6 Use anti-embolism stockings that conform to the Sigel pressure profile (ankle 18 mmHg, calf 14 mmHg, knee–popliteal break 8 mmHg, mid-thigh 10 mmHg, upper thigh 8 mmHg).

1.7.7 Encourage patients to wear their anti-embolism stockings day and night from admission until they are discharged or are no longer significantly immobile. Anti-embolism stockings should be removed daily for hygiene purposes and to inspect skin condition.

1.7.8 Discontinue the use of anti-embolism stockings if there is marking, blistering or discoloration of the skin, particularly over the heels and bony prominences.

1.7.9 Show patients how to use anti-embolism stockings correctly and ensure they understand that this will reduce their risk of developing VTE.

1.7.10 Monitor the use of anti-embolism stockings and offer assistance if they are not being worn correctly.

1.7.11 Ensure that patients who are discharged with anti-embolism stockings are able to remove and replace them, or have someone available who will be able to do this for them.
Intermittent pneumatic compression devices/foot impulse devices

1.7.12 Do not offer intermittent pneumatic compression devices or foot impulse devices to patients with a known allergy to the material of manufacture.

1.7.13 Encourage patients on the ward who have intermittent pneumatic compression or foot impulse devices to use them for as much of the time as is possible and practical, both when in bed and when sitting in a chair.

Pharmacological VTE prophylaxis

1.7.14 Where there is a choice of pharmacological agents within a recommendation, base the decision on local policies and individual patient factors, including clinical condition (such as renal failure) and patient concerns about the use of animal products (see 1.8.1).

1.8 Patient information and support

1.8.1 Ensure that patients are aware of the animal origin of heparin products (see wwwnpc.co.uk/med_partnership/resource/our-publications/drugs-of-porcine-origin.html). For patients who have concerns about using animal products, offer synthetic alternatives based on clinical judgement and after discussing their suitability, advantages and disadvantages with the patient.

1.8.2 Before starting VTE prophylaxis, offer patients verbal and written information on:

- the risks and possible consequences of VTE
- the importance of VTE prophylaxis and its possible side effects
- the correct use of VTE prophylaxis (for example, anti-embolism stockings, intermittent pneumatic compression devices or foot impulse devices).
1.8.3 As part of the discharge plan, offer patients verbal and written information on:

- the signs and symptoms of deep vein thrombosis and pulmonary embolism
- the correct use of VTE prophylaxis at home (if discharged with prophylaxis)
- the implications of not using VTE prophylaxis correctly (if discharged with prophylaxis)
- the signs and symptoms of adverse events related to VTE prophylaxis (if discharged with prophylaxis)
- the importance of seeking medical help if deep vein thrombosis, pulmonary embolism or other adverse events are suspected.

1.8.4 Notify the patient’s GP if the patient has been discharged with pharmacological prophylaxis to be used at home.

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available from www.nice.org.uk/guidance/index.jsp?action=download&o=37889

Groups that will be covered

a) Adults (18 years and older) admitted to hospital as inpatients or formally admitted to a hospital bed for day-case procedures, including:

- surgical inpatients
- inpatients with acute medical illness (for example, myocardial infarction, stroke, spinal cord injury, severe infection or exacerbation of chronic obstructive pulmonary disease)
- trauma inpatients
- patients admitted to intensive care units
- cancer inpatients
- people undergoing long-term rehabilitation in hospital
• patients admitted to a hospital bed for day-case medical or surgical procedures.

b) Within this population, pregnant women admitted to hospital have been identified as a group requiring special consideration.

c) During the review of the evidence, any additional groups that are shown to have particular clinical needs will be given special consideration.

Groups that will not be covered
a) People younger than 18 years.

b) People attending hospital as outpatients.

c) People presenting to emergency departments without admission.

d) Elderly or immobile people cared for at home, or in external residential accommodation, unless admitted to hospital.

e) Patients admitted to hospital with a diagnosis of, or suspected diagnosis of, deep vein thrombosis or pulmonary embolus.

How this guideline was developed

NICE commissioned the National Collaborating Centre for Acute Care to develop this guideline. The Centre established a Guideline Development Group (see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information in the booklet: ‘The guideline development process: an overview for stakeholders, the public and the NHS’ (third edition, published April 2007), which is available from www.nice.org.uk/guidelinesprocess or from NICE publications (phone 0845 003 7783 or email publications@nice.org.uk and quote reference N1233).
3 Implementation

The Healthcare Commission assesses how well NHS organisations meet core and developmental standards set by the Department of Health in ‘Standards for better health’ (available from [www.dh.gov.uk](http://www.dh.gov.uk)). Implementation of clinical guidelines forms part of the developmental standard D2. Core standard C5 says that NHS organisations should take into account national agreed guidance when planning and delivering care.

NICE has developed tools to help organisations implement this guidance (listed below). These are available on our website (www.nice.org.uk/CGXX).

[NICE to amend list as needed at time of publication]

- Slides highlighting key messages for local discussion.
- Costing tools:
  - costing report to estimate the national savings and costs associated with implementation
  - costing template to estimate the local costs and savings involved.
- Implementation advice on how to put the guidance into practice and national initiatives that support this locally.
- Audit support for monitoring local practice.

4 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future.

4.1 Assessment of risk for VTE

What is the absolute risk of VTE among different groups of hospital patients and can the risk be reliably estimated on admission to hospital to ensure that appropriate patients are offered VTE prophylaxis?

Why this is important

One of the most difficult areas the Guideline Development Group faced when developing the guideline was to identify the absolute risk of VTE among Venous thromboembolism: reducing the risk. NICE guideline DRAFT (March 2009)
specific patient groups in relation to the reason for admission. A new, large pragmatic cohort study and/or record linkage study using Hospital Episode Statistics and the General Practice Research Database is proposed. This would allow all people admitted to hospital to be studied to identify those who develop VTE, including people who are diagnosed with VTE in primary care after discharge from hospital. Information on baseline patient-related factors, procedures and duration of stay, complications, prophylactic therapies and concomitant drug use should be collected and analysed. It should allow the identification of independent risk factors for VTE and the development and subsequent validation of a risk model to estimate the absolute risk of VTE in individual patients. This research would allow clearer identification of those patients at risk of VTE and those in whom the risk is so low that the bleeding risk of pharmacological VTE prophylaxis would add overall hazard.

4.2 **VTE prophylaxis for general medical patients**

What is the clinical and cost effectiveness of pharmacological prophylaxis, mechanical prophylaxis and combined pharmacological and mechanical prophylaxis for reducing the risk of VTE in medical patients?

**Why this is important**

Only a small number of trials with medical patients were identified and generally the inclusion criteria were narrow, for example, patients with an acute medical illness, with a hospital stay of more than 5 days, and often with severely limited mobility. Further research into less severely ill populations would be beneficial.

In addition, the only trials of mechanical prophylaxis for medical patients were small randomised controlled trials in patients with stroke and acute coronary syndrome. This trial should investigate the benefits of reducing the risk of VTE balanced against the risk of bleeding. The trial should compare pharmacological prophylaxis alone, mechanical prophylaxis alone, and combined mechanical and pharmacological prophylaxis. The benefit of extended-duration prophylaxis in these patients might also be investigated.
4.3 **VTE prophylaxis for patients with lower limb plaster casts**

What is the clinical and cost effectiveness of pharmacological prophylaxis for reducing the risk of VTE in patients with lower limb plaster casts?

**Why this is important**
A number of randomised controlled trials have been published reporting the use of VTE prophylaxis in patients with lower limb plaster casts. However, within these trials there has been a range of patients including patients with soft tissue injuries and no operation, those with operated and unoperated fractures and patients having elective procedures. The incidence of VTE in the published trials that did not use VTE prophylaxis ranges from 4%–40%. The implications of providing pharmacological prophylaxis for all patients with lower limb plaster casts are potentially considerable with respect to cost. Trials stratifying patients by reason for plaster cast would be useful to determine which patients should be recommended for prophylaxis.

4.4 **VTE prophylaxis for patients after stroke**

What is the overall risk/benefit of low molecular weight heparin and/or fondaparinux sodium in respect of both stroke outcome and the development of VTE for patients with acute stroke?

**Why this is important**
Patients with either ischaemic or haemorrhagic stroke have a risk of both VTE and bleeding into the brain. ‘Stroke: diagnosis and management of acute stroke and transient attack [TIA]’ (NICE clinical guideline 68, published July 2008) recommends the use of aspirin for treatment of ischaemic stroke but does not recommend anticoagulants. There is recent evidence to suggest that prophylactic doses of anticoagulants in addition to aspirin reduce the risk of VTE in patients with ischaemic stroke but there are no data showing an effect of these anticoagulants on the stroke itself. Do they increase the risk of haemorrhagic transformation and so increase neurological damage? This research should include patients with haemorrhagic or ischaemic strokes to
identify which patients would benefit from additional pharmacological prophylaxis.

4.5 Incidence of post-thrombotic syndrome after VTE

What is the incidence, loss of quality of life and cost associated with post-thrombotic syndrome after potentially preventable deep vein thrombosis?

Why this is important
During development of the guideline it became apparent that the incidence of post-thrombotic syndrome, particularly after asymptomatic deep vein thrombosis, was not well reported. This study should use standard, validated definitions to identify the incidence of post-thrombotic syndrome both when a deep vein thrombosis has occurred as a result of a hospital admission and in the absence of hospital-acquired deep vein thrombosis. The study also should aim to identify the costs to the NHS of treating post-thrombotic syndrome.

5 Other versions of this guideline

5.1 Full guideline
The full guideline 'Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital' contains details of the methods and evidence used to develop the guideline. It is published by the National Collaborating Centre for Acute Care, and is available from our website (www.nice.org.uk/CGXXXfullguideline) and the National Library for Health (www.nlh.nhs.uk). [Note: these details will apply to the published full guideline.]

5.2 Quick reference guide
A quick reference guide for healthcare professionals is available from www.nice.org.uk/CGXXXquickrefguide
5.3 ‘Understanding NICE guidance’

A summary for patients and carers (‘Understanding NICE guidance’) is available from www.nice.org.uk/CGXXXpublicinfo

We encourage NHS and voluntary sector organisations to use text from this booklet in their own information about reducing the risk of VTE.

6 Related NICE guidance

Published


Under development

NICE is developing the following guidance (details available from www.nice.org.uk):

Rivaroxaban for the prevention of venous thromboembolism after elective orthopaedic surgery of the lower limbs. NICE technology appraisal guidance (publication expected April 2009).

7 Updating the guideline

NICE clinical guidelines are updated as needed so that recommendations take into account important new information. We check for new evidence 3 years after publication, to decide whether all or part of the guideline should be
updated. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations.
Appendix A: The Guideline Development Group

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4 From September 2008
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6 From February 2008
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Appendix B: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

Mr Peter Robb (Chair)
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Lay Member