To reduce the risk of venous thromboembolism, it is essential patients are given the right support to use anti-embolism stockings correctly.

**Anti-embolism stockings**

**In this article...**

- The indications for anti-embolism stockings
- Procedure for using anti-embolism stockings
- Competencies required to perform the procedure

Venous thromboembolism (VTE) is a major cause of death and morbidity in hospitalised patients but is potentially preventable (National Institute for Health and Clinical Excellence, 2010a). To reduce the risk of hospital-acquired thrombosis, all inpatients should be assessed to determine their individual risk of VTE and bleeding on admission to hospital (NICE, 2010b).

Anti-embolism stockings (AES), foot impulse devices or thigh or knee-length intermittent pneumatic compression devices can be used to reduce the risk of VTE. The choice of prophylaxis should be based on individual patient factors.

Stocking can be thigh or knee-length and are the most widely used form of mechanical thromboprophylaxis. This could be due to cost, accessibility and patient preference.

This article discusses aspects of NICE guidance relating to the use of AES to enable nurses to provide quality care.

**Indications for AES**

Patients should be supplied with stockings as soon as they are identified as having a high risk of VTE. They should be advised to wear them day and night until their mobility is no longer significantly reduced (NICE, 2010a).

All surgical patients who are at high risk of VTE should be offered pharmacological and mechanical thromboprophylaxis unless contraindicated (NICE, 2010a).

Medical patients with a high risk of VTE, such as those with reduced mobility, active cancer, history of VTE or significant medical comorbidities should receive pharmacological prophylaxis only, unless they have significant risk of bleeding. These patients should be offered mechanical thromboprophylaxis instead, unless they have conditions that may impair arterial circulation or damage the skin, such as peripheral arterial disease, peripheral neuropathy and fragile skin.

Stroke patients should not be given AES at all as they have been found to be ineffective at reducing risk of deep vein thrombosis in these patients and are associated with an increased risk of skin damage (Dennis et al, 1999). However, these patients can use other forms of mechanical prophylaxis (NICE, 2010a); intermittent pneumatic compression devices or foot pumps can be considered but, if these are unsuitable, hydration and early mobilisation may be the only safe options available.

If mobility is still impaired at the time of discharge, advise patients to wear stockings at home until their mobility is restored. NICE (2010a) defines significantly reduced mobility as “patients who are bed bound, unable to walk unaided or likely to spend a substantial proportion of the day in bed or in a chair”. Patients should be given information on how to change and wash them.

AES reduce the risk of VTE by exerting graduated circumferential pressure, which increases blood flow velocity and promotes venous return. In preventing venous distension, stockings are thought to reduce subendothelial tears and inhibit the activation of clotting factors (NICE, 2010a). Thigh-length stockings increase blood flow velocity in the femoral vein, preventing dilatation of the popliteal vein, and possibly offering more protection above the knee than knee-length stockings (Benko et al, 1999), although NICE (2010a) does not specify which length should be used.

NICE (2010b) has published seven VTE quality standards that aim to define high-quality care. Quality standard 3 states...
patients needing AES should have them fitted and monitored in accordance with NICE guidelines.

Stockings carry a potential risk to patients. Risk is reduced by ensuring individuals are carefully assessed for suitability, legs are competent measured and stocking usage is closely monitored (NICE, 2010a). It is important that health professionals are involved in selecting and procuring AES to ensure clinical evidence on their efficacy and safety associated with the product has been fully considered. NT

Emma Gee is a coagulation nurse at King’s College Hospital Trust and member of the VTE National Nursing and Midwifery Network

References
Dennis M et al (1999) Effectiveness of thigh-length graduated stockings to reduce the risk of deep vein thrombosis after stroke (CLOTS trial 1); a multicentre, randomised controlled trial. The Lancet; 373 (9679): 1958-965.

BOX 3. THE PROCEDURE

- Identify if anti-embolism stockings (AES) are indicated by assessing the patient’s risk of VTE and bleeding
- Assess for contraindications to AES
- Do not offer AES to a patient with:
  - Suspected or proven peripheral arterial disease
  - Peripheral arterial bypass grafting
  - Peripheral neuropathy or other causes of sensory impairment
  - Any local conditions in which stockings may cause damage, for example fragile skin, dermatitis, gangrene or recent skin graft
  - Known allergy to material
  - Cardiac failure
  - Severe leg oedema or pulmonary oedema from congestive heart failure
  - Unusual leg size or shape or deformity preventing correct fit
  - Caution and clinical judgement should be used when applying stockings to legs with venous ulcers or wounds
  - If you are uncertain, particularly regarding the presence of arterial disease, seek expert assistance

- Decide what length of stockings to apply, taking into consideration:
  - Clinical judgement
  - Patient preference
  - Concordance
  - Compliance
  - Surgical/wound site
  - Gain informed patient consent to treatment with AES
  - Measure the patient’s legs to find the correct size, noting that different sizes for each leg may be needed; this can be done with the patient in bed or standing
  - For thigh-length stockings:
    - Measure the circumference of both thighs at their widest point
    - Measure the circumference of both calves at their widest point
    - Measure the distance from the glutal furrow (buttock fold) to the heel
  - For knee-length stockings:
    - Measure the circumference of both calves at their widest point
    - Measure the distance from the popliteal fold to the heel
  - Select the correct stockings using the manufacturer’s measurement table
  - Apply the stockings to the patient’s legs.
  - Teach the patient how to apply and remove them. Ensure the patient understands that stockings will reduce the risk of VTE
  - Monitor side-effects of AES
  - Ask the patient to report any feelings of numbness, tingling, pain or discomfort
  - Remove stockings daily for washing and inspect skin condition, particularly over the heels and bony prominences
  - Patients with significantly reduced mobility, poor skin integrity or sensory loss should have their skin checked two to three times per day
  - If there is evidence of marking, blistering or skin discolouration, or if a patient experiences pain, discontinue the use of AES and consider alternative mechanical prophylaxis
  - Re-measure legs if they develop swelling or oedema
  - Advise patients to wear AES day and night until their mobility is no longer significantly reduced
  - Complete documentation
  - If the patient needs stockings on discharge, give patients verbal and written information as per manufacturers’ guidance on caring for the stockings and checking their skin

Embolism stockings increase venous blood flow velocity and reduce the risk of deep vein thrombosis in non-mobile patients

5 key points

1 Venous thromboembolism is a major cause of death and morbidity
2 All inpatients should be assessed for VTE risk
3 Patients should be supplied with anti-embolism stockings (AES) as soon as they are identified as having a high risk of VTE
4 To reduce any potential risks associated with AES, patients should be assessed for suitability
5 Legs should be measured and stocking usage monitored

In association with National Nursing & Midwifery Network