How to apply antiembolism stockings to prevent venous thromboembolism

Venous thromboembolism (VTE) is a major cause of potentially preventable death and morbidity in hospitalised patients (National Institute for Health and Care Excellence, 2018). To reduce the risk of hospital-associated thrombosis, all patients should be assessed to determine their individual risk of VTE. Antiembolism stockings (AES) and intermittent pneumatic compression (IPC) devices can be used to reduce the risk of VTE. The choice of prophylaxis should be based on:

- Individual patient factors;
- Local guidance;
- National guidance.

This article focuses on the use of AES. 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.

Thigh-length stockings increase blood flow velocity in the femoral vein, preventing dilatation of the popliteal vein, and may offer more protection above the knee than knee-length stockings (Benko et al, 1999), although NICE (2018) does not specify which length should be used.

If AES are indicated, patients should be supplied with them as soon as possible. They should be advised to wear them day and night until their mobility is no longer significantly reduced. Patients and carers must receive clear information on how to manage their stockings at home, as well as what to do if problems arise (NICE, 2018). Patients and carers may need help to apply and remove stockings and to monitor their skin health.

Indications for antiembolism stockings

Surgical patients

The NICE (2018) guideline offers slightly different guidance depending on the type of surgery patients are having and their risk factors. Due to the variation in this guidance, many trusts have opted for a simplified approach, so it is important to make sure that local guidance is also reviewed and followed.

Medical patients

Under the NICE (2018) guidance, medical patients who have a high risk of developing VTE should not receive mechanical thromboprophylaxis. The exception is patients in critical care, who should be considered for mechanical measures only if pharmacological thromboprophylaxis is contraindicated.

Patients who have had a stroke should not be given AES at all (NICE, 2018) as these stockings have been found to be ineffective at reducing the risk of deep vein thrombosis in this patient group and they are associated with an increased risk of skin damage (Dennis et al, 1999). IPC can be considered for patients who are immobile and have had an acute stroke. It should be started within three days of the stroke and discontinued when the patient is mobile, discharged or after 30 days, whichever is soonest. If IPC is unsuitable, hydration and
Clinical Practice

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1a. For thigh- and knee-length stockings, measure the circumference of both calves at their widest point

1b. For thigh-length stockings, measure the circumference of both thighs at their widest point

1c. For thigh-length stockings, measure the distance from the gluteal furrow (buttock fold) to the heel

1d. For knee-length stockings, measure the distance from the popliteal fold to the heel

Fig 1. Measuring the legs

Box 1. Contraindications to antiembolism stockings

Do not offer antiembolism stockings to a patient with:
- Suspected or proven peripheral arterial disease
- Peripheral arterial bypass grafting
- Peripheral neuropathy or other causes of sensory impairment
- Any conditions in which stockings may cause damage, for example fragile skin, dermatitis, gangrene or recent skin graft
- Known allergy to the stocking fabric
- Cardiac failure
- Severe leg oedema or pulmonary oedema from congestive heart failure
- Unusual leg size or shape or deformity preventing correct fit

If you are unsure about contraindications, particularly regarding the presence of arterial disease, seek expert help. Clinical judgement and caution should be used when applying stockings to legs with venous ulcers or wounds.

Source: Adapted from National Institute for Health and Care Excellence (2018)

Applying antiembolism stockings

Equipment
- Tape measure;
- AES of an appropriate size and length.

The procedure
1. Wash and dry hands before approaching the patient.
2. Discuss VTE risk with the patient and explain why AES may be required.
3. Identify whether stockings are indicated by assessing the patient’s risk of VTE and bleeding following your local policy and procedure.
4. Assess for contraindications to AES, as highlighted in Box 1.
5. If the patient requires AES, gain informed patient consent to apply the stockings.
6. Wash and dry hands.
7. Measure the patient’s legs to find the correct size (Fig 1), noting that different sizes may be needed for each leg. Legs can be...
measured while the patient is standing up or laying in bed.

8. For thigh-length stockings:
   - Measure the circumference of both thighs at their widest point;
   - Measure the distance from the gluteal furrow (buttock fold) to the heel (Fig 1).

9. For knee-length stockings:
   - Measure the circumference of both calves at their widest point;
   - Measure the distance from the popliteal fold to the heel (Fig 1).

10. Select the correct stockings using the manufacturer’s measurement table.

11. Apply the stockings to the patient’s legs (Fig 2).

12. Teach the patient how to apply and remove the stockings; ensure the patient understands that the AES will reduce the risk of VTE.

13. Advise the patient to wear the AES day and night until their mobility is no longer significantly reduced.

14. Ask the patient to inform staff if they feel any discomfort, numbness, tingling or pain associated with the stockings.

15. Make sure the patient is comfortable.

16. Wash and dry hands.

17. Document care (Box 3).

18. Remove stockings daily for washing and inspect the condition of the patient’s skin, particularly over the heels and bony prominences.

19. Patients who have significantly reduced mobility, poor skin integrity or sensory loss – for example, diabetic neuropathy – should have their skin checked two to three times per day.

20. 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.

21. Re-measure legs if they develop swelling or oedema.

22. If the patient needs stockings when they are discharged, give verbal and written information as per the manufacturers’ guidance on caring for the stockings and checking the patient’s skin.

**Box 3. Information to document**

- **Venous thromboembolism and bleeding risk assessment**
- **Absence of contraindications to using antiembolism stockings (AES)**
- **Patient’s consent indicating they agree to wear AES**
- **Whether written and verbal information about AES was given to the patient**
- **Choice of stocking length – knee- or thigh-length**
- **Leg measurements in cm:**
  - Thigh circumference
  - Length (buttock fold to heel or popliteal fold to heel)
  - Calf circumference
  - Size of stocking applied to the patient

**Conclusion**

It is important that nurses follow local guidance on the use of AES and monitor their patients for signs of complications. Adherence to treatment can be challenging for patients, so nurses should explain the reasons for AES and support patients to manage their care. **NT**

**References**

- National Institute for Health and Care Excellence, (2018) Venous Thromboembolism in over 16s: Reducing the Risk of Hospital-acquired Deep Vein Thrombosis or Pulmonary Embolism. nice.org.uk/ng89

**Professional responsibilities**

This procedure should be undertaken only after approved training, supervised practice and competency assessment, and carried out in accordance with local policies and protocols.