Anti-Embolism Stockings Clinical Guideline

V3.0

December 2018
1. **Aim/Purpose of this Guideline**

1.1. Each year 25,000 people in the UK die from venous thromboembolism. This figure includes both patients admitted for medical care of serious illnesses, as well as those admitted for surgery. Deep vein thrombosis (DVT), once developed, is a cause of substantial morbidity and may lead to the development of post thrombotic syndrome (PTS) with clinical features of chronic swelling and ulceration of the legs. Graduated Anti-embolism compression stockings (AES) are used as a prophylactic measure to prevent deep vein thrombosis and pulmonary emboli in at risk patients. Correctly applied, they are a safe, non-invasive therapy that works by exerting graded circumferential pressure from distal to proximal regions of the leg.

1.2. AES have two potential actions in preventing DVT in the immobile patient; graduated compression increases blood flow velocity and promotes venous return whilst the prevention of passive venous distension is thought to prevent sub-endothelial tears and the activation of clotting factors. Application of AES is not without risk, therefore it is important that patients are fully assessed and their legs measured before stockings are fitted and that stocking use is closely monitored.

1.3. Anti-embolism stockings can be used either as a therapy on their own or as an adjunct to anti-coagulant therapy in patients who have been clinically assessed as having a moderate to high thrombotic risk. Prophylactic treatment should be started pre-operatively or as soon as the patient becomes immobile. Evidence supports the use of below knee stockings in the majority of cases (1,2). Thigh length stockings may be required for individual patients and these should be specifically prescribed.

1.4. The purpose of this guideline is to set the standard for clinical staff who apply anti-embolism stockings to patients as prescribed.

2. **The Guidance**

2.1. **Responsibilities**

It is the responsibility of clinical managers to ensure healthcare workers undertaking this clinical skill have received sufficient and appropriate training. Clinical competency must be assessed and achieved before undertaking this task. The individual practitioner is responsible for ensuring that knowledge and skills are maintained through regular update and practice.

2.2. **Use of Anti-embolic stockings**

Anti-embolic stockings must be prescribed on the patient's electronic prescription chart (EPMA) following medical assessment of risk of thrombosis.

2.3. **Cautions / Contra-indications**

2.3.1. Patients must be assessed for any pre-disposing conditions where anti-embolism stockings are contra-indicated. Any contra-indications to AES should be clearly recorded in the patient’s medical notes or EPMA system.
2.3.2. Do not offer anti-embolism stockings to patients who have:

2.3.2.1. **Suspected or proven peripheral arterial disease including arterial bypass grafting** External pressure from the stocking will further decrease the flow of blood to the lower limb causing ischaemia and/or necrosis of tissue. The colour of the patient’s feet should be noted and felt for warmth and palpable pedal pulses. If pedal pulses are not palpable by hand then a Doppler assessment may be required. Clinicians should listen carefully to arterial signals, and where monophasic or biphasic sounds are detected senior advice must be sought.

2.3.2.2. **Stroke.** Patients with confirmed acute stroke should not be prescribed compression stockings. Clinicians should refer to the RCHT stroke guidelines. In patients with non-haemorrhagic stroke at high risk of VTE pharmacological prophylaxis with LMWH should be considered. **NB** a previous history of minor stroke with minimal residual hemiparesis is not an automatic contra-indication to AES use. Patients should be assessed for their suitability for AES in line with patients who have peripheral neuropathy (see below).

2.3.2.3. **Peripheral neuropathy or other causes of sensory impairment.** Patients with diabetes may have peripheral neuropathy and/or have a reduced peripheral blood supply. Without accurate assessment of sensation or peripheral blood flow then the patient’s skin integrity may be affected if anti-embolic stockings are applied. Check feet for appearance, sensation, warmth and colour. If foot deformity, cracked skin or loss of sensation is identified patients will not detect undue pressure caused by anti-embolism stockings and must be monitored very closely.

2.3.2.4. **Any local conditions in which stockings may cause damage e.g. fragile ‘tissue paper’ skin, dermatitis, gangrene or recent skin graft.** Arterial blood flow to the foot may already be reduced/occluded if pressure damage is present. Any previous history of pressure sores should be identified as anti-embolism stockings can further compound the situation. The patient’s heels must be observed for signs of pressure damage.

2.3.2.5. **Known allergy to material of manufacture.** The patient’s allergy status must be checked prior to application.

2.3.2.6. **Acute Cardiac failure with severe leg oedema** Compression stockings may further increase the pressure within the circulatory system if the pulmonary circulation is already overloaded. Note known and controlled heart failure without significant oedema is not a contra-indication to use of AES.

2.3.2.7. **Unusual leg size or shape or Major limb deformity preventing correct fit.**
2.3.3. Caution and clinical judgement should be exercised when applying anti-embolism stockings over venous ulcers or wounds.

2.3.4. Due to their potential employment as a ligature caution should be exercised when deciding to provide stockings to patients who may be at risk of self-harm or who may present a risk of violence or aggression to hospital staff.

2.4. **Patient Assessment**

2.4.1. Patients who require anti-embolism stockings must have their legs measured to ensure the correct size of stocking is provided. Anti-embolism stockings should be fitted and patients shown how to use them by staff trained in their use.

2.4.2. Patients who develop oedema or postoperative swelling must have their legs re-measured and anti-embolism stockings refitted.

2.4.3. If arterial disease is suspected, seek expert opinion before fitting anti-embolism stockings.

2.4.4. Anti-embolism stockings that provide graduated compression and produce a calf pressure of 14-15mmHg should be used.

2.5. **Documenting the Assessment**

There should be evidence in the nursing records that a patient assessment has been undertaken prior to stocking application. If any criteria are identified which prevent stocking application the medical staff must be informed, the reasons documented and alternative prophylaxis considered. A record of the measurement and the size of stockings selected must be entered in the patient’s record by the practitioner undertaking the procedure. The appliance label sticker / LOT number (where available) can be affixed to the patient’s nursing notes or VTE prevention care plan and signed accordingly.

2.6. **Measurement and Application of anti-embolism stockings**

2.6.1. Accurate measurements of the patient's calf are required in order to provide effective prophylaxis.

2.6.2. To obtain accurate measurements the patient should be either sat on a chair, the edge of the bed or if immobile ensure their leg is not resting on the bed by bending the knee. Legs resting on the bed will give an inaccurate calf measurement resulting in insufficient pressure application if the stocking is too big or tourniquet effect if the stocking is too small.

Measure the circumference of the calf at the greatest point on both legs. The leg circumference will determine the size.

**Below Knee:** Measure at Point C
**Above Knee:** Measure at Point T

For calf length stockings you will also need to measure the length from behind the knee to the heel of the foot.
2.6.3. Choose the correct size according to the manufacturer's guide. Re-assessment must be made following a procedure where the stockings have been removed and need to be re-applied, eg, in the recovery room after a surgery as the patient’s leg may have developed oedema during surgery.

2.7. Application of Stockings

1. Put hand inside the stocking and grab the heel.

   Pull the stocking inside out.

2. Place the foot inside the opening you have made.

3. Ease the stocking up the leg making sure there are no wrinkles. Ensure heel is fitted correctly

4. Ensure stocking top sits in line with the base of the patella.

   Ensure the stocking feels comfortable for the patient.
2.8. **Care of the Patient following Application of Stockings**

2.8.1. Patients should be encouraged to wear their anti-embolism stockings day and night until they no longer have significantly reduced mobility.

2.8.2. Anti-embolism stockings should be removed daily for hygiene purposes and to inspect skin condition. In patients with a significant reduction in mobility, poor skin integrity or any sensory loss, inspect the skin two or three times per day, particularly over the heels and bony prominences.

2.8.3. Discontinue the use of anti-embolism stockings if there is marking, blistering or discolouration of the skin, particularly over the heels and bony prominences, or if the patient experiences pain or discomfort. If suitable, offer an intermittent pneumatic compression device as an alternative.

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

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

2.9. **Intermittent pneumatic compression devices**

2.9.1. Intermittent pneumatic compression devices should be considered in instances where the wearing of AES is contra-indicated (ie in stroke) or where the patient is experiencing problems with daily wearing of AES. Intermittent pneumatic compression devices should not be offered to patients with a known allergy to the material of manufacture.

2.9.2. Patients who have intermittent pneumatic compression devices fitted should be encouraged to use them for as much of the time as is possible and practical, both when in bed and when sitting in a chair.

2.10. **Maintaining Safe Practice**

2.10.1. Once Anti-embolism stockings have been applied it is important to monitor the patient's skin in order to identify early signs of skin breakdown.

<table>
<thead>
<tr>
<th>Complications</th>
<th>Possible Cause</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red marks on feet or legs.</td>
<td>Poor fitting hosiery.</td>
<td>Re-measure limbs and check application.</td>
</tr>
<tr>
<td>Patient complains stockings are too tight.</td>
<td>Poor fitting hosiery.</td>
<td>Re-measure limbs and check application.</td>
</tr>
<tr>
<td>Top of stockings too tight or rolled down.</td>
<td>Poor fitting hosiery.</td>
<td>Re-measure limbs and check application. If</td>
</tr>
</tbody>
</table>
2.10.2. Should complications arise following application that results in removal of the stockings then approval must be sought from medical staff and alternative prophylaxis considered and clinical decision must be documented in the patient's medical/nursing records.

2.11. **Discharge of Patients with Stockings**

2.11.1. Assessment of the need to wear stockings following discharge should be made by the medical staff.

- Patients should be informed about the wearing and washing of their stockings, and the length of time to continue wearing.

- Patients should receive a Trust Patient Information Sheet prior to discharge (RCHT063). A supply should be kept on the ward for inpatient use and further copies can be ordered from design and publications dept. RCHT

- Patients should receive two pairs of stockings on discharge because of the need to wear them at all times. They are not available on FP10.

2.11.2. Orthopaedic patients who have had a total knee or hip replacement and are taking Rivaroxaban do not need to wear stockings on discharge.

2.11.3. Ensure that people who are discharged with anti-embolism stockings:

- understand the benefits of wearing them
- understand the importance of wearing them correctly
- understand the need to remove them daily for hygiene purposes
- are able to remove and replace them, or have someone available who will be able to do this for them
- know what to look for if there is a problem – for example, skin marking, blistering or discolouration, particularly over the heels and bony prominences
• know who to contact if there is a problem
• know when to stop wearing them

2.12. Audit

Ward / departmental managers are responsible for monitoring practice. Review of practice may result from any adverse incidents highlighted on the Trust’s risk reporting system. In such circumstances the manager will assess whether practice complied with RCHT guidelines and implement and provide evidence of remedial action where appropriate before closing the incidence on the system.

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Number of patients with no prescription for AES when clinically indicated</th>
<th>Number of patients with prescription for AES when not clinically indicated</th>
<th>Evidence of initial patient assessment for suitability of application of Anti embolism stockings</th>
<th>Evidence that stockings have been applied according to prescription</th>
<th>Evidence that patients have received written or verbal information regarding their stockings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Andrew McSorley – Lead Anticoagulant/Thrombosis Nurse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>Monthly data harvest from EPMA, via reporting/investigation of adverse incidents to DATIX system and systematic investigation into hospital associated thrombosis events</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Ongoing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>The outcomes of any incident investigations will be reported via the Senior Nursing Committee and actions planned according to the issues identified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>The Lead Anti Coagulant Nurse will work with the Divisional Nursing team to develop and implement the action plan.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned within 3 months. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Anti-Embolism Stockings Clinical Guideline V3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Oct 2018</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>December 2018</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>December 2021</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Andrew McSorley, Lead Anticoagulation/Thrombosis Nurse</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872-253827</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>The purpose of this guideline is to set the standard for clinical staff who apply anti-embolism stockings to patients as prescribed.</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Use this section to suggest keywords to be added by the Uploader to aid document retrieval.</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>8&lt;sup&gt;th&lt;/sup&gt; August 2018</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Anti-Embolism Stockings Clinical Guideline V2.0</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>RCHT Thrombo-embolic group Tissue Viability team RCHT</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Karen Jarvill</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical/Nursing Generic</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td>• NICE CG92 (2010) – Venous thromboembolism: Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients</td>
</tr>
</tbody>
</table>
admitted to hospital  
- NICE CG 89 (2018) Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism  
- NHSLA Risk Management Standards

**Related Documents:**
- RCHT Standards of Record-Keeping  
- RCHT Patient Identification Policy  
- RCHT Consent Policy  
- RCHT Infection Control Policy  
- RCHT Clinical Guideline for Acute Stroke Management  
- RCHT Clinical Guideline for secondary prevention after stroke or TIA  
- RCHT / PCT multi-disciplinary care pathway for stroke and TIA  
- RCHT Thrombosis prevention and anticoagulation policy  
- RCHT Thrombosis prevention, Investigation and management guidelines  
- SIGN 122 (2010) – Prevention and management of venous thromboembolism *A national clinical guideline*

**Training Need Identified?** No

### Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jun 13</td>
<td>V1.0</td>
<td>Previous version history not known.</td>
<td></td>
</tr>
</tbody>
</table>
| 1 Aug 16 | V2.0       | Changes to wording to reflect national guidance NICE 92 CG  
Inclusion of up-to date photographs reflecting stockings currently in use at RCHT | Heather Newton, Consultant Nurse Tissue Viability.  
Andrew McSorley, Lead Anticoagulation/Thrombosis Nurse |
| 1 Sep 18 | V3.0       | Content review and wording changes to ensure compliance with NICE 89  
Addendum Appendix 3 decision algorithm for AES use | Andrew McSorley, Lead Anticoagulation/Thrombosis Nurse |

All or part of this document can be released under the Freedom of Information Act 2000

Anti-Embolism Stockings Clinical Guideline V3.0  
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### Appendix 2. Initial Equality Impact Assessment Screening Form

<table>
<thead>
<tr>
<th>Name of service, strategy, policy or project (hereafter referred to as policy) to be assessed:</th>
<th><strong>Anti-Embolism Stockings Clinical Guideline V3.0</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Covering all areas of the Trust</td>
</tr>
<tr>
<td>Is this a new or existing Procedure?</td>
<td>Existing policy</td>
</tr>
<tr>
<td>Name of individual completing assessment:</td>
<td>Andrew McSorley</td>
</tr>
<tr>
<td>Telephone:</td>
<td>01872 253597</td>
</tr>
<tr>
<td>1. Policy Aim*</td>
<td>To promote best practice in the care of patients requiring anti-embolic stockings</td>
</tr>
<tr>
<td>2. Policy Objectives*</td>
<td>To ensure all staff are aware of their responsibilities in relation to assessment, application, monitoring and discharge of patients with anti-embolism stockings</td>
</tr>
<tr>
<td>3. Policy – intended Outcomes*</td>
<td>Patient safety and reduction of risk</td>
</tr>
<tr>
<td>4. How will you measure the outcome?</td>
<td>Audit of assessment of patients for DVT risk and Outcomes</td>
</tr>
<tr>
<td>5. Who is intended to benefit from the Policy?</td>
<td>All patients admitted to RCHT who are assessed at being at risk of deep vein thrombosis will be supplied with anti-embolism stockings. Assessment and application will be according to best practice. Informed workforce through education and training.</td>
</tr>
<tr>
<td>6a Who did you consult with</td>
<td>Workforce</td>
</tr>
<tr>
<td>b). Please identify the groups who have been consulted about this procedure.</td>
<td></td>
</tr>
</tbody>
</table>

**Please record specific names of groups**

RCHT Thrombo-embolic group – Thrombosis prevention and anticoagulation steering group (TPAS)

c) What was the outcome of the consultation? | Agreement to proposed updates to guideline following consultation |

*Please see Glossary*
7. The Impact
Please complete the following table. If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.

Are there concerns that the policy could have differential impact on:

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>X</td>
<td></td>
<td>Older person’s skin is at greater risk of skin damage from stocking application. Older people have an increased risk of vascular disease which is a contraindication to the application of the stockings</td>
</tr>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td>X</td>
<td></td>
<td>Some patients with significant sensory impairment will be contra-indicated to Anti-embolism stockings. Patient leaflets will be available in alternative formats e.g. easy read.</td>
<td></td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage and Civil partnership</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended. Yes No X

9. If you are not recommending a Full Impact assessment please explain why.
Not required – no impact identified for specified patient groups

Full statement of commitment to policy of equal opportunities is included in the policy
<table>
<thead>
<tr>
<th>Signature of policy developer / lead manager / director</th>
<th>Date of completion and submission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew McSorley</td>
<td>1st October 2018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Names and signatures of members carrying out the Screening Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Andrew McSorley</td>
</tr>
<tr>
<td>2. Human Rights, Equality &amp; Inclusion Lead</td>
</tr>
</tbody>
</table>

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust’s web site.

Signed __________
Date _______________
Appendix 3. Decision Algorithm for Anti-Embolism Stockings

Consider possible patient contra-indications:

- **Proven or suspected arterial disease**: potential for skin damage through skin necrosis, check patient’s feet for warmth and palpable pedal pulses before applying AES. Do not apply if pedal pulse absent or monophasic on Doppler.
- **Stroke**: AES should not be used in acute stroke. Where there is a history of non-acute stroke assess patient for residual paresis/neuropathy before applying AES.
- **Peripheral neuropathy**: skin integrity may be affected by AES, check feet for sensation, colour and warmth before applying, do not apply if skin is damaged or there is significant loss of sensation preventing detection of pressure.
- **Dermatitis, gangrene or fragile, ‘tissue paper’ skin**: Risk of further damage to skin, do not apply stockings.
- **Known allergy to material of manufacture**: risk of reaction, do not apply AES.
- **Acute Cardiac Failure**: Do not apply AES where there is acute cardiac failure with gross oedema of the lower legs. AES may be used in cases where heart failure is well controlled and there is no current circulatory overload or gross oedema present.
- **Venous Ulcers or wounds**: Caution and clinical judgement are required to avoid further skin damage.

Anti-Embolism Stockings are **Contra-indicated**

- Record contra-indications to patient VTE prevention care plan / patient notes
- Discontinue any prescription for AES in EPMA
- Consider use of IPC for high risk patients

There are **no Contra-indications** to use of Anti-Embolism Stockings

- Ensure patient has an active prescription for AES within EPMA
- Explain to patient rationale for use of compression stockings to prevent VTE
- Measure and fit stockings to patient
- Record all actions to VTE prevention care plan
- Continue stockings use until patient returns to full mobility or is discharged