Title:	**Anti Embolic Stockings, Guidelines for the use of**	Ref No: 0393 Version 3
		Classification: protocol
Directorate:	Trustwide	Due for Review: 31/12/16
Responsible for review	VTE Nurse Helen Orchard, Tissue Viability Specialist Nurse	Document Control
Ratified by:	Jane Viner, Director of Professional Practice, Nursing and Peoples Experience David Sinclair, Interim Medical Director	
Applicability	All Staff	

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).

Anti embolic [AE] stockings 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).

The use of graduated compression stockings as a prophylactic deterrent against complications, such as deep vein thrombosis and pulmonary emboli, will only be effective if they are used in the correct way.

Correctly applied, they are a safe, non-invasive therapy for reducing the incidence of complications by the promotion of venous blood flow in the lower limbs.

AE stockings can be used as a therapy on their own or as an adjunct to Heparin/Warfarin therapy in patients who have been clinically assessed.

A VTE risk assessment should be performed at pre-assessment clinic and on admission to identify patients at risk of venous thromboembolism in order to ascertain appropriate management.
For VTE risk assessment see guideline 0929: Venous Thromboembolism Prophylaxis.

Evidence supports the use of below knee anti-embolic stockings unless thigh length stockings are specifically requested either by the medical team or the anaesthetist.

Anti-embolic stockings must be prescribed by a medical practitioner on the patient drug chart

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

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.

Clinical indications for considering the use of anti-embolic stockings:-

The risk of developing a deep vein thrombosis or pulmonary embolism is increased in patients who:-

- Active cancer or cancer treatment
- Age >60
- Critical care admission
- Dehydration
- Known thrombophilias
- Obesity (BMI ≥ 30kg/m²)
- Personal history or first degree relative with history of VTE
- Thrombophilic drugs eg combined oral contraceptive, tamoxifen, HRT
- Varicose veins with phlebitis
- Prolonged immobility (mobility significantly reduced ≥ 3 days or ongoing reduction in mobility relative to normal state)
- Temporary cessation of antiplatelet or anticoagulant treatment
- Severe or ongoing sepsis
- Pregnancy (see guideline 0428 Thromboembolism And Pregnancy – Risk, Assessment, Prophylaxis And Treatment)
- Acute surgical admissions with inflammatory or intra-abdominal condition

- For Stroke patients see Guideline 1307 – VTE Prophylaxis following Acute Stroke

When to apply AE Stockings

Prophylactic treatment should be started pre-operatively or as soon as the patient becomes immobile

ASSESSMENT

VTE Risk assessment (RA) on admission, and again within 24 hours is MANDATORY. Guidance is provided within the drug chart, and the RA boxes must be completed In order to reduce the risk of inappropriate therapy and also to provide good documentation of clinical decisions, it is just as important to document reasons for not prescribing VTE prophylaxis as it is to document prescribed therapy

Prior to application of AE stockings the legs must be checked for colour warmth and sensation. Pedal pulses must be palpable. This basic vascular assessment must be clearly recorded in the patient's medical records

Prior to the application of anti-embolic stockings it is very important to undertake a patient assessment in order to exclude the following conditions, which **CAN** be a contra-indication to use.

CONDITION	RATIONALE
Suspected or proven peripheral arterial disease Peripheral arterial bypass grafting	Peripheral circulation is impaired therefore anti-embolic stockings could compound the condition by further reducing the capillary and peripheral blood volume.
Peripheral neuropathy or other causes of sensory impairment	Patients with altered sensation in the lower limbs will not be able to alert staff if stockings are too tight and causing tissue damage

CONDITION	RATIONALE
Congestive Cardiac Failure / Pulmonary Oedema	Anti-embolic stockings by improving the venous return, would further 'overload' the heart and pulmonary vessels leading to further congestion.
Diabetes	Patients with diabetes can present with peripheral neuropathy or peripheral arterial disease.
Any local skin conditions where stockings may cause further damage, for example fragile 'tissue paper' skin, dermatitis or recent skin grafting	AE stockings can be difficult to apply and have on occasions caused skin tears or exacerbated existing wounds by dragging of the skin when applied.
Known allergy to material used in the manufacturer of the stocking	Mild or even severe allergic reactions and dermatitis may occur when stockings are in use – seek expert advice.
Unusual leg size, shape or major limb deformity preventing correct fit.	Incorrectly fitted stockings will not provide adequate treatment to prevent DVT and increase the risks of tissue damage and pressure ulcers

If a patient has any of these conditions it is essential to liaise with the medical staff in order to discuss alternative prophylaxis.

MEASURING AND APPLICATION

A Qualified Nurse/Assistant Practitioner who has received appropriate training should measure patients to determine the size of stockings required to meet the needs of the individual patient. Patients should be re-measured if there is a time delay between measurement and fitting of anti-embolic stockings

	Action		Rationale
1	Sit patient on a chair, the edge of the bed or if immobile, ensure their leg is not resting on the bed by bending the knee.	1	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.
2	Measure the circumference of the calf at the widest point on both legs.	2	The calf circumference will determine the size. Choose the correct size according to the manufacturers guide.
3	A record of the measurement and type and size of stockings must be entered on the patient's drug chart	3	
4	Patients should be re-measured if there are any signs of tissue damage attributable to the stockings, or any evidence of significant oedema or lower limb swelling or the patient complains that the stockings are painful.	4	The leg may well develop oedema/swelling following surgery.

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

Ongoing management of patient who are wearing AE stockings:

Once the need for anti-embolic stockings is identified, they should be worn at all times except during personal hygiene procedures.

Every 12 hours patient's legs should be checked to ensure the hosiery is in place correctly (no wrinkles) and the patient does not report any pain or discomfort.

Details of checks should be clearly recorded in the patient's medical record

Stockings should be removed daily to: -

a. Check the patient's skin condition for any red or dusky areas. Toes/legs must be checked for colour, warmth and sensation.
b. Allow the patient's legs to be washed.
c. Ensure correct positioning of the stockings.
d. Ensure correct fitting of the stockings.

A clean pair of stockings should be provided every 3 days or if soiled

Patient's limbs may need to be re-measured as the patient's condition changes, for example significant limb oedema can develop following joint replacement surgery

Discontinuing the use of AE stockings:

The use of anti-embolic stockings should normally be discontinued when the patient has returned to their former state of mobility or an improved state of mobility.

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".

However you may need to consider discontinuing using the stockings if the patient shows any sign of the following conditions

- Red marks on feet/legs.
- Patient complains of stockings too tight.
- Dusky/mottled skin on heels.
- Pressure ulcers
- Rashes.
- Tight band around top of stockings.
- Wound breakdown under stockings
- Patient's unable to tolerate or wear the stockings correctly

Any decision to remove stockings prior to this state of mobility MUST be approved by Senior Medical Staff and documented in the patient's medical records.

Patient Information:

Patients must be given written information regarding the use of anti-embolic stockings.

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.

Evidence based: Yes

References:

1. Autar R (2009) A review of the evidence for the efficacy of anti-embolism stockings in venous thrombo-embolism prevention. *J Orthopaed Nurs* 13(1): 41–49

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3. Cock KA (2006) Anti-embolism stockings: are they used effectively and correctly? *Br J Nurs* 15(6; Supp): S4–S12

4. Holford C P, Graduated Compression for Preventing Deep Venous Thrombosis, British Medical Journal 1976; ii; 969-970.

5. Kakkar V –v- et al, Natural History of Post Operative Deep Vein Thrombosis. Lancet 1969;230-232

6. MJ LeF. Porteous et al, British Journal of Surgery 1989; Vol 6, March 296-297.

7. National Institute for Health and Clinical Excellence (2010a) Venous Thromboembolism – Reducing the Risk. London: NICE

8. National Institute for Health and Clinical Excellence (2010b) Venous Thromboembolism Prevention Quality Standard.London: NICE.

9. Tsapogas MJ et al, Post-operative Venous Thrombosis and the Effect of Prophylactic Measures Archives of Surgery. 1971; 103: 561-7.

10. Turner GM et al, The Efficacy of Graduated Compression Stockings in the Prevention of Deep Vein Thrombosis after Major Gynaecological Surgery. British. Journal of Obstetrics and Gynaecology. 1984; 91: 588-591.

Produced as a result of an audit: No
Has implementation and usage of this protocol/guideline been audited: No

Appendix 1

Patient assessment for Anti Embolic stockings

Patient Identification Label	Ward: Date: Time: Signature

Limb assessment

Colour, check both lower limbs for pallor, dusky or mottled patches	Right	Left	Yes	No
Warmth, check both legs to ensure even temperature				
Sensation, ask patient if there are any areas of numbness/tingling				
Pedal Pulses present. Check Dorsalis pedis, Posterial tibial or Peroneal vessels				

Patient assessment

Does the patient currently have or have a history of;	Yes	No
Peripheral vascular disease		
Peripheral arterial bypass graft		
Peripheral neuropathy or other sensory impairment		
Cellulitis		
Any local skin condition on the leg e.g dermatitis, gangrene, skin grafts, skin lesions, gout		
Leg oedema, pulmonary oedema from congestive cardiac failure		
Extreme leg deformity		
Leg/foot ulceration		
Pressure ulcer to heel		
Known allergy to contents of stockings		
If patient refuses to wear stockings, this refusal must be documented in notes		
If ankle circumference exceeds manufacturers recommendation		

Appendix: 2

Patient Identification Sticker

Anti-embolic stockings Check list

Every 12 hours the patients' legs should be assessed to ensure that the hosiery is in place correctly (no wrinkles) and that the patient does not report any pain or discomfort.

Limb Assessment

- Colour, check both lower limbs for pallor, dusky or mottled patches
- Warmth, check both legs to ensure even temperature
- Sensation, ask patient if there are any areas of numbness/tingling
- Pedal Pulses present. Check Dorsalis pedis, Posterial tibial or Peroneal vessels

Document any concerns in the Patients medical notes and discuss with Medical Staff

Sign when completed

Date	Day Shift Limb assessment completed	Night Shift Limb assessment completed	Stockings removed	Clean stockings every 3rd day	Signature
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	

Protocols & Guidelines – Document Control

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Author:	VTE Nurse Helen Orchard, Tissue Viability Nurse		
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Equality Impact:	The guidance contained in this document is intended to be inclusive for all patients within the clinical group specified, regardless of age, disability, gender, gender identity, sexual orientation, race and ethnicity & religion or belief.		
Evidence based:	Yes		
References:	Yes		
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Approved By:	Jane Viner, Director of Professional Practice, Nursing and Peoples Experience		
	David Sinclair, Interim Medical Director		
Links or overlaps with other policies: 0929: Venous Thromboembolism Prophylaxis; 0428 Thromboembolism And Pregnancy – Risk, Assessment, Prophylaxis And Treatment; 1307 – VTE Prophylaxis following Acute Stroke			
All SDHCF Trust strategies, policies and procedure documents.			

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1	May 1997	New	Nursing Advisory Committee T Hickland, Director of Nursing and Quality Dr J Broomhall, Medical Director
2	February 2000	Revised	Helen Orchard T Hickland, Director of Nursing and Quality Dr J Broomhall, Medical Director
2	May 2002	Date change	Helen Orchard T Hickland, Director of Nursing and Quality Dr J Broomhall, Medical Director
3	18 December 2003	Revised	Clinical Nurse Specialist, Tissue Viability Director of Nursing & Quality Medical Director
3	21 January 2008	Revised	Clinical Nurse Specialist, Tissue Viability Director of Nursing & Quality Medical Director
3	13 November 2009	Document Information	
3	31 December 2014	Revised	Jane Viner, Director of Professional Practice, Nursing and Peoples Experience David Sinclair, Interim Medical Director