Intermittent Pneumatic Compression Guidance

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Please indicate what type of document this is (please check):

☐ Policy
☐ Procedure
☒ Guideline

Disclosure

This intermittent pneumatic compresson (IPC) Guidance has been collaboratively developed with colleagues from the NHS, Spire Healthcare, Arjo, and Cardinal Health. All partners contributed clinical, technical, and operational expertise to support the creation of safe, evidence-based recommendations.

No individual or organisation involved had any decision-making authority that would create bias or preferential treatment toward any product, manufacturer, or supplier. All input has been reviewed to ensure the guidance remains impartial, clinically driven, and aligned with best practice for patient care.

Guidance on a Page

Intermittent Pneumatic Compression (IPC) Device Guidance

What Does the Guidance Cover?

This guidance provides recommendations for the safe use of intermittent pneumatic compression (IPC) in patients who have undergone a venous thromboembolism (VTE) risk assessment and for whom IPC is indicated. It aims to standardise IPC practice and ensure consistent application across healthcare settings. The guidance is intended for use by all healthcare professionals in the UK.

Who are the key groups who need to be aware of this guidance (please check)?

☒ Hospital clinical colleagues
☒ Medical Colleagues
☐ Other (please specify) .....

What Does It Say?

- Definition of deep vein thrombosis (DVT) and pulmonary embolism(PE)
- Overview of types of mechanical thromboprophylaxis methods
- References the evidence base that supports the use of IPC
- Venous Thromboembolism (VTE) is the most common cause of preventable death in hospitalised patients
- Use of IPC can reduce the incidence of hospital associated thrombosis
- Individual assessment of patients is required to determine sutability to use IPC
- IPC is not suitable for all patients
- Patients should wear IPC for as long as possible during a 24 hour period to maximise the effect
- IPC should be delivered in accordance with the manufacturers' instructions
- Patients should be educated about the benefits of IPC in helping prevent VTE

What Do I Need to Do?

- Familiarise yourself with the recommendations in NICE Guideline NG89 Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism
- Ensure you receive appropriate training from your IPC provider and have your competency assessed before using the devices.
- Check that your patient has had a VTE risk assessment completed within 14 hours of admission
- Do not use the device if you suspect your patient may have any contraindications, as explained in the main text.
- When the patient's mobility status changes, reassess the need for IPC.

Further Information

- For further information please contact your hospital VTE prevention lead and your IPC Provider.

1. Introduction

This guidance has been developed to support healthcare professionals in the safe and effective use of intermittent pneumatic compression (IPC) devices for venous thromboembolism (VTE) prevention, providing a standardised approach to practice.

In alignment with NICE guidance[1] mechanical thromboprophylaxis should be used based on individual clinical assessment of venous thromboembolism (VTE) risk.

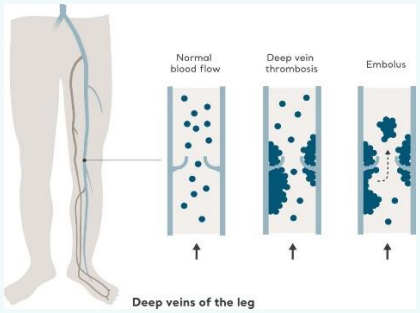
VTE is the most common cause of preventable death in hospitalised patients[2] with around 60% of all VTEs occurring due to hospitalisation[3]. Approximately one third of people with acute DVT subsequently develop post thrombotic syndrome, leading to persisting functional limitations, including symptoms such as leg ulceration, pain, and oedema following a DVT[4].

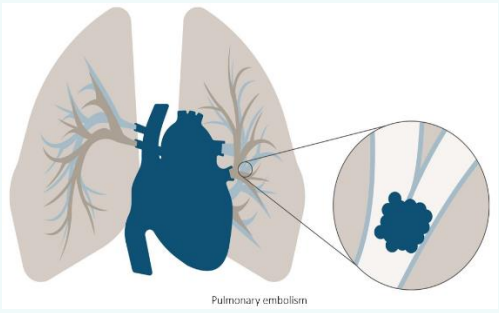
Intermittent pneumatic compression (IPC) device use should be considered alongside pharmacological prophylaxis (where appropriate), as part of a comprehensive care plan that includes VTE risk assessment, patient education, and encouragement of early mobilisation and adequate hydration.

The outcomes from decades of VTE prevention research demonstrate the potential value of IPC devices in surgical and high-risk patient groups, such as critical care, neurosurgery and stroke, often recommending their use as part of a multimodal approach.

2. Deep Vein Thrombosis and Pulmonary Embolism Definition

A deep vein thrombosis (DVT) is a blood clot that forms in a deep vein, most commonly in the leg but can also occur in the pelvis, arm or any deep vein in the body. If part of the clot breaks away, it can travel through the bloodstream to the lungs, causing a pulmonary embolism (PE), which can be life-threatening. DVT and PE are collectively known as venous thromboembolism (VTE)[1].





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3. Types of Mechanical Thromboprophylaxis

There are two main types of mechanical VTE prophylaxis; intermittent pneumatic compression and anti-embolism stockings (also called graduated compression stockings).

4. Intermittent Pneumatic Compression Devices

Intermittent pneumatic compression devices reduce venous stasis and VTE risk by applying cyclical pressure to the limbs. They work by inflating and deflating air-filled sleeves, which enhances venous return. The aim of IPC is to mimic the action of the muscle pumps in the leg that are normally activated during walking in patients who are not ambulatory. IPC has also been shown to increase global fibrinolytic activity, the body's natural process of breaking down blood clots [5].

IPC sleeves come in several forms—thigh length, knee length, and foot pumps, allowing selection based on individual patient needs.

IPC devices may also be known by the their brand names such as Sequential Compression Device (SCD) and Flowtron, and various other descriptions such as foot impulse devices and compression boots.

5. Evidence

Clinical trials have demonstrated that intermittent pneumatic compression is effective in reducing venous thromboembolism (VTE) across a range of patient populations[7,7].

6. Patient Assessment

Hospital-associated thrombosis accounts for a significant proportion of all VTE cases, therefore, it is essential to carry out a VTE risk assessment and provide tailored mechanical and pharmacological thromboprophylaxis for all adult inpatients if clinically indicated. This should be guided by the patient's medical history, surgical procedures, and individual risk factors such as obesity, previous VTE, inherited thrombophilia, co-morbidities, and current clinical status.

7. Patient Selection Guidance

NICE Guideline 89 'Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism[1] provides evidence-based recommendations for the prevention of VTE, including the use of IPC in surgical and acutely ill medical patients.

NICE recommends considering use of IPC specifically for :

- Patients with a high bleeding risk or where pharmacological prophylaxis is contraindicated
- High VTE risk surgical patients
- Patients following acute stroke
- Pelvic, hip or proximal femur fragility fractures if pharmacological prophylaxis is contraindicated
- Immobile patients following major trauma
- Immobile pregnant and post partum women with increased VTE risk

8. Application of Intermittent Pneumatic Compression Devices

To ensure optimal efficacy, it is important that IPC sleeves fit correctly. The size selection should be based on measurements of the patient's limb. However, most IPC garments use hook-and-loop fastener material so can adapt to a patient's limb size and shape within a range of sizes specified by the manufacturer's guidance.

Duration

NICE[1] defines 'significantly reduced mobility' as: "People who are bed bound, unable to walk unaided or likely to spend a substanitlal proportion of the day in bed or in a chair."

There is no recognised 'safe' period of interrupted use, however, clinicians should assess patients for signs and symptoms of VTE before reapplying IPC if it has been off for a prolonged period. Please check your local policy. The effectiveness of prophylaxis increases with consistent application.

As a persons condition changes, it may be appropriate to re-apply IPC devices in order to reduce liklikhood of VTE occurring, even if they were fully mobile at the start of their admission.

To support effective and continuous use, ensure that patients and healthcare staff receive appropriate education on the purpose, benefits, and sensations associated with IPC therapy. Providing clear explanations and addressing concerns early can improve acceptance of the device.

Where possible, demonstrate the device, explain what the patient should expect (e.g. inflation/deflation cycles, noise, fit) and check understanding. Encourage patients to report discomfort or issues promptly so adjustments can be made without interrupting prophylaxis. Document any episodes of prolonged interruption and actions taken to support adherence.

For patients with impaired mental capacity, ensure all decisions regarding IPC device use follow your organisation's local policies and guidance.

9. Contraindications

Individual manufacturers guidelines for indications for use and contraindications should be followed when IPC systems are used for VTE prophylaxis.

General contraindications:

- Suspected or confirmed acute DVT. Due to the potential risk of embolisation travel, IPC devices should not be applied until the patient has undergone diagnostic tests and the absence of a DVT has been confirmed.
- Severe congestive heart failure
- Any condition that would prevent the compression garment being fitted properly or operating normally
- Major limb deformity preventing correct fit
- Any condition that could be worsened by local compression or the material of the garment
- If the patient is high risk of falls, and attempting to moblise unaided the garments and tubing should be be assessed to in relation to their risk of increased falls.

10. Patient Consent and Understanding of Use of IPC Devices

Patients should be provided with both verbal and written information explaining how IPC works, its role in reducing the likelihood ofblood clots, and the expected duration of use. Consent for use should then be gained from the patient and documented in their medical record.. In cases where patients decline IPC, clear documentation should reflect the discussion and prompt escalation to senior clinical or medical staff.

Patients who are unable to provide consent due to impaired mental capacity should be managed in line with local guidance to support patient advocacy.
Where language barriers are also present, conversations should be supported with approved interpretation services, in line with local policy.

Healthcare staff whose scope of practice includes application and moniroing of IPC sleeves, should document the patient's leg measurements and sleeve size in the patient record and should monitor for adverse effects including skin changes, discomfort, or numbness, escalating any concerns promptly. Sleeves should be briefly removed once every shift to check skin condition and integrity, findings should be recorded in the patient record.

11. Infection Prevention Guidance

Intermittent pneumatic compression device pumps and tubing are multi patient use. They must be cleaned and decontaminated in accordance with the manufacturer's instructions and in consultation with the local Infection Prevention and Control team.
The sleeves/garments/cuffs are intended for single-patient use (please check with your IPC provider).

12. Education and Training

Clinicians who apply IPC devices must undergo the required medical device training.
Training should include:

- Rationale for use and patient assessment, including contraindications
- Patient information and gaining consent
- How to measure limbs for garment sizing
- How to apply IPC devices
- How to assess and check skin integrity
- Safe use of equipment including troubleshooting

13. References

1. National Institute of Health and Care Excellence (NICE). Clinical guideline NG89. Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism. 2018.
2. Kahn, Morrison, Diendéré, Piché, Filion, Klil-Drori, Douketis, Emed, Roussin, Tagalakis, Morris, Geerts. Interventions for implementation of thromboprophylaxis in hospitalized patients at risk for venous thromboembolism. 2018 https://doi.org/10.1002/14651858.CD008201.pub3
3. Hunt B. Preventing hospital associated venous thromboembolism. British Medical Journal. 2019 doi.org/10.1136/bmj.l4239
4. Rabinovich A, Kahn SR. The post thrombotic syndrome: current evidence and future challenges. Journal of Thrombosis and Haemostasis. 2017. 15(2):230-241.
5. Morris RJ, Roberts CH. Haematological Effects of Intermittent Pneumatic Compression for Deep Vein Thrombosis Prophylaxis. Thromb Haemost. 2020;120(6):912-923. doi: 10.1055/s-0040-1710016. Epub 2020 May 2. PMID: 32359225.
6. Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism - Kakkos, S - 2022 | Cochrane Library
7. CLOTS (Clots in Legs Or stockings after Stroke) Trials Collaboration; Dennis M, Sandercock P, Reid J, Graham C, Forbes J, Murray G. Effectiveness of intermittent pneumatic compression in reduction of risk of deep vein thrombosis in patients who have had a stroke (CLOTS 3): a multicentre randomised controlled trial. Lancet. 2013 Aug 10;382(9891):516-24. doi: 10.1016/S0140-6736(13)61050-8. Epub 2013 May 31. Erratum in: Lancet. 2013 Aug 10;382(9891):506. Erratum in: Lancet. 2013 Sep 21;382(9897):1020. PMID: 23727163.

Further Information

Cardinal Health
How IPC can reduce blood clot risk from orthopaedic surgery
NICE guidance qs201 - Venous thromboembolism in adults: Published in August 2021
https://www.nice.org.uk/guidance/qs201
NICE pathway – Reducing venous thromboembolism risk in hospital patients: Published in November 2021
https://pathways.nice.org.uk/pathways/venous-thromboembolism/reducing-venous-thromboembolism-risk-in-hospital-patients#content=view-index