Guidelines for the Management of Venous Thromboprophylaxis

**All ICU patients are at increased risk of venous thromboembolism (VTE) and should be considered daily for VTE prophylaxis**

**Is the patient at increased risk of bleeding?**

- Active bleeding or high bleeding risk
- Severe liver disease (INR > 1.7)
- Acquired bleeding disorder e.g. DIC
- Untreated inherited bleeding disorder e.g. haemophilia
- Severe hypertension (SBP > 230, DBP > 120)
- Thrombocytopenia (platelets < 70)
- Previous primary intracerebral bleed < 6/12
- New stroke (ischaemic < 2/52; haemorrhagic < 1/12)
- Lumbar puncture/epidural/spinal anaesthesia inserted or removed in previous 4 hours (6 hours if traumatic) or insertion or removal intended within next 12 hours

**Does the patient have a contraindication to prophylactic pharmacological VTE anticoagulation?**

- Therapeutic dose LMWH, IV heparin or Fondaparinux prescribed
- On oral anticoagulant with INR ≥ 2
- Allergy to heparin or LMWH (or Rivaroxaban)
- On HIV protease inhibitor or azole antifungal (Rivaroxaban only, consider LMWH/heparin instead)
- Previous heparin induced thrombocytopenia (LMWH/UFH only)
- Acute renal failure (creatinine ≥ 150 micromol/L)
- Chronic kidney disease eGFR < 30 mL/min: avoid Rivaroxaban
- Chronic kidney disease eGFR < 20 mL/min: avoid Tinzaparin

**Prescribe tinzaparin according to dosing guidelines (see Table 1)**

- If patients eGFR is < 20 mL/min prescribe heparin 5000 U sc tds
1. INTRODUCTION

Venous Thromboembolism (VTE) comprising Pulmonary Embolus (PE) and its precursor Deep Vein Thrombosis (DVT) can develop as a result of poor venous blood flow, endothelial trauma, hypercoagulability or a combination of the three. PE carries a significant risk of death, especially if not diagnosed and treated promptly. In those who survive, there is still a significant risk of morbidity with pulmonary hypertension and post-thrombotic limb being recognised complications of VTE events.

All patients should be assessed daily in critical care for VTE risk and non-pharmacological and pharmacological options for VTE prophylaxis

2. PROCESS

<table>
<thead>
<tr>
<th>Recommendation (Action)</th>
<th>Justification (Rationale)</th>
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| Certain patients have additional risk factors for VTE. If patients are at high risk of VTE (e.g. 2 risk factors) and at high risk of bleeding (e.g. intracerebral bleed, traumatic brain injury, spinal surgery) mechanical calf compression systems should be used in addition to anti-embolic stockings. | Additional risk factors include:  
  - Malignancy  
  - Dehydration  
  - Obesity (BMI > 30kg/m²)  
  - History of first degree relative with history of VTE  
  - Trauma, especially lower limb and pelvic fractures  
  - Known thrombophilia  
  - Varicose veins with thrombophlebitis  
  - Hormone therapy  
  - Pregnancy or within 6 weeks post delivery  
  - Prolonged surgery and anaesthesia |
| In some patients mechanical compression systems are contraindicated | These patients who have undergone include prolonged periods without non-pharmacological or pharmacological VTE prophylaxis where there is a theoretical risk that mechanical compression could dislodge an existing DVT. |

Table 1: Tinzaparin dosing

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dose</th>
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<tbody>
<tr>
<td>&lt;50 kg</td>
<td>Tinzaparin 3500 IU SC od</td>
</tr>
<tr>
<td>50-100kg</td>
<td>Tinzaparin 4500 IU SC od</td>
</tr>
<tr>
<td>&gt;100kg</td>
<td>Tinzaparin 4500 IU SC bd</td>
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### 3. REFERENCES

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### Recommendation (Action) | Justification (Rationale)
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**Anti-embolic stockings are contra-indicated in some patients** | - Suspected or proven peripheral arterial disease, including previous peripheral arterial bypass grafting.  
- Peripheral neuropathy or other causes of sensory impairment.  
- Any local conditions in which stockings may cause damage, for example fragile ‘tissue paper’ skin, ulcers, dermatitis, gangrene or recent skin graft.  
- Known allergy to material of manufacture.  
- Severe leg oedema or pulmonary oedema from congestive heart failure.  
- Limb deformity or unusual size/shape preventing correct fit.  
- New stroke (within 2 weeks).  
- Use caution and clinical judgement when applying anti-embolism stockings over venous ulcers or wounds.

**Ensure late admissions receive VTE thromboprophylaxis** | If the patient is admitted to critical care after 6 pm ensure a stat dose is written up for the evening of admission unless specifically requested by the surgeons or otherwise contra-indicated.

**Monitoring platelets** | There is a small risk of HIT in patients receiving heparin therapy. HIT is most likely to occur between day five and ten of administration. **The platelet count should be monitored every 4 days for the first two weeks whilst the patient is on tinzaparin, and every two days for those on unfractionated heparin. Thrombocytopenia should be suspected if the platelet count drops by fifty per cent or more, or if the platelet count falls below 50.** See unit HIT guideline and seek advice from haematology.

**Monitoring potassium** | Potassium monitoring is required in patients with diabetes, stage 3 chronic kidney disease, or in patients on potassium sparing drugs, as tinzaparin can cause hyperkalaemia in these groups. Monitor potassium levels weekly in patients in the high risk group whilst they are receiving tinzaparin.

**Risk assessment before discharge** | **ALL patients must be risk assessed for VTE using the BSUH thromboprophylaxis risk assessment algorithm on the BSUH drug chart on discharge to the ward from critical care.**
4 ONLINE RESOURCES

NICE CG 92 Venous thromboembolism: reducing the risk for patients in hospital

BSUH VTE Prophylaxis guidelines