Venous Thromboembolism Prophylaxis Guidelines for Acute Adult Inpatients

Staff this document applies to: All medical, nursing and pharmacy staff treating acute adult inpatients.

State any related policies, procedures or guidelines:
- NHMRC Clinical Practice Guideline For the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals
- Prevention of Venous Thromboembolism – Best Practice Guidelines for Australia & New Zealand 4th Edition
- Heparin Guidelines
- Warfarin Guidelines
- Perioperative Anticoagulation and Antiplatelet Guidelines
- Perioperative Medication Guidelines
- Anti-embolic Stockings
- Orthopaedic Unit Extended DVT Prophylaxis Protocol
- Guidelines For DVT Prophylaxis In Acute Spinal Cord Injury Patients
- Guideline For Calf Stimulators & Ted Stockings In Acute Spinal Cord Injury Patients

Medical staff must also refer to any specific unit based guidelines. Contact Haematology for specific advice, if necessary, for prophylaxis in patients under 16 years of age.

Background/rationale:
Although effective pharmacological and mechanical preventative options have existed for decades, venous thromboembolism (VTE) remains a major cause of morbidity and a significant cause of mortality in hospitalised patients across Australia and internationally. The incidence of deep vein thrombosis (DVT) and pulmonary embolism (PE), referred to as VTE, has been found to be 100 times greater among hospitalised patients compared to those in the community. DVT occurs in over 50% of some categories of hospitalised patients if prophylaxis is not used. PE remains the commonest cause of preventable death: 1% of all hospital admissions will die from this. Approximately 10% of hospital deaths are attributed to PE.

This guideline aims to identify a process for risk assessment and outline the published best practice prophylaxis for prevention of VTE. Patients should be individually assessed on admission and thereafter if circumstances change e.g., following theatre.

Evidence:
Adequate hydration and early mobilisation are simple measures that should be applied as standard practice to prevent VTE. Other important options for VTE prophylaxis include pharmacological or mechanical methods. The Best Practice Guidelines for Australia & New Zealand - Prevention of Venous Thromboembolism state that studies have confirmed the effectiveness of subcutaneous low-dose unfractionated heparin, and low molecular weight heparin for preventing VTE. Aspirin may have at best a weak protective effect against DVT in some people and therefore is not first-line therapy for prophylaxis.

Anti-embolic graduated compression stockings reduce the incidence of VTE by up to two thirds. (This evidence is drawn largely from surgical/orthopaedic populations.) The evidence is also mainly from studies that used full-length stockings; efficacy of below-knee graduated compression stockings is less clear as there are few comparative studies. Note - Graduated Compression Stockings are no longer recommended for stroke patients because of their lack of efficacy in this patient group and the increased risk of lower limb ulceration.
Process for risk assessment:
- All acute inpatients should have a VTE risk assessment, where appropriate, within 24 hours of admission by a medical staff. Documentation of the assessment should be easily identified in the patient’s medical record.
- There should be evidence of a further risk assessment in those patients whose risk of VTE may have changed e.g. patients undergoing surgical procedures.
- When VTE prophylaxis is indicated the patients’ medical officer should order it on the medication chart, including the prescription of graduated compression stockings when indicated. Graduated compression stockings may be prescribed by nursing staff if there is a current agreed standing order.

### Stratification of Risk: (adapted from NHMRC Clinical Practice Guideline For the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals 2009 & Prevention of Venous Thromboembolism, Best Practice Guidelines for Australia and New Zealand, Fourth Edition. 2007)

<table>
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<tr>
<th>Current Risk Factors</th>
<th>Recommended Prophylaxis for Adults</th>
<th>Duration of Pharmacotherapy</th>
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<tr>
<td><strong>SURGICAL</strong>&lt;br&gt;Major surgery*&lt;br&gt;Orthopaedic surgery of pelvis, hip or lower limb (e.g., hip or knee replacement, hip fracture)&lt;br&gt;Lower leg fractures &amp; injuries with immobilisation&lt;br&gt;Multiple trauma/spinal surgery&lt;br&gt;Laparoscopic surgery (&gt; 1 hour &amp; patient remains in hospital &gt; 24 hours)&lt;br&gt;Cancer patients having major surgery† (except head &amp; neck surgery, unless significant risk factors)</td>
<td>If no contraindications (e.g., bleeding), use Low molecular weight heparin e.g., Enoxaparin 40 mg† some patients require dose reduction subcutaneously daily AND Graduated compression stocking or intermittent pneumatic compression or foot pump (refer to unit specific guidelines)</td>
<td>Abdominal surgery 5 – 9 days Hip replacement/hip fracture surgery 35 days Knee replacement surgery 14 days Major abdo/pelvic surgery for cancer 28 days Other surgery 1 week or until mobile</td>
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<td><strong>MEDICAL</strong>&lt;br&gt;Age &gt; 60 (unless otherwise well, ambulant &amp; no other risk factors)&lt;br&gt;Ischaemic stroke*&lt;br&gt;History of DVT / PE&lt;br&gt; Decompensated heart failure&lt;br&gt;Cancer&lt;br&gt;Acute or acute on chronic lung disease (includes chest infection)&lt;br&gt;Acute on chronic inflammatory disease (e.g., IBD, SLE, Rheumatoid arthritis)&lt;br&gt;Thrombophilia&lt;br&gt;Acute spinal cord injury&lt;br&gt;Morbid Obesity&lt;br&gt;Myocardial infarct&lt;br&gt;</td>
<td>If no contraindications (e.g., bleeding), use Low molecular weight heparin e.g., Enoxaparin 40 mg† some patients require dose reduction subcutaneously daily Unfractionated heparin is preferred following myocardial infarct where full anticoagulation is not used OR If low molecular weight heparin or unfractionated heparin contraindicated, use, Graduated compression stocking* contraindicated in stroke or intermittent pneumatic compression</td>
<td>1 week or until mobile</td>
</tr>
<tr>
<td><strong>Low Risk</strong>&lt;br&gt;Minor surgery, without medical risk factors&lt;br&gt;None of the above medical risk factors</td>
<td>Consider graduated compression stocking, OR low molecular weight heparin if risks*</td>
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* In patients with moderate to severe renal impairment (CrCl < 30 mL/min) or weight < 50 kg halve the dose of low molecular weight heparin e.g., Enoxaparin 20 mg subcutaneously daily or use unfractionated heparin 5000 units subcutaneously twice daily.
* Use pharmacological thromboprophylaxis with extreme caution following neurosurgery, due to high risk of bleeding.
* Graduated compression stockings are no longer recommended for stroke patients because of their lack of efficacy in this patient group and the increased risk of lower limb ulceration.10
* Additional VTE risk factors: immobility, thrombophilia, oestrogen therapy**, pregnancy or puerperium, strong family history of VTE. Genetically defined thrombophilia has variable risks, increased if strong family history, recurrent DVT, suggest discuss with haematology.
** Consideration should be given to the cessation of hormone replacement therapy or the oral contraceptive pill prior to surgery in high-risk patients.

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Ambulation and hydration:
Where possible, all patients should be encouraged to ambulate regularly as this will reduce VTE risk. Adequate hydration is also an important component of VTE prophylaxis in all patients, regardless of risk category. Caution should be used in patients who are on fluid restriction.

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<tr>
<th>General contraindications to prophylaxis:</th>
<th>Mechanical Prophylaxis</th>
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<tr>
<td>Pharmacological prophylaxis</td>
<td>Mechanical Prophylaxis</td>
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<tr>
<td>Active bleeding</td>
<td>Severe peripheral vascular disease</td>
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<tr>
<td>Adverse reaction to low molecular weight heparin or unfractionated heparin</td>
<td>Severe peripheral neuropathy</td>
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<td>High risk of bleeding e.g., untreated haemophilia, thrombocytopenia, active peptic ulcer</td>
<td>Severe lower limb oedema</td>
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<td>Acute intracerebral haemorrhage (pharmacological prophylaxis may be appropriate after the hyper-acute period – discuss with consultant responsible)</td>
<td>Extreme leg deformity</td>
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<td>On current therapeutic anticoagulation</td>
<td>Recent skin graft</td>
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<td>Documented history of HITs within last 100 days, discuss alternative agents with haematology</td>
<td>Dermatitis</td>
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<td>Stroke* (intermittent pneumatic compression may be used – discuss with consultant)</td>
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<td>Inflammatory conditions of the lower leg</td>
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<td></td>
<td>Morbid obesity where correct fitting of graduated compression stocking cannot be achieved</td>
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Graduated compression stockings:
There is a wide variety of graduated compression stockings available but they can be divided into two distinct, non-interchangeable types – one for VTE prophylaxis and one for treatment of cardiovascular insufficiency.

Ideal characteristics for the selection of graduated compression stockings for VTE prophylaxis
- Evidence of clinical efficacy
- Pressure of 16-20 mm Hg at the ankle in the supine position with graduated compression to knee or above

General recommendations for the use of graduated compression stockings for DVT Prophylaxis (refer to Anti-embolic Stocking Procedure)
- Graduated compression stockings need to be measured and fitted for the individual patient
- Should be worn continuously during the period of immobility until the return of full ambulation

Pharmacological prophylaxis:
Low molecular weight heparin e.g., enoxaparin
High-risk: 40 mg subcutaneously once daily

Renal impairment (Creatinine clearance < 30 mL/min) and patients < 50 kg
Renal impairment is associated with increased risk of bleeding complications and this should be considered when prescribing VTE prophylaxis. When low molecular weight heparin e.g., enoxaparin is used, halve the dose to 20 mg subcutaneously once daily or use unfractionated heparin 5000 units subcutaneously twice daily.

Pharmacological prophylaxis in surgical patients:
In general caution is required when a nerve block is planned. Consult Anaesthetist.

Commencement of prophylaxis
Decisions about timing of prophylaxis in surgical patients must be made in consultation with the Surgical Unit Consultant and Anaesthetist, particularly if the patient is having a spinal or epidural anaesthetic. Some patients may require prophylaxis prior to or during surgery. Except where specified by the treating unit commence prophylaxis 6 hours post-operatively for Orthopaedic patients and intra-operatively for general surgery patients\(^2\), unless there are contraindications (e.g., bleeding)
Patients already receiving pharmacological prophylaxis in the pre-operative period

Decisions about whether to withhold low molecular weight heparin, unfractionated heparin or other thromboprophylaxis agents in the 12 hours before surgery must be made in consultation with the Surgical Unit Consultant and Anaesthetist.

Unit specific guidelines:

Medical staff must also refer to any **specific unit based guidelines** when prescribing prophylaxis and document accordingly.

- Individual consideration should be given to patients who are palliative or ‘Not for Resuscitation’.
- Patients with acute spinal cord injury should receive a minimum of 6 weeks prophylaxis with warfarin as outlined in the Victorian Spinal Cord Service guidelines (Refer to [Guidelines For DVT Prophylaxis In Acute Spinal Cord Injury Patients](#)).
- In patients undergoing knee replacement surgery, prophylaxis should continue for 14 days and for 35 days in patients having hip fracture/replacement surgery (Refer to [Orthopaedic Unit Extended DVT Prophylaxis Protocol](#)).
- There may also be unit specific requirements for mechanical prophylaxis, e.g., graduated compression stockings are contraindicated in stroke patients.

Duration of prophylaxis:

A guide to duration of pharmacological prophylaxis (adapted from the NHMRC guidelines) is provided in the Risk Stratification table. Decisions regarding time of commencement and duration of prophylaxis should be made for each patient individually.

Some unit-specific guidelines recommended longer courses of prophylaxis (see above) and there is evidence that cancer patients having major surgery may benefit from extended prophylaxis.

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### References/supporting documents:

1. NHMRC Clinical Practice Guideline For the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals 2009

### List key words (to assist users in searching for this document):

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