NHS
Greater Glasgow and Clyde

CLINICAL GUIDELINE

Thromboprophylaxis for Orthopaedic Patients Admitted to Hospital (Adults)

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Important Note:

The Intranet version of this document is the only version that is maintained.
Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

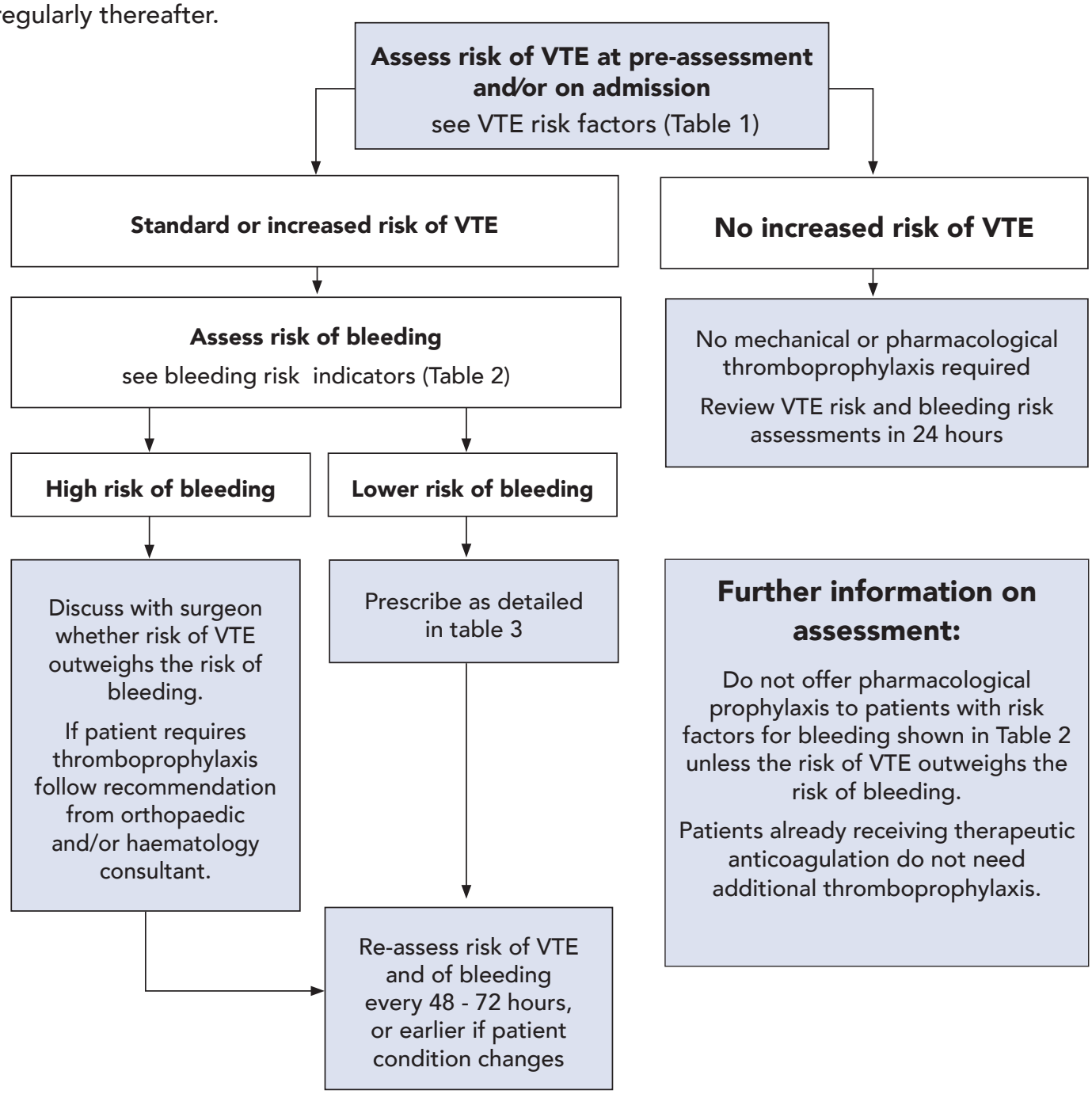
Introduction

Many operations carried out in orthopaedics fall into the general "high risk" category (lower limb arthroplasty, osteotomy, etc). Others fall into the general "low risk" group (knee arthroscopy, foot surgery, upper limb surgery). Orthopaedic thromboprophylaxis policies need to differentiate between standard patients with a standard level of risk for the operation and patients who have other factors making their orthopaedic surgery significantly higher risk for venous thromboembolism (VTE).

Assessment of VTE and bleeding risk

All patients (including day surgery patients and 23 hour admissions) must have their risk of VTE and bleeding assessed at pre-assessment and/ or admission using an appropriate risk assessment tool and then regularly during their stay in hospital. **A record of these assessments must be made and documented in patients' records.**

Assess the patient at pre-assessment and / or admission using the following algorithm and indicators as guidance and reassess risk of bleeding and VTE within 24 hours of admission and regularly thereafter.



If usual anticoagulation is witheld for surgery, VTE prophylaxis may be indicated if that surgery delayed

Table 1 – Indicators of patients at standard or increased risk of VTE

It is recognised that the majority of orthopaedic patients are at risk of VTE. It is however important to stratify VTE risk as standard or increased risk in order to tailor thromboprophylaxis to minimise adverse effects on other aspects of patient overall care.

Patients presenting at least one of these risk factors should be regarded at **standard risk of VTE:**

- acute trauma/ surgical admission
- age > 60 years
- expected significant reduction in mobility relative to their normal state for more than 2 days
- hip or knee replacement surgery or other major orthopaedic elective surgery
- surgical procedure with total anaesthetic/ surgical time > 90 minutes, or > 60 minutes if surgery of lower limb
- dehydration

Regard patient as being at an **increased risk of VTE** compared to standard orthopaedic risk if they present one or more of the following risk factors:

- critical care admission
- obesity (BMI>30Kg/m^2)
- active cancer or cancer treatment
- thrombophilia
- personal history or 1st degree relative with a history of VTE
- pregnancy or ≤ 6 weeks post partum (seek specialist advice)
- hormone replacement therapy, tamoxifen
- oestrogen containing contraceptive pill
- varicose veins with phlebitis
- current significant medical condition e.g.
    - serious infection
    - heart failure
    - respiratory failure
    - inflammatory disease
    - This list is not a comprehensive list and there will be patients with other specific conditions which are sufficiently pro-thrombotic that merit thromboprophylaxis – discuss with senior colleague/ haematology if unsure.

Table 2 – Indicators of patients at high risk of bleeding

Regard patient at high risk of bleeding if they have any of the following risk factors:

- surgery expected within the next 12 hours
- surgery expected within the next 48 hours and/ or risk of clinically important bleeding
- active bleeding or risk of bleeding including
    - new-onset stroke
    - platelet count < 75 x 10^9/L
    - acute liver failure
    - active duodenal or gastric ulcer
- concurrent use of therapeutic anticoagulant
- acute bacterial endocarditis
- any spinal intervention (prophylactic enoxaprin dose is contraindicated for 12 hours before spinal and epidural anaesthetics and lumbar puncture. Enoxaparin contraindicated for 4 hours after spinal and epidural anaesthetics and removal of epidural catheter)
- persistant uncontrolled hypertension (BP ≥ 230/120 mmHg)
- untreated inherited bleeding disorder (e.g. haemophilia or von Willibrands)
- spinal surgery (seek specialist advice)
- proliferative diabetic retinopathy

Recommendation for thromboprophylaxis

Every patient must be risk assessed. Assessment must be recorded in the patient records. It is the responsibility of the consultant in charge to decide on the appropriate VTE prophylaxis. Follow recommendations recorded in the patient specific VTE prophylaxis instruction sheet. Contra-indications and drug interactions with any of these agents must managed appropriately- see BNF for details. If in doubt discuss directly with consultant's team.

If VTE prophylaxis is appropriate to the patient's care but there are contra-indications to chemical/drug prophylaxis then alternative measures such as mechanical prophylaxis or vena-caval filters should be discussed on an individual basis with the consultant team.

Patients on long term antiplatelets prior to surgery: despite an increased risk of bleeding, it is considered that prescribing prophylactic LMWH or aspirin for up to five weeks post orthopaedic surgery in a patient on one single long term antiplatelet is acceptable in most cases. If a patient is on a combination of antiplatelet agents, the risk of thrombus vs risk of bleeding must be discussed with specialist who recommended antiplatelet treatment. This discussion should take place at pre-assessment where possible or as early as possible following surgery. Management plan must be recorded in the patient records and communicated to Primary Care by including details in any IDL and highlighting how long the prophylaxis is expected to be prescribed for.

Patients on oral anticoagulants prior to surgery: in general terms anticoagulants can be restarted as soon as clinically appropriate. Patients on warfarin may require LMWH until therapeutic INR has been achieved. For further information regarding perioperative anticoagulant guidelines please refer to:
https://rightdecisions.scot.nhs.uk/ggc-clinical-guideline-platform

Table 3 - Recommendation for thromboprophylaxis for orthopaedic patients admitted to hospital (adults)

Note that enoxaparin should be prescribed by brand name

<table>
<tr><th colspan="4">Elective Procedures</th></tr>
<tr><th>Procedure</th><th>Risk stratification</th><th>During admission</th><th>On discharge</th></tr>
<tr><td rowspan="2">Hip Arthroplasty</td><td>Standard VTE risk</td><td rowspan="2">Enoxaparin SC 40mg once daily (*) (**)</td><td>Enoxaparin SC 40mg once daily (*) (**) For 10 days post-surgery followed by aspirin 75mgs orally once daily for further 28 days
Or Enoxaparin SC 40mg once daily (*) (**) for an overall treatment course of 28 days</td></tr>
<tr><td>Increased VTE risk</td><td>Continue enoxaparin SC for overall treatment course of 28 days</td></tr>
<tr><td rowspan="2">Knee Arthroplasty</td><td>Standard VTE risk</td><td>Aspirin 75 mgs orally 4-6 hours after surgery once daily
Or Enoxaparin SC 40mg once daily (*) (**)</td><td>Aspirin 75mgs orally once daily or Continue enoxaparin 40mg SC for an overall treatment course of 2 weeks</td></tr>
<tr><td>Increased VTE risk</td><td>Enoxaparin SC 40mg once daily (*) (**)</td><td>Continue enoxaparin SC for an overall treatment course of 4 weeks</td></tr>
<tr><td></td><td colspan="3">Rivaroxaban (under consultant advice only)

A small proportion of patients may require thromboprophylaxis with rivaroxaban following elective hip or knee replacement – in these cases follow orthopaedic and/ or haematology consultant recommendations. Check BNF for advice on dose and duration of treatment. Discuss arrangements with clinical pharmacist if patient is to be discharged on rivaroxaban. Note that rivaroxaban is licensed for thromboprophylaxis only after elective hip or knee replacement and its use following a post-op course of enoxaparin is off-label.</td></tr>
<tr><td rowspan="2">Other

elective surgery (inc upper limb, arthroscopy and forefoot surgery)</td><td>Standard VTE risk</td><td colspan="2">No need for pharmacological thromboprophylaxis.
Unless extended surgical time (>90 minutes) and or concurrent lower limb surgery then follow recommendation from orthopaedic and/ or haematology consultant.</td></tr>
<tr><td>Increased VTE risk</td><td colspan="2">Follow recommendations from orthopaedic and/ or haematology consultant.</td></tr>
<tr><td rowspan="2">Elective Foot and ankle surgery (excluding forefoot surgery) requiring immobilisation +/- altered weightbearing</td><td>Standard VTE risk</td><td colspan="2">Continue Enoxaparin SC 40mg once daily or aspirin 75mg orally for duration of immobilisation or minimum 6 weeks</td></tr>
<tr><td>Increased VTE risk</td><td colspan="2">Continue Enoxaparin SC 40mg once daily for duration of immobilisation or minimum 6 weeks</td></tr>
<tr><td>Elective

spinal surgery</td><td colspan="3">Thromboprophylaxis assessment done on a case-by-case basis depending on the type of surgery and risk factors – follow recommendations from spinal surgeon</td></tr>
<tr><td>Orthopaedic Oncology surgery</td><td colspan="3">Thromboprophylaxis assessment done on a case-by-case basis depending on the type of surgery and risk factors – follow recommendations from orthopaedic oncology surgeon</td></tr>
</table>

Trauma Procedures			
Procedure	**Risk stratification**	**During admission**	**On discharge**
Hip fracture surgery	All patients unless contraindicated	Enoxaparin SC 40mg once daily (*) (**)	Continue enoxaparin SC for an overall treatment course of 28 days If enoxaparin is contraindicated alternative methods of prophylaxis should be discussed with the consultant in charge
Lower limb fracture surgery (inc ankle fracture surgery and hindfoot surgery)	Standard VTE risk	Enoxaparin SC 40mg once daily (*) (**)	Continue enoxaparin SC or aspirin orally 75mg daily until weight bearing in cast/boot/splint
	Increased VTE risk	Enoxaparin SC 40mg once daily (*) (**)	Continue enoxaparin SC for an overall treatment course of 5 weeks. If patient requires a cast/ boot/ splint beyond 5 weeks post-op then continue thromboprophylaxis for the duration of cast/ boot/ splint.
Pelvic fracture surgery	Enoxaparin SC 40mg once daily for a total of 5 weeks (*) (**) unless actively bleeding		
Spinal fracture surgery	Thromboprophylaxis assessment done on a case-by-case basis depending on the type of surgery and risk factors – follow recommendations from spinal surgeon		
Spinal cord injury	Enoxaparin SC 40mg once daily (**)		
Multiple trauma	Thromboprophylaxis assessment done on a case-by-case basis depending on the extent of injuries – follow recommendations from orthopaedic and/ or haematology consultant		
No Surgical Procedure			
Orthopaedic patients who do not require surgery nor a lower limb cast, boot or splint but have reduced mobility	Enoxaparin SC 40mg once daily (**) - usually stopped at discharge or earlier if patient is no longer at high thrombotic risk when re-assessed (as per NHS GGC Therapeutics Handbook)		
Lower limb casts, boots or splints	For lower limb injuries that require immobilisation, removable "walking-boot" splints should be used in preference to backslabs or casts. If a patient is being managed in a "walking boot" splint, and allowed to weight-bear, and has no other increased risk factors, then no chemical thromboprophylaxis is required (except for achilles tendon ruptures - even when managed in a boot with wedges).Risk assess every patient prior to discharge. Refer to NHS GGC Risk Assessment for VTE - Outpatients with Lower Limb Injuries for risk assessment and recommendations which can be found on the Right Decision platform. **https://rightdecisions.scot.nhs.uk/ggc-clinical-guideline-platform/haematology/venous-thromboembolism/venous-thromboembolism-vte-in-lower-limb-injury-risk-assessment-1149/**		
Achilles Tendon injuries	Should be considered at higher risk and receive VTE chemoprophylaxis. Where possible consider using Rivaroxaban. Enoxaparin SC 40mg once daily can be considered if Rivaroxaban is contraindicated. It should be noted that the use of Rivaroxaban is an off label use for Achilles Tendon injuries. Dose and duration of treatment should be as per NHS GGC Risk Assessment for VTE - Outpatients with Lower Limb Injuries for risk assessment and recommendations which can be found in the Clinical Guideline Repository section of the Right Decision platform. **https://rightdecisions.scot.nhs.uk/ggc-clinical-guideline-platform/haematology/venous-thromboembolism/venous-thromboembolism-vte-in-lower-limb-injury-risk-assessment-1149/** Once the ankle returns to a neutral position and weightbearing is permitted the VTE risk is considered to return to standard.		

(*) Started on the day of surgery at 6pm or at least 4 hours after surgery, which ever is latest
(**) Reduce dose to 20mg if CrCl <30ml/min or if patient weighs <50Kg. For some patients weighing over 120kg, the dose may need to be increased. Please refer to guidelines

Heparin Dose Adjustment in the Presence of Renal Impairment (157) (nhsggc.org.uk)

Heparin Dose Adjustment, Adult Patients with Very High, or Low Body weight (156) (nhsggc.org.uk)

CrCl Calculator

Prescribing enoxaparin for thromboprophylaxis

ENOXAPARIN should only be prescribed after assessing the risks of VTE and assessing the risks of bleeding. Contraindications should be considered carefully (eg Heparin Induced Thrombocytopaenia (HIT), acute bacterial endocarditis, recent stroke etc).

Timing of enoxaparin administration

For in-patients with a significant reduction in mobility ENOXAPARIN should be prescribed at 6pm the night before surgery. Otherwise it should be started after surgery at the later of: 4hrs post-operatively or 6pm. Then at 6pm on subsequent days.

For patients admitted on the day of surgery that require ENOXAPARIN thromboprophylaxis:

- Anti-embolism stockings can be considered on a risk/benefit judgement
- ENOXAPARIN started after surgery at the later of: 4hrs post-operatively or 6pm. Then at 6pm on subsequent days.

Precautions with Epidural & Spinal Anaesthetic Techniques

Epidural and spinal anaesthetic techniques should not be carried out within 12hr of aprophylactic dose of ENOXAPARIN. Likewise epidural catheters should not be removed within 12 hr of a prophylactic dose of ENOXAPARIN. Wait >4h after any of these procedures before giving next dose of ENOXAPARIN. In most cases administration of ENOXAPARIN at 6pm will avoid any difficulties here.

Monitoring platelet count

All patients prescribed heparin, including LMWH, should have a baseline platelet count assessed. Post-operative patients receiving LMWH have a low risk of HIT and do not require routine platelet count monitoring for this purpose. Further advice on Diagnosis and Treatment of HIT can be found can be found in the Right Decision Platform.

https://rightdecisions.scot.nhs.uk/ggc-clinical-guideline-platform

Anti-embolism stockings (AES)

The use of AES for up to 6 weeks post-operatively can be considered based on risk/ benefit judgement.

Siegel profile compliant AES should be used. Calf length AES may be used where thigh length AES are unsuitable.

AES must be **removed** for 30 minutes in each 24 hour period. Reassess **daily** for any changes to skin or changes to patient condition such as oedema, and re-measure if any changes are noted.

Medical practitioners must prescribe the use of AES within the medication kardex.

Incorrect fitting of AES can be detrimental to the patient causing skin damage. Observation and continual assessment is required.

AES may be replaced with intermittent pneumatic compression devices (IPC) whilst in hospital.

Do not offer AES to patients who have:

- Peripheral arterial disease
- Peripheral neuropathy of legs
- Leg/foot ulcers
- Fragile 'tissue paper' skin
- Major limb deformity
- Cellulitis or massive oedema

Cautions

- Ensure the correct size is provided
- Remeasuring and refitting may be required
- Ensure good capillary refill after fitting
- Show patients how to use AES
- Ensure patients discharged with AES are able to remove and replace them (or have assistance)
- Do not fold down the tops of AES

General recommendations

- Facilitate early mobilisation as soon as possible
- Do not allow patients to become dehydrated
- Advise patients to consider stop taking oestrogen-containing oral contraceptives or hormone replacement therapy 1 month before elective surgery (and make adequate alternative contraceptive arrangements, if appropriate)
- Pre-existing established anti-platelet therapy
    - Assess risks and benefits of stopping before surgery
    - See *GG&C Secondary prevention of Coronary Heart Disease – Antiplatelet Guideline*
    - Do not regard anti-platelet therapy as adequate prophylaxis for VTE
    - Consider offering additional VTE prophylaxis to patients having antiplatelet agents assessed to be at increased risk of VTE (Table 1), taking into account the increased risk of bleeding
- Do not offer ENOXAPARIN to those on full anticoagulant therapy
- If regional anaesthesia is used pharmacological prophylaxis must be timed to minimise the risks of epidural haematoma

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