29 Foot and ankle orthopaedic surgery

29.1 Introduction

The risk of VTE in the foot and ankle surgery population is heterogeneous. However, there are several known risk factors that can increase the risk of VTE, including type and duration of surgery and period of immobilisation. Some patients who have foot or ankle surgery may be immobilised and require the use of a plaster cast or orthosis; these patients are evaluated in the lower limb immobilisation review (chapter 24). This guidance is for the totality of patients treated with lower limb immobilisation; clinicians should consider individual patient risk, such as people with tendoachilles rupture, when determining which VTE prophylaxis intervention is appropriate for a patient.

29.2 Review question: What is the effectiveness of different pharmacological and mechanical prophylaxis strategies (alone or in combination) in people having foot and ankle surgery?

For full details see review protocol in appendix C.

Table 130: PICO characteristics of review question

Population	Adults and young people (16 years and older) having foot and ankle surgery who are: • Admitted to hospital • Having day procedures • Outpatients post-discharge
Interventions	Mechanical: • Anti-embolism stockings (AES) (above or below knee) • Intermittent pneumatic compression (IPCD) devices (full leg or below knee) • Foot pumps or foot impulse devices (FID) • Electrical stimulation (including Geko devices) Pharmacological: • Unfractionated heparin (UFH) (low dose, administered subcutaneously) • Low molecular weight heparin (LMWH), licensed in UK: ○ enoxaparin (standard prophylactic dose 40mg daily; minimum 20mg daily* to maximum 60mg twice daily*) ○ dalteparin (standard prophylactic dose 5000 units once daily; minimum 1250 units once daily* to maximum 5000 units twice daily*; obese patients – maximum 7500 twice units daily*) ○ tinzaparin (standard prophylactic dose 4500 units once daily; minimum 2500 units once daily* to maximum 4500 units twice daily*; obese patients – maximum 6750 twice daily*) • LMWH, licensed in countries other than UK: ○ Bemiparin (standard 2500 units daily; minimum 2500 units daily to maximum 3500 units daily) ○ Certoparin (3000 units daily) ○ Nadroparin (standard 2850 units once daily; minimum 2850 units once daily to maximum up to 57 units/kg once daily) ○ Parnaparin (standard 3200 units once daily; minimum 3200 units once daily to

	maximum 4250 units once daily) ○ Reviparin (minimum 1750 units once daily to maximum 4200 units once daily) • Vitamin K Antagonists: ○ warfarin (variable dose only) ○ acenocoumarol (all doses) ○ phenindione (all doses) • Fondaparinux (all doses)* • Apixaban (all doses)* • Dabigatran (all doses)* • Rivaroxaban (all doses)* • Aspirin (up to 300mg)* *off-label
Comparisons	Compared to: • Other VTE prophylaxis treatment, including monotherapy and combination treatments (between class comparisons for pharmacological treatments only) • No VTE prophylaxis treatment (no treatment, usual care, placebo) Within intervention (including same drug) comparisons, including: • Above versus below knee stockings • Full leg versus below knee IPC devices • Standard versus extended duration prophylaxis • Low versus high dose for LMWH • Preoperative versus post-operative initiation of LMWH
Outcomes	Critical outcomes: • All-cause mortality (up to 90 days from hospital discharge) • Deep vein thrombosis (symptomatic and asymptomatic) (7-90 days from hospital discharge. Confirmed by: radioiodine fibrinogen uptake test; venography; Duplex (Doppler) ultrasound; MRI; Impedance Plethysmography (used as rule out tool) • Pulmonary embolism (7-90 days from hospital discharge). Confirmed by: CT scan with spiral or contrast; pulmonary angiogram; ventilation/perfusion scan including VQSpect; autopsy; echocardiography; clinical diagnosis with the presence of proven VTE • Major bleeding (up to 45 days from hospital discharge). A major bleeding event meets one or more of the following criteria: results in death; occurs at a critical site (intracranial, intraspinal, pericardial, intraocular, retroperitoneal); results in the need for a transfusion of at least 2 units of blood ; leads to a drop in haemoglobin of ≥2g/dl; a serious or life threatening clinical event. Includes unplanned visit to theatre for control of bleeding • Fatal PE (7- 90 days from hospital discharge). Confirmed by: CT scan with spiral or contrast; pulmonary angiogram; ventilation/ perfusion scan including VQSpect; autopsy; echocardiography; clinical diagnosis with the presence of proven VTE Important outcomes: • Clinically relevant non-major bleeding (up to 45 days from hospital discharge): bleeding that does not meet the criteria for major bleed but requires medical attention and/or a change in antithrombotic therapy. • Health-related quality of life (validated scores only)(up to 90 days from hospital discharge) • Heparin-induced thrombocytopaenia (HIT) (duration of study) • Technical complications of mechanical interventions (duration of study) • Unplanned return to theatre (up to 45 days from hospital discharge)

Study design	Randomised controlled trials (RCTs), systematic reviews of RCTs

29.3 Clinical evidence

No relevant clinical studies comparing different pharmacological and mechanical prophylaxis strategies for people who are undergoing foot and ankle surgery were identified. See the study selection flow chart in appendix E and excluded studies list in appendix N.

29.4 Economic evidence

Published literature

No relevant health economic studies were identified.

See also the health economic study selection flow chart in appendix F.

29.5 Evidence statements

Clinical

No relevant clinical studies were identified.

Economic

No relevant economic evaluations were identified.

29.6 Recommendations and link to evidence

Recommendations	**1.5.17 Consider pharmacological VTE prophylaxis for people undergoing foot or ankle surgery:** • **that requires immobilisation (for example, arthrodesis or arthroplasty). Consider stopping prophylaxis if immobilisation continues beyond 42 days (see recommendation 1.5.4) or** • **when total anaesthesia time is more than 90 minutes or** • **the person's risk of VTE outweighs their risk of bleeding. [2018]**
Research recommendation	**None**
Relative values of different outcomes	The committee considered all-cause mortality (up to 90 days from hospital discharge), deep vein thrombosis (symptomatic and asymptomatic) (up to 90 days from hospital discharge), pulmonary embolism (up to 90 days from hospital discharge), fatal PE (up to 90 days from hospital discharge), and major bleeding (up to 45 days from hospital discharge) as critical outcomes. The committee considered clinically relevant non-major bleeding (up to 45 days from hospital discharge), health-related quality of life (up to 90 days from hospital discharge), heparin-induced thrombocytopaenia (duration of study), and technical complications of mechanical interventions (duration of study) as important outcomes. Please see section 4.4.3 in the methods chapter for further detail on prioritisation of the critical outcomes.

Quality of the clinical evidence	No clinical evidence was identified for inclusion in this review.
Trade-off between clinical benefits and harms	In the absence of any clinical evidence, the committee considered advice from the orthopaedic subgroup and discussed that for those undergoing foot and ankle surgery, prophylaxis is not indicated for those whose surgery lasts less than 90 minutes, are not subsequently immobilised and are assessed as low risk for VTE. Where patients are immobilised after their foot or ankle surgery the risk of VTE is the same as the population reviewed for lower limb immobilisation and therefore the same recommendations apply, including the consideration of stopping prophylaxis if immobilisation continues after 42 days.
Trade-off between net clinical effects and costs	No relevant economic studies were identified for this population. Relevant unit costs were presented to the committee. The committee acknowledged that the risk of VTE will be minimal if the surgery total anaesthesia time is less than 90 minutes and the person undergoing the surgery has been assessed to be at low risk of VTE. This means that provision of prophylaxis for this group is unlikely to be cost-effective. Where immobilisation is required the risk of VTE will be higher, which would justify the cost of provision of prophylaxis. For this group, LMWH has been recommended based on the evidence considered specifically for people discharged with lower limb immobilisation in a separate chapter in this update. This was also reported to be in line with current practice. The committee acknowledged that long durations of immobilisation in this population are unlikely; however, the decision to continue prophylaxis beyond 6 weeks (42 days) should be made based on the balance between VTE and bleeding risks.
Other considerations	The ‘consider’ recommendation is a reflection of the lack of evidence in this population. However, it is the committee’s view that for this group of patients, prophylaxis is likely to be most clinically and cost effective when immobilisation is required or anaesthesia time is longer than one hour. The committee noted that not all patients who receive lower limb immobilisation are orthopaedic patients; for example, some patients with diabetic foot also receive immobilisation. This group of patients is also included in these recommendations.