Thromboprophylaxis in orthopaedic surgery

The risk in orthopaedic surgery
Some orthopaedic procedures probably carry no risk of thrombosis (e.g. upper limb surgery), whereas others carry a particularly high risk (e.g. revision hip surgery). Total hip replacement, total knee replacement and hip fracture have been the most widely studied procedures. The rate of fatal PE, without prophylaxis, is around 0.4% for total hip replacement and total knee replacement, and is probably higher for hip fracture. The symptomatic DVT rate for total hip replacement is around 4%. It may be higher for total knee replacement, although the similarity between postoperative and thrombotic swelling or calf pain confounds diagnosis. The frequency of chronic venous insufficiency, an important longer-term outcome, is unknown but is likely to be raised in those with asymptomatic DVT.

The ACCP 8th Conference on Antithrombotic and Thrombolytic Therapy recommendations for the prevention of VTE are provided in Figure 5.1 [1]. NICE recommends that, in addition to mechanical methods being offered, all orthopaedic patients undergoing lower-limb surgical procedures or wearing plaster casts should have a risk assessment. Those with risk factors should be offered mechanical prophylaxis and LMWHs, continued until the risk has expired. All those having a knee or hip replacement should be given mechanical thromboprophylaxis and then post operative LMWHs, fondaparinux, dabigatran or rivaroxaban. These should be continued for 2 weeks after knee replacement and 4 to 5 weeks after hip replacement [2].

Mechanical prophylaxis
Because bleeding is of concern to surgeons and anaesthetists, mechanical methods are enticing. GCS are widely used. The stockings should be carefully woven, fit well and must remain in place. There are few data on the efficacy after orthopaedic surgery, but a meta-analysis of studies from elsewhere in surgery suggests that they have a modest benefit. IPC devices (above or below
the knee) are effective, particularly after knee surgery. Foot pumps rhythmically empty the plantar venous plexus of the foot, flushing out the deep leg veins, offering prophylaxis that is probably equivalent to LMWH. They work best without the simultaneous use of graduated stockings and with the leg flat or slightly hanging down to enhance the preload required to prime the foot plexus.

Compliance and expense are issues for all mechanical methods; they are not suitable for, nor is there evidence in favour of, extended duration prophylaxis with mechanical devices.

**Pharmacological methods**

**Warfarin**

Warfarin is still widely used in North America. Death from PE in patients taking warfarin is exceedingly rare; the drug is nearly as effective as LMWH in reducing venographic DVT. It is supported by the main consensus groups and can be delivered beyond hospital discharge to protect against the risk of late-onset VTE. It is, however, regarded as obsolete in much of Europe because of the narrow window of safety, the need for regular coagulation monitoring, the delayed lead-time to effect, and the potential interaction with drugs or alcohol. It may not be as safe and efficacious in real clinical practice as it is in...