INVITED COMMENTARY

Deep Vein Thrombosis after Arterial Surgery: A Literature Review by M. Bani-Hani, M. Titi, H. Al-khaffaf

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The authors are to be congratulated on producing such a comprehensive review of the literature on deep vein thrombosis and its prevention after arterial surgery. The most striking aspect of this review is just how inadequate and confusing the literature on the subject is. In particular, numerous definitions of and techniques for diagnosing deep vein thrombosis have been used and Table 1 clearly demonstrates to the reader the paucity of randomised controlled trials. The largest number of patients randomised in the six controlled trials reviewed is 400. However, it has been calculated that the number of patients required to be randomised if it might be expected that subcutaneous heparin halved the rate of venous thromboembolism (VTE) would be 500 for deep vein thrombosis, 5000 for pulmonary embolism, 20,000 for fatal pulmonary embolism and 100,000 to show an effect on total mortality.1 The first randomised controlled study to show a significant reduction in the incidence of VTE in general surgical patients recruited 4471 patients.2 Therefore, the conclusion that I draw from this review is that no conclusion can be drawn. This is primarily because the relevant randomised controlled trials are pitifully underpowered.

So where does this leave the practising vascular surgeon in his/her attempt to minimise the incidence of VTE in patients undergoing arterial surgery? Nearly all patients undergoing vascular surgery are taking anti-platelet agents which should not be stopped around the time of surgery because such agents reduce the incidence of perioperative cardiac and cerebrovascular events.3 There is no evidence that anti-platelet agents decrease the incidence of post-operative VTE,4 yet they do increase the risk of bleeding. As the authors explain in their review, it is assumed by many vascular surgeons that the use of intravenous heparin reduces the incidence of postoperative thromboembolism. However, there is no evidence for this assumption. The dilemma for the vascular surgeon therefore is that the nature of the surgery itself plus the use of an anti-platelet agent combined with preoperative prophylactic subcutaneous heparin will increase the risk of bleeding. On the other hand, numerous authoritative guidelines for the prevention of VTE indirectly categorise arterial surgical patients into high-risk groups and therefore effectively recommend that such patients should receive heparin thromboprophylaxis. Thus, the vascular surgeon is trapped between the desire to reduce the incidence of VTE in his/her arterial surgical patients whilst not wanting to increase the risk of bleeding or fall foul of the potential medico-legal consequences of failure to provide effective VTE prophylaxis.

Although as the authors argue, the ideal answer to this dilemma is a large-scale adequately powered prospective

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randomised trial, it would not be ethical to randomise a control group with no prophylaxis. Therefore, in my opinion the only approach the vascular surgeons can take is to transpose the evidence from VTE prophylaxis in general surgical patients to their arterial surgery practice. I will summarise my own approach in the following paragraphs. Unfortunately, my views cannot be evidence-based, but rather a distillation of what I consider to be the pertinent information from general surgical trials.

There is considerable evidence that TED stockings and intraoperative intermittent pneumatic compression (IPC) reduce postoperative VTE. In arterial patients with palpable peripheral pulses these methods should be used and in those without peripheral pulses the ankle pressure should be measured. If they are >100 mm Hg then it should be safe to apply TED stockings. This calculation assumes that the compression pressure of TED stockings at the ankle is 20 mm Hg and a minimum arterial perfusion pressure of 80 mm Hg at the ankle is adequate. With regard to IPC, if there is concern about the vascular supply to the leg, then whilst the IPC boots are applied in theatre it is straightforward to investigate with a pencil Doppler whether or not the ankle signals disappear during the compressive phase.

With regard to carotid artery surgery it is widely accepted that neck surgery is low risk for VTE and high risk for bleeding. I therefore only use TED stockings and IPC prophylaxis in these patients. Amputation patients are particularly high-risk group because of pre- and postoperative immobility. I therefore use preoperative low molecular weight heparin, a TED stocking and IPC. In the case of patients undergoing lower limb reconstructive surgery or aortic surgery, in addition to the physical methods mentioned above, I prescribe low molecular weight heparin starting preoperatively. If, however, the surgeon is particularly concerned about the risk of intraoperative bleeding, it has been shown that low molecular weight heparin started up to 10 h postoperatively is as effective as that started 2 h preoperatively. Thus, low molecular weight heparin can be started up to 10 h after surgery in these patients without increasing the risk of intraoperative bleeding. An additional advantage of this approach is that concerns regarding the timing of epidural placement after low molecular weight heparin administration are negated.

References