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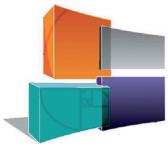

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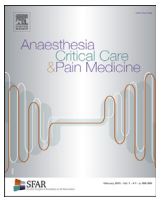

Editorial

Does intermittent pneumatic compression PREVENT deep vein thrombosis in the ICU?

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Multiple factors including severity of illness, immobilisation, and invasive interventions significantly increase the risk of developing thromboembolic complications in patients requiring management in intensive care units (ICU) [1,2]. Strong evidence exists for the use of prophylactic heparins in order to reduce this risk [3]. Accordingly, barring contra-indications or indications for therapeutic anticoagulation otherwise, all patients admitted to ICU are recommended to receive this therapy [3]. Where factors preclude the use of medical thromboprophylaxis, use of intermittent pneumatic compression devices are widely recommended as an alternative [4]. Given that medical thromboprophylaxis significantly lowers but does not eliminate risk, many patients are managed with both pharmacologic and mechanical preventative measures in the ICU. However, it has not been previously established as to whether the use of intermittent pneumatic compression offers protective effect beyond medical approaches alone [5].

Recently, Arabi et al. reported the results of the PREVENT study, a 20-centre prospective trial evaluating 2003 patients aged 14 and older admitted to ICUs in Saudi Arabia, Canada, India, and Australia [6]. The investigators included medical, surgical, and trauma patients who were expected to require admission to ICU for at least three days and randomly assigned them either to receive heparin plus intermittent pneumatic compression or to heparin alone. The primary outcome measure was the development of incident proximal lower limb deep venous thrombosis (DVT) as diagnosed by twice-weekly scheduled ultrasonography or performed as clinically indicated. They observed no significant differences in the proportion of patients developing DVT (3.9% of the heparin plus pneumatic compression group versus 4.2% heparin only controls; $P = 0.74$). All-cause mortality at 90 days was not different (26.1% versus 26.7% controls; $P = 0.8$).

This clinical trial was effectively designed, conducted, analysed, and reported. Although some 16,053 patients were screened in order to achieve the study cohort of 2003 patients, a high proportion of the eligible patients were successfully enrolled (2027/2535; 80%) with only 17 post randomisation exclusions and 7 further consent withdrawals leading to the final study population. Patients largely received their allocated interventions and there were relatively few protocol violations (28 in each group).

It is a limitation that the use and type of compression devices were not uniform across the study sites. Approximately 80% of patients had only knee length devices and the possibility exists that thigh level devices could be of different efficacy. It should also be kept in mind in generalising the results that a minority of subjects were either surgical or trauma patients with the large majority medical patients. Notably, and as the authors point out, the main limitation was that due to a lower observed (4%) than expected (7%) rate of DVT in controls, the study was subsequently under-powered. However, there was only a small observed absolute difference in DVT incidence between cases and controls (0.3%), which is likely not of clinical significance.

The key clinical practice implication of this trial is that intermittent pneumatic compression should not further be prescribed for most patients who are receiving adequate heparin thromboprophylaxis while admitted to ICU. Although modestly under-powered, no subgroups were observed to have a major signal to suggest benefit of the addition of intermittent pneumatic compression to heparin. Intermittent pneumatic compression devices increase costs of care, may serve as fomites for infection transmission, and may contribute to patient discomfort, immobility, and skin breakdown. While there are inevitably cases where "dual" prophylaxis may be considered reasonable, the decision to do so should be based on individualised clinical assessment and should not further be considered as a routine practice.

Although this study provides novel and important information to guide clinical management, it further raises the question as to whether intermittent pneumatic compression has any role in critically ill patients (i.e. even when medical thromboprophylaxis is contraindicated). This study further adds to the existing and remarkably limited body of literature indicating a lack of benefit in thromboembolism prevention with use of intermittent pneumatic compression in ICU patients [7]. Further study investigating the utility of these devices in patients who have contra-indications to standard heparin thromboprophylaxis is warranted.

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Disclosure of interest

The authors declare that they have no competing interest.

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