Physical Methods for Preventing Deep Vein Thrombosis in Stroke

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Background
Deep vein thrombosis (DVT) and secondary pulmonary embolism (PE) are uncommon but important complications of stroke and often the causes of death and morbidity. There is good evidence that anticoagulants can significantly reduce the risk of DVT (64%) after stroke, but this benefit is offset by a small but definite risk of serious hemorrhages. Physical methods can prevent DVT and PE and are not associated with any bleeding risk. They are effective in some categories of medical and surgical patients, but we do not know whether they are safe and effective in stroke patients.

Objectives
The aim of the review was to assess the effectiveness and safety of physical methods (ie, graded elastic compression stockings, intermittent pneumatic compression, and electrical muscular stimulation) of preventing the onset of DVT and fatal or nonfatal PE in patients with recent stroke.

Search Strategy
We searched the Cochrane Stroke Group trials register (June 2003). In addition, we searched the following electronic bibliographic databases: Cochrane Central Register of Controlled Trials (The Cochrane Library, Issue 2, 2003), MEDLINE (1966 to June 2003), EMBASE (1980 to June 2003), and CINAHL (1982 to June 2003). The reference lists of all relevant articles were screened for additional trials.

Selection Criteria
Unconfounded randomized controlled trials compared physical methods for the prevention of DVT with control in which prophylaxis was started within 7 days of the onset of stroke. We included patients of both sexes and all ages with any pathological type of stroke (either ischemic or hemorrhagic). Patients with subarachnoid hemorrhage were not included.

Data Collection and Analysis
Two reviewers searched independently for relevant trials, and 2 others independently checked the results. Types of outcome measures were: death from any cause, fatal and nonfatal PE during the scheduled treatment, and follow-up period. The Peto odds ratio and 95% CI were calculated for each
outcome using the Cochrane Review Manager software program (RevMan 4.2).

Main Results
We reviewed 43 studies and 31 abstracts, and only 2 trials met our inclusion criteria. In one trial of 97 patients, compression stockings were associated with a nonsignificant trend toward a reduction in DVT detected by Doppler ultrasound. In the other trial of 26 patients, an intermittent pneumatic compression device was not associated with a significant reduction in DVT detected by 125-I-fibrinogen scanning. Overall, physical methods were not associated with a significant reduction in DVT during the treatment period in survivors (odds ratio, 0.54; 95% CI, 0.18 to 1.57) or death (odds ratio, 1.54; CI, 0.5 to 4.77). Also assessing a nonpre-specified outcome, “death or DVT,” overall physical methods were not associated with a significant effect on this outcome (odds ratio, 0.88; CI, 0.39 to 1.98).

Reviewers’ Conclusions
The 2 small randomized controlled trials of physical methods for preventing DVT and PE in acute stroke do not provide conclusive evidence on the balance of risk and benefit. Although graded compression stockings and physical methods may be effective in some categories of high-risk patients, there is clearly a need for large-scale trials in stroke patients. The CLOTS Trial sought to determine whether graded compression stockings are effective, and for patients with a clear indication for graded compression stockings, whether below-knee or full-length is best.

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*Stroke*. 2005;36:1102-1103; originally published online April 7, 2005;
doi: 10.1161/01.STR.0000162386.92643.63

*Stroke* is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
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