Review on the value of graduated elastic compression stockings after deep vein thrombosis
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CRD summary
This review concluded that graduated elastic compression stockings can prevent post-thrombotic syndrome after deep vein thrombosis, whereas the evidence for recurrent deep vein thrombosis is inconclusive. Given the inadequate reporting of review procedures, small number of included studies, clinical variability of the studies and possibly inappropriate statistical methods, the conclusions must be regarded with caution.

Authors' objectives
To evaluate the effectiveness of graduated elastic compression stockings (GECS) in preventing recurrent deep vein thrombosis (DVT) and post-thrombotic syndrome (PTS) after DVT.

Searching
MEDLINE (1954 to April 2006), proceedings in the ISI Web of Knowledge (1990 to 2006) and Current Contents were searched; the search terms were reported. In addition, references of relevant studies were screened. Unpublished data were excluded.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion. The interval between DVT and enrolment ranged from 5 to 10 days to 12 months. Follow-up ranged from 36 to 76 months, on average.

Specific interventions included in the review
Studies evaluating GECS were eligible for inclusion. The GECS were below-knee in the included studies and compression ranged from 20 to 40 mmHg at the ankle, where specified. The comparators were either no stockings or placebo stockings.

Participants included in the review
Studies in patients with DVT were eligible for inclusion; no other inclusion criteria were specified. The patients in the included studies had experienced a first episode of DVT diagnosed by ultrasound or venography; studies of patients with past DVT were excluded. DVT was proximal (if reported). Clinical status was identified as post-acute phase of DVT, following 6 months anticoagulation, or asymptomatic venous reflux.

Outcomes assessed in the review
Studies were eligible for inclusion if recurrent DVT or PTS was assessed. The outcomes in the included studies were recurrent symptomatic and asymptomatic DVT. The diagnosis of recurrent DVT was made by ultrasound, venography or I125-labelled fibrinogen scan. PTS diagnoses were based on a validated clinical scale or the presence of chronic pain and leg swelling for at least 6 months after DVT.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected the studies.

Assessment of study quality
The reviewers assessed blinding and noted whether the studies provided a priori power calculations. The authors did not state how the validity assessment was performed.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. For each study, the number of patients who developed recurrent DVT or PTS was extracted to calculate event rates for treatment and control groups, the relative risk (RR), the number-needed-to-treat (NNT), and corresponding confidence intervals (CIs).

**Methods of synthesis**

**How were the studies combined?**
The studies were combined by adding incidence data for treatment and control groups over relevant studies per outcome. Pooled RRs appeared to be based on overall event rates; weighting was not reported.

**How were differences between studies investigated?**
Statistical heterogeneity was investigated using Cochran's Q and I-squared statistics. A sensitivity analysis was conducted to assess the effect of a small study on the estimate of NNT for PTS. Other differences were discussed in the text.

**Results of the review**
Four RCTs (n=537) were included in the review.

Most of the included studies were blinded; one was double-blinded. Power calculations were reported in three studies.

Two studies reported on compliance (93%) with respect to wearing GECS.

Overall, GECS reduced the incidence of PTS: the RR was 0.47 (95% CI: 0.36, 0.61, p<0.05; 3 RCTs, n=421). At the study level, the RR favoured GECS in 2 RCTs; the RR could not be computed in 1 study. The estimate of NNT to prevent one case of PTS was 4; the exclusion of 1 small study did not change the estimate. Statistical heterogeneity was non significant and I-squared was 0%.

Overall, GECS were not associated with a statistically significant reduction in the incidence of symptomatic recurrent DVT (3 RCTs, n=490). At the study level, the RR favoured GECS in 1 RCT. Cochran's Q was non significant and I-squared was 49.2%. GECS reduced the incidence of asymptomatic recurrent DVT; the RR was 0.20 (95% CI: 0.06, 0.64, p<0.05; 1 RCT, n=116). The estimate of NNT was 5.

**Cost information**
At the time of publication, the total costs for a pair of class 3 GECS (pressure 25 to 35 mmHg) purchased twice a year for 2 years were £41.76 (not customised) and £85.68 (customised). Assuming an NNT of 4 and that less than 3% of patients need customised GECS, the prevention of one case of PTS costs approximately £167 when excluding other costs for prescriptions, consultations, and recurrent DVT or PTS.

**Authors' conclusions**
GECS can significantly reduce the incidence of PTS and should be routinely prescribed for patients after DVT. The effect of GECS on recurrent DVT was less conclusive.

**CRD commentary**
The authors of this review clearly defined the research question in terms of the intervention, outcomes and trial design. The target population of patients with DVT was implied. The search terms were reported and full texts were checked for additional studies. Language restrictions were not reported. As unpublished data were excluded, publication bias cannot be ruled out; the reviewers did not report a formal investigation of publication bias. The reviewers searched relevant databases independently, but methods to reduce errors and bias for other stages of the review process were not reported.

The included studies were clinically heterogeneous with respect to the time of enrolment in the study after DVT, compression profile, treatment of control group, follow-up period diagnostic tests employed. Differences in study
features suggest that combining the studies in a meta-analysis might have been inappropriate. The method of calculating the pooled RR seems inappropriate as the weighting of individual study results was not reported. In additional, the model used for the meta-analyses was not reported.

The authors' conclusions regarding the effectiveness of GECS in preventing PTS may be unreliable for several reasons: publication bias is possible, the number of included studies was small, details of review procedures were inadequately reported, the included studies were clinically heterogeneous, and the statistical methods for combining the studies seem inappropriate. The authors' conclusion regarding inconclusive evidence for the effectiveness of GECS in preventing recurrent DVT follows from the reported evidence.

**Implications of the review for practice and research**

Practice: The authors stated that GECS should be prescribed soon after DVT to prevent PTS in patients with no contraindications for compression.

Research: The authors stated that future research should validate and standardise diagnostic PTS criteria to facilitate comparison among studies. Studies of recurrent symptomatic DVT should include patients at higher risk of DVT. Studies of recurrent asymptomatic DVT are needed to confirm the effectiveness of GECS.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.