Deep vein thrombosis prophylaxis: the effectiveness and implications of using below-knee or thigh-length graduated compression stockings

Byrne B

Authors' objectives
To evaluate existing evidence for the use of either thigh-length or below-knee graduated stockings to prevent deep-vein thrombosis (DVT) for patients in acute care settings.

Searching
The literature was searched from 1982 to 1999 using the MEDLINE, CINAHL, ScHARR and Cochrane Library databases. The search terms included 'DVT', 'thrombophlebitis', 'bandages', 'stockings', 'elastic' and 'compression'. The MEDLINE search was initially restricted to studies conducted on humans and published in the English language. An unrestricted search was also performed for the period 1993 to 1999. In addition, handsearches and searches of reference lists from published papers were conducted. Two of the major companies producing anti-embolism stockings in Australia were contacted for evidence that was used when making recommendations to the agencies that they service.

Study selection
Study designs of evaluations included in the review
The author did not restrict the types of study design to be included in the review. The actual studies included reviews of the literature (2), experimental studies (1), randomised controlled trials (RCTs; 4), observational studies (1) and discussion papers (1).

Specific interventions included in the review
The use of graduated compression stockings, irrespective of stocking length, to prevent DVT. This included below the knee and thigh-length graduated stockings.

Participants included in the review
The author did not specify any inclusion or exclusion criteria for the study participants. However, in the 'Discussion' section, it was stated that the objective was to evaluate these types of interventions in 'acute care settings'. The participants in the review included healthy volunteers, patients with a total knee or total hip replacement, patients in orthopaedic wards, patients having lower limb surgery and patients aged at least 40 years having major abdominal surgery.

Outcomes assessed in the review
The author did not clearly state the outcomes to be examined in the review. The narrative discussed studies under the headings of 'relative effectiveness' and 'relative efficacy'; this was not part of the systematic review.

How were decisions on the relevance of primary studies made?
The author does not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
The author does not report the criteria used to assess validity, or how the validity assessment was performed.

Data extraction
The author does not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

There was a single table containing brief information on the author and journal, sample size, study design, limitations.
and conclusions or outcomes.

**Methods of synthesis**

How were the studies combined?
The studies were combined in a narrative review.

How were differences between studies investigated?
Heterogeneity was not formally assessed.

**Results of the review**

Ten studies (n=2,480) were included. These included 580 patients from four RCTs, 17 in an experimental study, 131 in an observational study and 1,752 identified in one of two literature reviews.

None of the four RCTs studying thigh-length or below-knee stockings showed a significant reduction in DVT formation relating to stocking length. Nine of the ten studies (using various study methodologies) concluded that there was no difference in efficacy between below-knee and thigh-length stockings in DVT prophylaxis. None of the ten hospitals contacted could refer to any evidence supporting the use of one stocking length over the other.

**Cost information**

None. However, 9 of the 10 studies reported that knee-length stockings were cheaper than thigh-length stockings.

**Authors' conclusions**

Below-knee graduated compression stockings appear to be equally effective as thigh-length stockings in DVT prophylaxis. However, the studies available to date had limitations, making it difficult to draw unquestionable conclusions and apply the outcomes to a non-specific patient population. Below-knee stockings are easier for both patients and nurses to use, have less association risk and problems and are more comfortable, thus promoting improved patient compliance. This provides a strong argument that standard practice should be the use of below-knee graduated compression stockings rather than thigh-length stockings.

**CRD commentary**

This was a poor review which considered an important question. The author sought potential studies from three main electronic databases, but the search criteria were limited. It is unclear whether the search was restricted to English language publications for all of the searches. It is also unclear as to why an 'unrestricted' search was performed. No clear inclusion and exclusion criteria were given for the study selection process. There was also no information on the validity criteria for selecting and assessing the studies in the review, or on the data extraction. All of these factors can potentially reduce the comprehensiveness of the review and introduce bias. There was an absence of information about the ten individual studies for which outcomes were presented. These included a range of studies from reviews of the literature to RCTs; pooling these is inappropriate. More detailed information is needed relating to the study participants, the study setting, the type of intervention, the length of the intervention, and the method for determining the outcomes. Without this it is difficult to draw conclusions about the work that has been performed.

The author stated the conclusions from each of the ten studies. It is unclear whether these conclusions were drawn by the authors of the individual studies or by the author of this review. These conclusions did not necessarily reflect the findings of each study. For example, it was unclear whether some of the studies were designed to determine equivalence between the types of stocking, but it was concluded that the stocking types were equivalent.

The author's conclusions in the review do not follow from the data presented. It is not possible to state from this review that 'below-knee graduated compression stockings appear to be equally effective to the thigh length stockings in DVT prophylaxis', on account of the methodological limitations of the review.
Implications of the review for practice and research
Practice: The author states that there is a strong argument that standard practice should be the use of below-knee graduated compression stockings rather than thigh-length stockings.

Reviewer’s statement: The data presented in this review cannot be used to influence practice.

Research: The author recognises the need for adequately powered RCTs of below-knee and thigh-length stockings which incorporate an assurance that stocking application is therapeutic at all times.

Reviewer's statement: Based on the data presented in this review, there appears to be a lack of good evidence from RCTs about the benefit (efficacy and effectiveness) of each type of stocking to prevent DVT formation in specific groups of patients.

Bibliographic details

PubMedID
11449214

DOI
10.1067/mhl.2001.116009

Indexing Status
Subject indexing assigned by NLM

MeSH
Bandages /adverse effects /economics; Edema /etiology; Equipment Design; Humans; Ischemia /etiology; Leg /blood supply; Randomized Controlled Trials as Topic; Venous Thrombosis /physiopathology /prevention & control /rehabilitation

AccessionNumber
12001005406

Date bibliographic record published
30/06/2003

Date abstract record published
30/06/2003

Record Status
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.