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REVIEW

A Summation Analysis of Compliance and Complications of Compression Hosiery for Patients with Chronic Venous Disease or Post-thrombotic Syndrome

Hadyn K.N. Kankam [a], Chung S. Lim [b], Francesca Fiorentino [c], Alun H. Davies [b], Manj S. Gohel [a,b,d,*]

[a] Faculty of Medicine, University of Cambridge, Cambridge, UK
[b] Academic Section of Vascular Surgery, Imperial College London, London, UK
[c] Department of Surgery & Cancer, Imperial College London, London, UK
[d] Department of Vascular Surgery, Addenbrooke's Hospital, Cambridge, Cambridge, UK

WHAT THIS PAPER ADDS

In the published literature, good compliance with compression stockings is reported in under two thirds of patients treated for chronic venous disease or after deep vein thrombosis. Compliance appears to be greater with lower degrees of compression, suggesting that starting patients with lower degrees of compression, before increasing the strength of compression in compliant patients, may be a logical approach. Overall, reporting of compliance with compression is poor and more studies are needed to assess reasons for non-compliance and to assess strategies to improve it.

Objectives: Compression stockings are commonly prescribed for patients with a range of venous disorders, but are difficult to don and uncomfortable to wear. This study aimed to investigate compliance and complications of compression stockings in patients with chronic venous disease (CVD) and post-thrombotic syndrome (PTS).

Methods: A literature search of the following databases was carried out: MEDLINE (via PubMed), EMBASE (via OvidSP, 1974 to present), and CINAHL (via EBSCO*host*). Studies evaluating the use of compression stockings in patients with CVD (CEAP C2—C5) or for the prevention or treatment of PTS were included. After scrutinising full text articles, compliance with compression and associated complications were assessed. Compliance rates were compared based on study type and degree of compression. Good compliance was defined as patients wearing compression stockings for >50% of the time.

Results: From an initial search result of 4303 articles, 58 clinical studies (37 randomised trials and 21 prospective studies) were selected. A total of 10,245 limbs were included, with compression ranging from 15 to 40 mmHg (not stated in 12 studies) and a median follow-up of 12 months (range 1—60 months). In 19 cohorts, compliance was not assessed and in a further nine, compliance was poorly specified. Overall, good compliance with compression was reported for 5371 out of 8104 (66.2%) patients. The mean compliance, weighted by study size, appeared to be greater for compression ≤25 mmHg (77%) versus > 25 mmHg (65%) and greater in the randomised studies (74%) than in prospective observational studies (64%). Complications of stockings were not mentioned in 43 out of 62 cohorts reviewed. Where complications were considered, skin irritation was a common event.

Conclusions: In published trials, good compliance with compression is reported in around two thirds of patients, with inferior compliance in those given higher degrees of compression. Further studies are required to identify predictors of non-compliance, to help inform the clinical management of these patients. Complications of compression are not documented in many studies and should be given more consideration in the future.

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INTRODUCTION

Patients with chronic venous disease (CVD) may present with various symptoms and signs including leg pain, heaviness, itch, oedema, skin discolouration, and ulceration. Although the clinical effectiveness of compression therapy

* Corresponding author. Addenbrooke's Hospital, Cambridge CB2 0QQ, UK.
E-mail address: m.gohel@imperial.ac.uk (Manj S. Gohel).

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is debatable, it is commonly prescribed as a first line intervention in patients with CVD.[1,2] Recent meta-analyses suggest that there is no compelling evidence to support the role of compression stockings in the prevention of post-thrombotic syndrome, following acute deep vein thrombosis (DVT).[3,4] However, compression therapy is commonly employed for prevention of post-thrombotic syndrome (PTS), or for symptom relief in patients with established PTS.[5] Compression hosiery or stockings are relatively cheap and generally considered to be a benign and non-invasive treatment with few contraindications. However, many patients do not tolerate stockings well, potentially leading to poor compliance.[6,7] Moreover, reported complications of compression include discomfort, skin irritation, pressure damage, ulceration, and even limb loss.[8–10]

Although many clinical studies assessed the effectiveness of various compression stockings or hosiery in patients with CVD or PTS, patient compliance or complications remain poorly understood. Before recommending any treatment, an understanding of compliance is crucial in evaluating the benefits and risks of the intervention. Therefore, this study aimed to evaluate the compliance with compression stockings used in patients with CVD (CEAP grade C2–C5) or for the prevention or treatment of PTS.

METHODS

Search strategy

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[11] provided a framework for the conduct of this review. A literature search of the MEDLINE (via PubMed), EMBASE (via the OvidSP, 1974 to present), and CINAHL (via EBSCO*host*) databases was performed on September 19, 2016. The terms, "compression stockings", "compression hosiery", "elastic compression", "elastic stockings", "inelastic compression", and "nonelastic compression" were searched and combined with the Boolean operator "OR". The search was limited to English language articles, human studies, and title/abstract (search fields) published between January 1, 1980, and December 31, 2015.

Inclusion criteria

Prospective clinical studies reporting clinical outcomes for patients treated with compression stockings for CVD (CEAP C2–C5) or PTS (treatment or prevention) were included. Studies that assessed compression therapy for prophylaxis of acute deep vein thrombosis (DVT) or treatment of venous ulceration were excluded, as were articles that studied compression bandages or compression therapy after a surgical procedure. Papers were included if they assessed the use of compression stockings or hosiery as a specific intervention for a minimum of 4 weeks. The literature search was performed by two independent researchers (H.K. and M.S.G.). After an initial search using the criteria described above, titles and abstracts were reviewed independently by the authors. Publications not meeting the inclusion criteria were excluded and any differences were resolved by discussion. The full texts of the remaining papers were retrieved and scrutinised before agreeing on the final set of included studies.

Data extraction

A predefined dataset was extracted from each of the included studies by two researchers (H.K. and M.S.G.). The data extracted included first author, year of publication, study design, class of compression, number of limbs studied, severity of disease in participants (CVD studies), prevention or treatment of PTS (PTS studies), assessment period, compliance with compression, method of assessing compliance, and complications of compression therapy. Where studies investigated groups of patients treated with different classes of compression, cohorts were analysed separately. Good compliance was defined as wearing hosiery or stockings more than 50% of the time.

Risk of bias

Using the Cochrane Collaboration tool[12] as a guide, the included papers were assessed for several biases: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias. Selection bias was further subdivided into random sequence generation and allocation concealment in the assessment of randomised and non-randomised controlled trials and controlled before and after studies. Attrition bias was considered to be of high risk if less than 80% of participants initially enrolled were followed up, without adequate explanation.[13]

Statistical analysis

Categorical data were tabulated as absolute figures and percentage of the total number of patients from all studies included. The frequency and proportions of patients with good compliance in different groups were determined. Because of the variability across interventions, study types, and patient population, no statistical inference could be drawn. Instead, weighted means using cohort size as the weight (with standard deviations [SD] as a measure of dispersion) were calculated and the following descriptive comparisons were made: prospective observational (PO) studies versus randomised clinical trials; compression $\leq$ 25 mmHg versus compression $>$ 25 mmHg; CVD versus post-thrombotic patients. All analyses were performed using STATA (version 13.2, Stata Corp., College Station, TX, USA).

RESULTS

Summary of literature search

The primary literature search returned 4303 articles, 2053 from MEDLINE, 1758 from EMBASE, and 492 from CINAHL. Of these, 3591 did not meet the inclusion criteria described above after screening their titles and abstracts. A further 654 articles were excluded after retrieving their full texts. A summary of the literature search and exclusions is presented in Fig. 1.

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