

COCHRANE COLUMN

Taryn Young

This month we highlight the review by Clarke *et al.* evaluating the effects of wearing compression stockings vs not wearing it among people travelling on flights lasting at least 4 h.

The aim of the Column is to highlight Cochrane systematic reviews of relevance to public health, and to stimulate debate on relevance, feasibility and acceptability. The Cochrane Collaboration (<http://www.cochrane.org>) is an international,

South African Cochrane Centre, Medical Research Council, PO Box 19070, Tygerberg 7505, South Africa. Email: taryn.young@mrc.ac.za

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non-profit organization that prepares and disseminates up-to-date systematic reviews on the effects of healthcare interventions in order to help people make well-informed decisions. Systematic reviews aim to answer focused healthcare questions by systematically identifying and evaluating all relevant research studies and synthesizing their results.

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Compression stockings to prevent deep vein thrombosis in long-haul airline passengers

Mike Clarke, Sally Hopewell, Ed Juszczak, Anne Eisinga and Monica Kjeldstrøm

The possibility of a relationship between air travel and an increased risk of deep vein thrombosis (DVT) has been discussed for more than half a century.¹ It was labelled 'economy class syndrome' in the 1970s, on the belief that prolonged sitting in confined conditions was a major factor.² However, the true frequency of DVT during long-haul flights is unknown. A systematic review of observational studies concluded 'there is currently no definite evidence that air travel increases the risk of DVT. However, there is some evidence to suggest that flights of 8 h or more increase the risk of DVT if a person has additional risk factors.'³

In recent years, there has been increasing interest in whether compression stockings (sometimes called 'flight socks') might reduce the risk of DVT and other circulatory problems in airline passengers. A recently published Cochrane review⁴ sought trials in which passengers on flights lasting at least 4 h were randomized either to wear compression stockings on both legs or not at all. Nine trials were found and included, with the shortest flight lasting 7 h. Trials in which passengers were randomized to wear a stocking on one leg only were also eligible. One such trial was found, which recruited 35 people.

The nine trials comparing wearing stockings on both legs versus not wearing them recruited 2821 passengers. Seven of the trials included people judged to be at low or medium risk of developing a DVT (1548 passengers) and two trials included high risk participants (1273 passengers). No deaths, pulmonary emboli or symptomatic DVTs were reported, but all trials included special tests to detect symptomless DVT after the flights. Among the 2637 participants with follow-up data available, 50 were found to have a symptomless DVT. There

was a highly statistically significant difference in these between the stockings and the no stockings group: three were in passengers allocated to wear stockings, compared to 47 in the no stockings group. The meta-analysis revealed an odds ratio of 0.10 (95% confidence interval 0.04–0.25, $P < 0.00001$). There is no robust evidence that different types of stockings vary in their effects or that particular subgroups of people similar to those in these trials would not experience this benefit.

The trial in which passengers were randomized to wear a stocking on one leg but not the other, assessed differences in oedema between the legs. This trial found that oedema was less for the leg on which a stocking was worn. Six of the trials of wearing stockings on both legs, or not, also measured oedema and revealed a significant reduction when stockings were worn.

Not all the trials reported on possible problems with wearing stockings but in those that did, the researchers said that the stockings were well tolerated, without any problems.

Because there were no deaths, pulmonary emboli or symptomatic deep vein thromboses in this review, it remains unproven whether compression stockings affect these outcomes. The lack of these more serious consequences of vascular problems in the review may be because the trials involved special additional tests on all participants which may have led to effective management and thereby prevented more serious consequences, if a symptomless DVT had been detected. It is also possible that death, pulmonary embolus and symptomatic DVT would have been so rare among the people in these trials that, even without the special diagnostic tests and subsequent treatments, no such events would have been recorded.

In summary, this review shows a large reduction in symptomless DVT among airline passengers who were allocated to wear compression stockings compared with those allocated not to wear such stockings. This reduction might relate to, for example, changing the risk of developing a symptomless DVT from about 10–30 per 1000 to 1–3 per 1000. The large and significant reduction in leg oedema associated with the wearing of stockings might also make their use attractive to airline passengers who suffer from this.

The full text of the Cochrane Review is available in *The Cochrane Library*: Clarke M, Hopewell S, Juszczak E, Eisinga A, Kjeldstrøm M. Compression stockings for preventing DVT in airline passengers. *The Cochrane Database of Systematic Reviews*

2006, Issue 2. Art. No.: CD004002.pub2. DOI:10.1002/14651858.CD004002.pub2.

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- ² Symington IS, Stack BH. Pulmonary thromboembolism after travel. *Br J Dis Chest* 1977;**71**:138–40.
- ³ Adi Y, Bayliss S, Rouse A, Taylor RS. The association between air travel and deep vein thrombosis: systematic review & meta-analysis. *BMC Cardiovasc Disord* 2004;**4**:7.
- ⁴ Clarke M, Hopewell S, Juszczak E, Eisinga A, Kjeldstrøm M. Compression stockings for preventing deep vein thrombosis in airline passengers. *Cochrane Database Syst Rev* 2006;CD004002.

Commentary: Compression stockings to prevent deep vein thrombosis in long-haul airline passengers

GDO Lowe

There is increasing interest in the risk of deep vein thrombosis (DVT) of the legs and its acute complication, pulmonary embolism (PE) following long-distance travel. While publicity has focused on air travel, there is also an increased risk with long-distance road travel (by car or bus), which suggests that leg immobility in limited-space seating is the major causal mechanism. Ongoing epidemiological research is defining the absolute risks of clinical DVT and PE, as well as the relative risks associated with flight duration (the risk currently appears to increase after 4 h) and other risk factors for DVT and PE (age, obesity, oral oestrogen use, cancer, recent immobilizing illness, previous DVT or PE and congenital or acquired thrombophilia). At the same time, it is important to establish the efficacy of specific prophylactic methods, which include heparins, aspirin and compression stockings. Current evidence-based clinical practice guidelines recommend that these be considered in high risk long-distance travellers, but that further research is required.

This Cochrane review by Clarke *et al.* provides an important step forward. It establishes reliably that the types of compression stockings used in the randomized trials which were reviewed greatly reduce the risk of asymptomatic DVT. This relative risk reduction is consistent with that observed for compression stockings in previous systematic reviews of randomized trials of their use in prophylaxis of asymptomatic

DVT in patients hospitalized in surgical wards. As the authors note, further randomized trials are required to establish the effect of wearing stockings on symptomatic DVT, PE or death in travellers (as was eventually shown for symptomatic DVT or PE in hospitalized surgical patients). Such trials will have to be very large: no such clinical events were observed in the trials reviewed.

The results of this review therefore support the efficacy of these compression stockings in prophylaxis of subclinical DVT (as well as leg oedema) in long-distance airline travellers; and the case for their consideration in those at high risk.¹ Larger trials are required to establish their efficacy in reducing the risk of clinical thrombotic events, as well as their adverse effects.

- (i) Scottish Intercollegiate Guidelines Network. Prophylaxis of venous thromboembolism (SIGN 62). Edinburgh: SIGN, 2002. Available at: www.sign.ac.uk (Accessed August 30, 2006).

A summary of Cochrane reviews (and protocols) of relevance to health promotion and public health can be viewed on the Cochrane Health Promotion and Public Health website: <http://www.vichealth.vic.gov.au/cochrane/>