Cochrane for Clinicians

Putting Evidence into Practice

Can Walking Lower Blood Pressure in Patients With Hypertension?

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Clinical Question

Is routine walking an effective way to lower blood pressure?

Evidence-Based Answer

Walking lowers systolic blood pressure by 4.11 mm Hg (95% CI, 3.01 to 5.22 mm Hg). It lowers diastolic blood pressure by 1.79 mm Hg (95% CI, 1.07 to 2.51 mm Hg) and resting heart rate by 2.76 beats per minute (bpm; 95% CI, 0.95 to 4.57 bpm).[1] (Strength of Recommendation: C, based on low- to moderate-certainty disease-oriented evidence.)

Practice Pointers

Hypertension can contribute to heart disease[2] and is affected by an individual's physical activity level and lifestyle habits.[3] Walking can be a relatively easy and affordable way to incorporate lifestyle changes and potentially lower blood pressure.

The authors of this Cochrane review evaluated studies of walking compared with no physical activity to lower blood pressure.[1] This review included 73 randomized controlled trials and 5,763 participants. Participants were 16 to 84 years of age and normotensive or hypertensive men and women with various health conditions—the category "prehypertensive" was not discussed. The primary outcome was change in systolic blood pressure; secondary outcomes included changes in diastolic blood pressure and heart rate.

Walking as an intervention occurred in multiple environments, including at the participant's home, in the local community, or in a laboratory with a treadmill. Participants walked an average of 153 minutes per week for an average of 15 weeks. Although the intensity of activity was described as "moderate," it varied among groups and was determined in a variety of ways, from heart rate or VO_2 max (maximal oxygen consumption during intense exercise) to the speed of walking; in several studies walking intensity was not described at all.

The primary evaluation found moderate-certainty evidence that walking lowered systolic blood pressure (mean difference [MD] = 4.1 mm Hg; 95% CI, 3.0 to 5.2 mm Hg). Secondary evaluation found low-certainty evidence that walking lowered diastolic blood pressure (MD = 1.8 mm Hg; 95% CI, 1.1 to 2.5 mm Hg) and heart rate (MD = 2.8 bpm; 95% CI, 1.0 to 4.6 bpm). A subgroup analysis by age found moderate-certainty evidence that walking lowered systolic blood pressure in participants 40 years or younger (MD = 4.4 mm Hg; 95% CI, 2.7 to 6.2 mm Hg). There was low-certainty evidence that walking lowered systolic blood pressure in patients 41 to 60 years of age (MD = 3.8 mm Hg; 95% CI, 1.9 to 5.6 mm Hg) and in those older than 60 years (MD = 4.3 mm Hg; 95% CI, 2.4 to 6.2 mm Hg). There were only eight total adverse events across the 21 trials that reported them, five of which were knee pain.

The findings of this review suggest that a walking regimen—three to five times a week at a moderate intensity for 20 to 40 minutes per session, with at least 150 total minutes per week for approximately three months—can lower systolic blood pressure, diastolic blood pressure, and heart rate in adult men and women with or without hypertension. These findings support guidelines for the management of hypertension in adults as established by the National Institute for Health and Care Excellence and the American Heart Association and American College of Cardiology, which recommend that lifestyle interventions be included as part of a hypertension treatment plan.[4,5]

The practice recommendations in this activity are available at http://www.cochrane.org/CD008823.

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These are summaries of reviews from the Cochrane Library.

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A collection of Cochrane for Clinicians published in *AFP* is available at https://www.aafp.org/afp/cochrane.

CME This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 15.

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Compression Stockings for Preventing Deep Venous Thrombosis in Airline Passengers

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Clinical Question

Are compression stockings safe and effective for the prevention of deep venous thrombosis (DVT) in airline passengers?

Evidence-Based Answer

Compression stockings are effective at reducing asymptomatic DVT in airline passengers taking flights longer than five hours in both high-risk (number needed to treat [NNT] = 37; 95% CI, 35 to 46) and low-risk (NNT = 111; 95% CI, 100 to 143) populations.[1] (Strength of Recommendation: C, based on disease-oriented evidence.) It is unclear if compression stockings prevent symptomatic DVT, pulmonary embolism (PE), or death. There are no significant adverse events associated with their use.

Practice Pointers

DVT occurs through the formation of a blood clot in the deep veins, typically within the lower extremities. This can ultimately lead to a PE, a significant cause of morbidity and mortality. Prolonged periods of immobility that occur during air travel are a risk factor for the development of venous thromboembolism (VTE).[2] However, symptomatic VTE (including DVT or PE) after long-distance travel is rare, with an incidence of 27 per 1 million passengers within 14 days of travel.[2] Asymptomatic DVT is a finding of uncertain clinical significance and occurs in 2.4% of high-risk travelers and 1.5% of low- or medium-risk travelers.[1] Risk factors for VTE with long-distance travel (greater than four hours) include active malignancy, recent surgery, pregnancy or recent postpartum state, hormone therapy, obesity, and a history of VTE.[3]

This Cochrane review included nine randomized trials of 2,821 patients comparing the use of bilateral, below-the-knee compression stockings vs. no stockings during flights lasting more than five hours.[1] The majority of these trials were conducted in the United Kingdom. All of these studies were at risk of performance bias because blinding of the participants was not possible. The authors also noted an unclear risk of selection bias—the majority of trials did not include sufficient information on the randomization methods. Two of the trials studied patients considered to be at high risk of DVT (i.e., those with obesity, prior DVT, recent cancer history, coagulopathy, or reduced mobility), whereas seven trials included individuals at low or medium risk. The follow-up period was immediately postflight through 48 hours postflight. Presence of DVT was assessed by ultrasonography or D-dimer and fibrinogen testing. Both groups demonstrated lower rates of asymptomatic DVT with compression stockings, but those in the high-risk population experienced a greater benefit.

Patients who wore compression stockings were at lower risk of developing asymptomatic DVT (odds ratio [OR] = 0.10; 95% CI, 0.04 to 0.25; high-certainty evidence). The incidence of asymptomatic DVT decreased from 1% to 0.1% for low-risk patients and from 3% to 0.3% for high-risk patients. The overall rate of asymptomatic DVT was very low, and no deaths, PE, or symptomatic DVTs were reported.

Four trials studied ankle compression strength of 20 to 30 mm Hg, and five trials studied over-the-counter compression strength of 10 to 20 mm Hg. The ideal compression strength could not be determined.

Citing issues of cost and uncertain benefits, the American Society of Hematology (ASH) advises against the routine use of compression stockings for low-risk travelers. However, for long-distance travelers at high risk of VTE, the ASH recommends compression stockings or low-molecular-weight heparin for flights longer than four hours, or aspirin (no specific dosing recommended) for those who are unable to tolerate those two options.[3] Although the optimal compression strength remains uncertain, this intervention is unlikely to be harmful. Insurance may cover compression stockings for specific medical conditions, and one pair typically costs $10 to $30 when bought over the counter.

The practice recommendations in this activity are available at http://www.cochrane.org/CD004002.

Editor's Note: The NNTs and their corresponding CIs reported in this Cochrane for Clinicians were calculated by the authors based on raw data provided in the original Cochrane review.

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