Aerobic exercise reduces blood pressure in both hypertensive and normotensive persons

Synopsis


Questions: Does aerobic exercise reduce blood pressure? If so, who responds, how large is the effect and what types of aerobic exercise are effective?

Data sources: Studies were identified by searching MEDLINE and SPORTDiscus (1966-September 2001) and by a manual search of the reference lists of retrieved articles. Study selection: Studies were selected if they were randomised controlled trials (RCTs), had follow-up of at least two weeks, the only difference between experimental and control groups was aerobic physical activity, and the paper was published in English. Data extraction: Three reviewers independently extracted data on characteristics of participants, study design, intervention method and outcomes. Disagreements were resolved by consensus. Statistical analysis: A random effects model was used to pool the overall effect size for both systolic and diastolic blood pressure. The characteristics used for sub-group analyses included hypertensive status, ethnicity, study duration, study sample size, study design, baseline BMI, weight loss during trial, exercise type, exercise frequency and exercise intensity.

Main results: Fifty-four RCTs met the selection criteria: 53 provided usable systolic blood pressure data and 50 provided usable diastolic blood pressure data. Systolic blood pressure decreased in 44 of 53 trials (20 statistically significant) and diastolic blood pressure decreased in 42 of 50 trials (16 statistically significant). The overall pooled net effect of aerobic exercise on systolic and diastolic blood pressure was -3.84 mmHg (95% CI -4.97 to 2.72 mmHg) and -2.58 mmHg (95% CI -3.35 to 1.81 mmHg). Reduced blood pressure was observed in all sub-groups.

Conclusions: Aerobic exercise reduces blood pressure in hypertensive and normotensive individuals. These beneficial effects were independent of changes in body weight. Sub-group analysis suggested the benefits occurred in all three of the ethnic groups studied.

Commentary

Approximately three million adult Australians have hypertension. It is the single most common problem managed in general practice (AIHW 2002) and a major risk factor for cardiovascular disease, the most common cause of death amongst Australians. Although pharmacotherapy effectively reduces blood pressure in the hypertensive (AIHW 2002), it can be associated with deleterious side effects. Thus, the efficacies of lifestyle modifications such as increased levels of physical activity are of interest.

This meta-analysis clearly demonstrates that aerobic exercise significantly reduces systolic and diastolic blood pressure in hypertensive and normotensive individuals. These beneficial effects were independent of changes in body weight. Sub-group analysis suggested the benefits occurred in all three of the ethnic groups studied.

The overall blood pressure lowering effect was 3.84 and 2.58 mm Hg for systolic and diastolic pressures respectively. Changes of this magnitude in the general population have important public health implications by virtue of their potential to reduce the incidence of cardiovascular disease in the community (AIHW 2002). However, their implications for the individual are likely to be more modest. Indeed, careful measurement technique would be critical to detecting changes of this magnitude in individuals.

It is of interest that the effects were apparent for different exercise modes and doses but the effect size was larger in studies of shorter duration and where the exercise intervention was supervised, suggesting that adherence is an important determinant of the benefits of this approach. It is also noteworthy that the participants in 51 of the 54 studies selected were sedentary at baseline. It follows that development of strategies to facilitate exercise adherence in individuals who are habitually inactive may be critical to the success of exercise interventions for the prevention and treatment of hypertension.

Physiotherapists working in primary and secondary prevention can and should play a major role in the promotion of aerobic exercise, thereby reducing the impact of hypertension and other chronic diseases.

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Reference