

Correspondence

Vitamin C and exercise-induced bronchoconstriction in athletes

To the Editor:

Anderson and Kippelen¹ reviewed the mechanisms of and therapeutic approaches to exercise-induced bronchoconstriction (EIB) in athletes. In addition to the treatments they discussed, vitamin C can also affect EIB.

We carried out a systematic review of the effect of vitamin C supplementation on the common cold.^{2,3} Vitamin C consistently reduced the duration of common cold symptoms, but the effect on common cold incidence was significantly heterogeneous. In the general population, vitamin C supplementation had no preventive effect; however, the supplements halved the incidence of colds in 6 placebo-controlled trials with participants under heavy acute physical stress: pooled relative risk, 0.50 (95% CI, 0.38-0.66; total, $n = 642$). Four of these trials were with marathon runners, 1 was with Canadian soldiers in a northern training exercise, and 1 was with schoolchildren in a skiing camp in the Swiss Alps.^{2,3}

In the general community the acute symptoms of cough, sore throat, and runny nose usually have a viral cause. However, it is not obvious that similar symptoms occurring after a marathon run are caused by a viral infection because they can result from an injury to runners' airways caused by their hours of exceptional ventilatory exertion.¹ Thus the common cold studies of marathon runners might have been measuring, at least in part, the effects of vitamin C on the physical injury to their airways instead of viral infections.

In their trial with marathon runners, Peters et al⁴ recorded the "self-reported symptoms including a running nose, sneezing, sore throat, cough, and fever" during a 2-week postrace period. The incidence of postrace cough was significantly reduced in the vitamin C group compared with the placebo group: relative risk, 0.29 (95% CI, 0.10-0.83; 4/43 vs 13/41). The incidence of sore throat was also reduced by vitamin C: relative risk, 0.33 (95% CI, 0.16-0.66; 8/43 vs 23/41). In contrast, vitamin C had no significant effect on the incidence of runny nose ($P = .2$). Peters did not carry out virologic or pulmonary function tests before or after the race, and thus the cause of the symptoms is uncertain, yet there is no strong basis to assume viruses caused the symptoms. Furthermore, a few studies have directly measured the effect of vitamin C supplementation on bronchial responsiveness.

Ogilvy et al⁵ reported that vitamin C reduced the duration and intensity of bronchoconstriction induced by methacholine.

The action of vitamin C was abolished by indomethacin, indicating that the effect was mediated through the prostaglandin metabolism. Direct evidence indicating that vitamin C affects EIB was found in 3 small ($n \leq 20$) laboratory studies in which the decrease of FEV₁ after exercise was attenuated by vitamin C supplementation.⁶⁻⁸ Tecklenburg et al⁸ also reported that vitamin C decreased the levels of proinflammatory eicosanoids in urine. These 3 laboratory studies do not, however, define the clinical importance of vitamin C for athletes. On the other hand, the 6 trials with participants under heavy acute physical stress^{2,3} indicate that vitamin C has clinically important effects on the respiratory symptoms of some athletes, although it is not clear to what degree that effect is directed at their viral infections and the physical injury to their airways. This means that more trials that examine the mechanisms and therapeutic effects of vitamin C on the respiratory symptoms of athletes are warranted.

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