

Vitamin C and exercise-induced bronchoconstriction in athletes

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To the Editor:

Anderson and Kippelen reviewed the mechanisms of and therapeutic approaches to exercise-induced bronchoconstriction (EIB) in athletes.¹ In addition to the treatments they discussed, vitamin C may 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 the 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 six placebo-controlled trials with participants under heavy acute physical stress: pooled RR = 0.50 (95% CI: 0.38-0.66; total n = 642). Four of these trials were with marathon runners, one was with Canadian soldiers in a Northern training exercise, and one 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 running nose usually have viral etiology. However, it is not obvious that similar symptoms occurring after a marathon run are caused by a viral infection, as 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 may 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 al. recorded the "self-reported symptoms including a running nose, sneezing, sore throat, cough, and fever" during a two-week post-race period.⁴ The incidence of post-race cough was significantly reduced in the vitamin C group as compared to the placebo group: RR = 0.29 (95% CI: 0.10-0.83; 4/43 vs. 13/41). The incidence of sore throat was also reduced by vitamin C: RR = 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 = 0.2). Peters did not carry out virologic or pulmonary function tests before and after the race and thus the etiology 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 al. reported that vitamin C reduced the duration and intensity of bronchoconstriction induced by methacholine.⁵ The action of vitamin C was abolished by indomethacin, indicating that the effect was mediated via the prostaglandin metabolism.⁵ Direct evidence indicating that vitamin C affects EIB was found in three small (n ≤ 20) laboratory studies in which the fall of FEV₁ after exercise was attenuated by vitamin C supplementation.⁶⁻⁸ Tecklenburg et al. also reported that vitamin C decreased the levels of proinflammatory eicosanoids in urine.⁸ These three laboratory studies do not, however, define the clinical importance of vitamin C for athletes. On the other hand, the six 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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