Sal vs. OB contrasts from interacting significantly with order.

For the benefit of readers who prefer a per-comparison alpha, or who might prioritize the various contrasts and measures differently than we have, Table 4 also notes those F_{contr}s that reach statistical significance by a fully a priori (per-comparison) criterion.

DISCUSSION

The purpose of this investigation was to determine the effects of a reinfusion of 400 ml of autologous RBCs on the 1,500 m track race in highly trained, male distance runners. Supporting data were measures of VO_2 max, La, Hb, Hct, 2,3-DPG, @ P_{50}.

The RBC infusion resulted in a faster overall 1,500 m race time in comparison with the preinfusion race or the race after saline when saline was first. In group 1, there was no change after saline infusion but an improvement after the RBC infusion. In group 2, the change was seen after infusion and remained throughout the rest of the study (ie, persisted after the second infusion of saline). In either case it was the RBC infusion that caused the decrease, and it lasted at least 7 days. The mean performance time for the 1,500 m track race was 4.5 s faster after RBC infusion, ie, an average of 3 s/km. The time improvement was greater than predicted from the regression line in other studies (Figure 1) which may be the result of an enhanced buffering capacity [6] the more anaerobic the event. The fitness level of the athlete may be an important prerequisite for the maximal benefits of induced erythrocythemia to occur. Sawka et al [14], report that subjects with an initial VO_2 max between 50 and 65 ml/kg/min appear to respond best to RBC infusion. A lack of peripheral reserves (insufficient oxidative capacity) in subjects below 50 ml/kg/min is theorized to be the main cause while in subjects greater than 65 ml/kg/min the cause is suspected to be effective usage already of peripheral and central reserves. This could account for the smaller time improvement (3 secs) observed in subject # 1 of group 2.

Although blood boosting is banned by the International Olympic Committee there is presently no test to effectively detect it. Efforts by Swedish researchers [15] to develop a test by screening high hemoglobin concentrations and depressed serum erythropoeitin have met with inconclusive results.

CONCLUSIONS

It is apparent that the infusion of 400 ml packed RBCs into a distance runner with normal blood volume and Hb level, will significantly increase red cell mass and Hb concentration. These augmentations significantly improve both VO_2 max and 1,500 meter track race time. Although the results of this study suggest a beneficial effect from induced erthrocythemia, it should be pointed out that the subjects in this study, although good calibre runners, were not elite runners and the results obtained may not be applicable to the latter.

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