

Red Blood Cell Variables in Volleyball Players of Kolkata, India

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Abstract

Intensive physical exercise often leads to suboptimal hematological status in humans as well as in animals. In some cases it may lead to anemia. Studies on training induced changes in red blood cell variables in Indian sportspersons are lacking, especially among volleyball players. The present cross-sectional study was conducted to measure the basic red blood cell variables in trained male (n=20) and female (n=16) state level volleyball players (18–25 years) of Kolkata, India, and to compare the data not only between two sexes but also with their sedentary (male = 20, female = 20) counterparts. Venous blood sample was drawn from the cubital vein and the red blood cell count (TC), packed cell volume (PCV), hemoglobin (Hb) concentration, MCV and MCHC were determined by standard methods. The volleyball players of both sexes had significantly lower values of TC, PCV and Hb concentration than their control counterparts but MCV and MCHC depicted insignificant variation, indicating a probable effect of hemodilution among the players. The reduction in TC, PCV and Hb concentration among the volleyball players was significantly correlated with the duration of the training, except in case of PCV in the female group. The decrement in TC and PCV among the female players was less probably because of their significantly ($P < 0.01$) lower training duration than the male players. It can be concluded that the high intensity endurance training resulted a decrease in TC, Hb concentration and PCV among the volleyball players and such decrement is significantly correlated with the training duration.

Key Words: Hemoglobin, Red Blood Cell, PCV, MCV, MCHC, Volleyball, Training

Introduction

There have been reports of suboptimal hematological status and even anemia resulting from intensive physical exercise in humans (*Biancotti et al. 1992; Hasilbeder et al. 1987; Magazanik et al. 1988; Radomski et al. 1980*) as well as in experimental animals (*Szygula et al. 1986*). These studies have investigated the acute effects of different types of intensive exercise as well as training on the red blood cell variables and reported a decrease in red blood cell count, hemoglobin concentration, packed cell volume, mean corpuscular volume and mean hemoglobin concentration (*Brodthagen et al. 1985; Gimenez et al. 1986; Cordova and Escanero, 1992; Laub et al. 1993*) or an increase in red blood cell count (*Schwandt, 1991; Cordova et al. 1993*). There are other reports

(*Hasilbeder et al. 1987; Magazanik et al. 1988; Schmidt et al. 1988; Schobersberger et al. 1990; Biancotti et al. 1992*) which concentrated on the effects of chronic high intensity training on these variables reported almost similar kind of observation as found in case of acute training or exercise. However, similar and contemporary studies are lacking in Indian sportspersons.

Volleyball is one of the popular sports in India and any kind of hematological deficiency may cause serious trouble among the volleyball players who come across a vigorous exercise protocol during their training session. Data on the hematological profiles, especially on red blood cell variables are not available on trained Indian volleyball players. The present study was therefore conducted to measure