

Blood parameters as a measure for controlling physical performance of young Algerian cyclists (U23 category)

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Abstract

Purpose: The use of blood parameters in monitoring athletes is an essential but an unstandardized component of managing athletic preparation. This study aims to describe and evaluate typical measurements and responses observed while monitoring elite cyclist during a training camp. The reported observations might contribute in constituting a scientific support for other practitioners to employ.

Material: 35 elite cyclists from the Algerian National team aged 16 – 23 years participated in this study. Peripheral fasting blood samples were collected in resting after 24 hrs of physical inactivity and outside competitions. Complete blood count (CBC) and hormonal index values (Cortisol, Testosterone, ProBNP and TnT) were tested twice before and after the training camp. The statistical data were analysed by the SPSS software version 22.0.

Results: The observed rates of change were significant ($p < 0,01$, $p < 0,05$) for most erythrocyte variables, except for leukocyte and platelet distribution levels. Hormonal values recorded for Troponin ($\downarrow 92,78\%$, $p = 0,000$) and Cortisol ($\downarrow 11,85\%$, $p = 0,000$) remained significantly as an anticipatory response to competition. The responses of the ProBNP and testosterone were not statistically significant and experienced a different response with regards to their kinetics.

Conclusions: This study is further support suggesting a viable approach to monitoring physical performance index in elite athletes. The results imply that reducing volume while increasing intensity of training just before competition can enhance performance during short preparation periods.

Keywords: physiological follow-up, physical performance, hematologic indices, hormonal profile, young cyclists.

Introduction

To bring a cyclist at his highest level of performance requires a rational management of the training process. This consists of organizing, controlling, monitoring certain parameters that are decisive for the establishment of high-level performance [1].

The management and organization of training periods and cycles is based on the competition schedule. Short-term “intensified training” (IT) are often used during training cycles over the course of a sporting season to elicit performance gains [2]. These typically short-term IT periods occur in the forms of both training (training camp) and during busy competition schedules (stage races, tournaments) [3].

The process of training camp is commonly used in several endurance sports [4] to enhance training adaptation at specific times in the season [5]. In sport such cycling; the main goal of training camp is to prepare cyclists for the upcoming competition period [6].

For the preparation of the Arab Championships, the Algerian Cycling Federation had, among others, resorted to a short-term training course. The nature of training camp was manipulated to align with certain goals:

improving aerobic capacities, perform high intensity work and preparing for a specific competition. To date, little is known about the hematological and hormonal effects of this kind of training.

Many athletes, coaches, and support staff are taking an increasingly scientific approach to both designing and monitoring training programs [7]. However, highly congested competition calendars in combination with inadequate athletic preparation management could negatively impact athlete performance.

Given the complexity of athletic preparation, some blood markers are typically employed for physiological profiling and monitoring purposes in athletes. During training and competition, hematologic [8], hormonal and immunological [9, 10] markers are routinely used in evaluating the health and performance of professional athletes.

In fact, training induced changes observed in various biochemical variables can be attributed to appropriate load dynamics [11]. Monitoring athletes using blood biomarkers seems to be appropriate tool for making statistical inferences in several key biological systems affected by training.

With the purpose that results can be correctly interpreted and useful in the sport practice, it is crucial to have reference values specific for athletes. So, it is important to establish baseline indices for the main

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