

Leukocyte counts in professional football players

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Athletes are usually monitored by using biochemical and hematological indices for evaluating possible pathologies and performance status. The immunological response is constantly and periodically monitored by using various parameters, including C-reactive protein, total and specific immunoglobulins, and total leukocytes and their subsets. Athletes often suffer from immunological modifications and, consequently, from infections impairing performance and training.¹ Leukocytes counts in athletes are usually similar to those of the general population. Sports activities induce an increase of leukocytes by corticosteroid-induced release of neutrophils from the bone marrow reserve, a pool of non-proliferating cells.² There are some reports of reduced leukocyte counts in athletes. Leukopenia has been described in Afro-Caribbean marathon runners;² lymphopenia has been reported in professional cyclists.³ Leukopenia has been reported in European football players, but the group of studied athletes was very small and blood was drawn at only one time in the sporting season.⁴ Immunological diseases in football players such as neuromuscular impairment caused by amyotrophic lateral sclerosis which is reported in these athletes with a higher frequency than in the general population, draw particular attention to leukocyte behavior in professional players.^{5,6} During two sporting seasons, from July 2001 to March 2003, we did 410 hematologic tests in 150 male football athletes (17-39 years, mean: 26; all Caucasians, except for 6 Africans) playing in four teams in the Italian First and Second Divisions. Each athlete had samples taken from 1 to 8 times during the period, 12 athletes had sample taken while playing in different teams because of their change of team. Pre-analytical phase recommendations were precisely followed;⁷ the analyses were performed on Cell Dyn 3500 (Abbott, Chicago, USA). We found a mean total leukocyte count of $6.09 \times 10^9/L$ with a standard deviation of 1.36; only in 12 cases (10 athletes) was a leukocyte count lower than $4 \times 10^9/L$ found, but a count lower than $3.5 \times 10^9/L$ was never found. The mean granulocyte count was $3.23 \times 10^9/L$ (standard deviation: 0.52), whereas the mean number of lymphocytes was $2.20 \times 10^9/L$ (standard deviation: 0.46); in only 15

cases (10 athletes) was lymphocyte count higher than that of the granulocytes. The high number of athletes and observations and the long period of study allow some considerations to be made about the behavior of leukocytes in professional football players. We did not find pathological trends in studied athletes and the fluctuations of the number of total leukocytes and subpopulations seemed to be physiological. We can exclude a correlation between high-intensity physical training, especially aerobic, and reduction of leukocytes and, consequently, impaired chronic immunological response, although the single parameter of leukocyte number is not sufficient to describe the immunological status of the individuals accurately. The careful medical follow-up, typical of Italian football players, should exclude that pathologies are missed, even in periods when hematological tests are not routinely performed: the institutional protocol of the Italian Football Federation states that hematological tests must be performed each semester to all the population of Italian professional football players,⁸ whereas we performed the tests five or six times in a year. In conclusion, the behavior of leukocytes in these athletes does not show peculiar shapes of interest.

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