A follow-up of GH-dependent biomarkers during a 6-month period of the sport season of male and female athletes

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In order to verify the effects of the sporting season (entailing periods of training, competition, recovery, resting) on GH-dependent parameters in male and female athletes from different sport disciplines, 47 male and female athletes (3 rowers, 5 swimmers, 7 alpine skiers, 3 soccer players, 7 middle distance runners, 14 sprinters, 4 triathletes, 1 road walker, 3 cyclists) were followed-up for a period of 6 months. Blood samples were taken every two months for the evaluation of IGF-I, N-terminal propeptide of type III procollagen (PIIINP) and C-terminal cross-linked telopeptide type I collagen (ICTP). Abnormal IGF-I, PIIINP and ICTP levels were observed during the follow-up period in 7/100 (7%), 9/100 (9.0%) and 8/100 (8%) samples of the male group, respectively, and in 9/88 (10.2%), 1/88 (1.1%) and 0/88 (0%) samples of the female group, respectively. Abnormal levels appeared to be randomly distributed over the different periods of the sporting season and within male and female subjects, with the large majority of abnormal values being found in the younger athletes. Taking into account all the tests done during the 6-month period (no. 564), individual markers falling outside the normal range (for age) were observed in a small number of instances (34/564 tests done, 24/300 for males and 10/264 for females). When our method for detection of exogenous recombinant GH (rhGH) administration, based on the concomitant determination of these three peripheral GH-dependent markers and on the attribution of specific scores, was applied in the same athlete at a given time point of the 6-month period, the prevalence of a positive score was extremely low (ie, 3/188 samples or 1.6%). Total positive scores were actually recorded in only three male athletes (2 swimmers and 1 skier, aged <21 yr) at one occasion during the 6-month period considered. In contrast, no total positive scores were found in female athletes (i.e., 0/88 samples). In conclusion, the concentrations of IGF-I, PIIINP and ICTP were stable and not significantly modified during 6 months of a sporting season (entailing periods of training, competition, recovery, resting) in athletes from different sport disciplines. Therefore, our method, based on the concomitant determination of three peripheral GH-dependent biomarkers appears safe, acceptable, relatively inexpensive and repeatable (in case of positive or suspected values) immediately or at different intervals of the sporting season. Further additional studies are requested to precise the cut-off values for narrower age-class subdivisions in both genders in order to improve the proposed method.