Combined evaluation of resting IGF-I, N-terminal propeptide of type III procollagen (PIIINP) and C-terminal cross-linked telopeptide of type I collagen (ICTP) levels might be useful for detecting inappropriate GH administration in athletes: a preliminary report.

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Objective: to verify whether combined measurements of GH-dependent parameters might be useful in detecting exogenous recombinant GH (rGH) administration in male athletes from different disciplines.

Methods: sixty-six athletes (control group) were sampled for the evaluation of resting IGF-I , N-terminal propeptide of type III procollagen (PIIINP) and telopeptide type I collagen (ICTP). Cut-off values (mean + 2 SD) for IGF-I, PIIINP and ICTP were calculated and arbitrary scores (1.5, 2.0) were assigned to abnormal parameters. By using the sum of individual parameter scores, positive (≥3) or negative (<3) scores were obtained. In addition, a subgroup of six athletes was treated for 3 weeks with rGH (0.09 IU/kg body weight, 6 days/week) and was similarly evaluated at the end of the 1st, 2nd and 3rd week (i.e. 18 samples).

Results: abnormal IGF-I or PIIINP or ICTP levels were found, respectively, in one, two and four subjects (1.5 - 6.1%) of the control group (in the younger athletes); only one 19-year-old subject of this group obtained a positive score. Abnormal IGF-I, PIIINP and ICTP levels were found in 61.1 - 66.7% samples of the treated group. Positive cases were 3/6 at the 1st and 2nd week and 6/6 at the 3rd week. The sensitivity of the screening approach was 50-100% (at the 1st - 2nd and 3rd week, respectively) and specificity was 98.5%.

Conclusion: the 'first level' screening test is safe, acceptable and relatively inexpensive. Further additional investigations of 'second level' (i.e. GH secretory profile, GH response to a GH-releasing peptide) can be retained to validate or exclude rGH administration or for the early diagnosis of infrequent endogenous GH hypersecretion.