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Influence of multiple injections of human chorionic gonadotropin (hCG) on urine and serum endogenous steroids concentrations.

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Since it is established that human chorionic gonadotropin (hCG) affects testosterone production and release in the human body, the use of this hormone as a performance enhancing drug has been prohibited by the World Anti-Doping Agency. Nowadays, the only validated biomarker of a hCG doping is its direct quantification in urine. However, this specific parameter is subjected to large inter-individual variability and its determination is directly dependent on the reliability of hCG immunoassays used. In order to counteract these weaknesses, new biomarkers need to be evidenced. To address this issue, a pilot clinical study was performed on 10 volunteers submitted to 3 subsequent hCG injections. Blood and urine samples were collected during two weeks in order to follow the physiological effects on related compounds such as the steroid profile or hormones involved in the hypothalamo-pituitary axis. The hCG pharmacokinetic observed in all subjects was, as expected, prone to important inter-individual variations. Using ROC plots, level of testosterone and testosterone on luteinizing hormone ratio in both blood and urine were found to be the most relevant biomarker of a hCG abuse, regardless of inter-individual variations. In conclusion, this study showed the crucial importance of reliable quantification methods to assess low differences in hormonal patterns. In regard to these results and to anti-doping requirements and constraints, blood together with urine matrix should be included in the anti-doping testing program. Together with a longitudinal follow-up approach it could constitute a new strategy to detect a hCG abuse, applicable to further forms of steroid or other forbidden drug manipulation.

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