Abuse of Zolpidem in Racing Cyclists: A New Type of Addiction Demonstrated by Hair Analysis

Pascal Kintz*, Marion Villain, Guillaume Salquebre, and Vincent Cirimele
Laboratoire ChemTox, 3 rue Gruninger, F-67400 Illkirch, France

AIMS: During several trials in France in the past years, it has been claimed that cyclists can abuse zolpidem (Stilnox), an hypnotic, for sedation during periods of time off. To document the abuse of benzodiazepines and hypnotics, particularly zolpidem, we have analyzed hair collected from cyclists from the same team.

METHODS: Hair was collected in one day from 29 cyclists during a medical survey and stored at ambient temperature until analysis. The laboratory was requested to test for anabolic steroids, drugs of abuse, corticoids, β-adrenergic compounds (e.g. salbutamol, clenbuterol) and, if sufficient specimen is available, for benzodiazepines and hypnotics. Enough material remained for 12 cyclists. The method included decontamination of hair with methylene chloride, cutting the hair into small pieces followed by incubation of 20 mg in phosphate buffer (pH 8.4). Liquid-liquid extraction, with 1 ng diazepam-d₅ as the internal standard, was performed with diethyl ether/methylene chloride (80/20). Separation was performed by LC using a XTerra C18 column with detection by MS/MS. The limits of quantification for all benzodiazepines and hypnotics ranged from 0.5 to 5 pg/mg using a 20-mg hair sample.¹

RESULTS: From the 12 cyclists tested, 10 were positive for zolpidem (0.3 to 1918 pg/mg), 6 for bromazepam (3.6 to 58 pg/mg), 5 for zopiclone (5.3 to 142 pg/mg), 3 for tetrazepam (7.0 to 139 pg/mg), 2 for diazepam (1.0 and 1.9 pg/mg) and finally 1 for 7-aminoflunitrazepam (79 pg/mg). This clearly demonstrates multi-drug use. Only one single cyclist was found negative. No doping agent was detected during the general investigations.

It is well known that many athletes experience some form of stress that may result in insomnia during the night before the competition. According to cyclists, as regards to the performance capacity, there is no risk to use sleep inducers the night before a race. The “toxicology of victory” has promoted new behaviors, where performance is the key point, even after the competition, during social life, for example. As athletes are sometimes subject to having their biological clock in disarray, they can develop over-consumption and dependence to active molecules.

CONCLUSIONS: Many cases of drug addiction in athletes have been revealed in recent years. The stress of competitive sports often leads to a specific vulnerability of sportsmen to addiction. In cyclists, zolpidem was the most frequently drug detected with a broad spectrum of exposure, ranging from one-time use (low pg/mg) to long-term use (> 1 ng/mg).

Keywords: Hair, Zolpidem, Sports

¹Villain et al - Screening method for benzodiazepines and hypnotics in hair at pg/mg level by LC-MS/MS. Journal of Chromatography B, 825: 72-78 (2005)