

# Anabolic androgenic steroid abuse and mood disorder: a case report



Received 31 July 2006; Reviewed 7 August 2006; Revised 8 August 2006; Accepted 10 August 2006;  
First published online 18 September 2006

Current data suggest that the use of anabolic androgenic steroids (AAS) has become quite common among athletes, bodybuilders, as well as adolescents and young adults who want to increase their muscle mass for aesthetic or athletic reasons. Commonly used anabolic steroids are the oral 17 $\alpha$  alkyl derivatives of testosterone (methyl testosterone, oxymetholone, oxandrolone, stanozolol) and the intramuscular 17 $\beta$ -esterified agents such as nandrolone decaonate, nandrolone phenpropionate, testosterone cypionate and testosterone propionate (Blue and Lombardo, 1999). The abuse of AAS has been associated with various psychiatric manifestations: sleep disorders, anxiety, labile mood, mania, depression, irritability, aggression, violence, suicidal and homicidal ideation and behaviour, psychosis, confusion and delirium. Long-term abuse may lead to the development of a dependence syndrome and associated withdrawal symptoms on attempted discontinuation (Hall et al., 2005; NIDA, 2006).

The case of a young man, a long-term steroid abuser with a prior history of psychotic depression and manifestations of a current manic episode, is presented. The patient was hospitalized in the D' Acute Ward of the Psychiatric Hospital of Thessaloniki and he was diagnosed with a substance-induced mood disorder (with manic features), attributed to the use of AAS. A few months after his brief hospitalization and under obscure circumstances the patient committed suicide.

## Case report

A 25-yr-old man was involuntarily admitted to the Psychiatric Hospital of Thessaloniki, after starting a fight, during which he was injured. In the first interview, the patient displayed psychomotor agitation and was restless, verbally aggressive, irritable and euphoric. His attention was constantly drawn to

irrelevant external stimuli and both his speech and form of thought were severely disturbed (pressure of speech, logorrhoea, flight of ideas). Mental status examination revealed delusional ideas of reference, persecution and grandeur as well as auditory hallucinations. The patient, although assaultive and threatening, did not express homicidal or suicidal ideation. He had no insight into his illness and demanded to be discharged to continue his 'mission from God'. No family history of a psychiatric disorder was reported.

The patient had been involved in bodybuilding, martial arts and illegal fighting matches and using AAS since early adolescence. According to his parents he was functioning well (he was working, he had a relationship) and had shown no signs of a psychiatric disorder until 2 yr ago. It was then that he was initially diagnosed with depression (depressed mood, anhedonia, feelings of worthlessness, self-reproach and self-devaluation, mood-congruent psychotic features, significant impairment in social and occupational functioning); no suicidal ideation was expressed at that point. He was prescribed paroxetine and his symptoms remitted gradually within the next 8 months. Subsequently he did not work again. One year ago he increased his dose of AAS (>2 g testosterone weekly) and started the concomitant use of stimulant amino acids, somatotropin, growth hormone and oestrogen antagonists (clomiphen, tamoxifen). In the last 6 months the patient gradually became irritable and aggressive, with decreased need for sleep, logorrhoea and 'peculiar' ideas. He also started displaying antisocial behaviour. Several incidents of violent assaults were reported and since the patient refused to visit a doctor, the parents were advised to request an involuntary psychiatric evaluation.

In the patient's clinical picture the mood disturbance (elevated and irritable) predominated and there was serious evidence from the history that his symptoms developed during steroid abuse. The reported depressive episode could also be attributed to either use or temporary discontinuation of AAS. These features, together with the absence of a family history of a psychiatric disorder, made the diagnosis of a substance-induced mood disorder (with manic

Address for correspondence: D. Kouvelas M.D., Ph.D., Associate Professor of Pharmacology and Therapeutics, Department of Pharmacology, School of Medicine, Aristotle University of Thessaloniki, PO Box 1532, 54006 Thessaloniki, Greece.  
Tel.: +30 2310 999335 Fax: +30 2310 999335  
E-mail: kouvelas@auth.gr

features) more appropriate. During his hospitalization, the patient was treated with 20 mg/d haloperidol and 300 mg/d chlorpromazine. However, he absconded from the hospital before any therapeutic effect had been achieved and the parents were reluctant to bring him back.

Later, the treating doctors were informed that the patient's violent outbursts and impulsivity continued until he was seriously injured in a car accident and had to be admitted to a general hospital. There, under the supervision of a psychiatrist, he received anti-psychotics (20 mg/d haloperidol) and benzodiazepines (7.5 mg/d lorazepam), which he continued – at least for some time – after his discharge. Apparently, he also stopped the use of AAS and he improved significantly within the next month. However, 6 months later it was reported by the parents that the patient had committed suicide. Unfortunately, information regarding the patient's mental status and medication at that point as well as the method of suicide, is lacking. Moreover, it remains unclear whether the suicide was committed at a time when the patient had started steroid use again or whether he was at a withdrawal stage.

### Discussion

The use of elevated doses of AAS is associated with the development of psychiatric manifestations (Hall et al., 2005; Trenton and Currier, 2005). Specifically, they occur among individuals consuming more than 1 g of testosterone weekly and become more common and severe as the dose increases. Irritability, aggression, mood lability, mania and depression are some of the most prominent symptoms. Generally, mood changes are considered a common early sign of steroid use, whereas depression is also common after discontinuation. Psychosis and homicidal or suicidal behaviour are less frequent (Hall et al., 2005; Trenton and Currier, 2005). The variety of psychiatric manifestations is attributed to factors such as the type and the amount of the substance, the duration of usage, the concomitant use of other psychoactive substances and the individual's personality traits (cluster B and especially antisocial and narcissistic personality disorders are common among AAS users) (Porcerelli and Sandler, 1998).

AAS users are often polysubstance abusers and the abuse more frequently includes substances such as cannabis, opioids, cocaine and amphetamines. Equally common is the concomitant use of substances, which can either enhance the desired effects of AAS or decrease their adverse effects: human growth hormone,

human chorionic gonadotropin, somatotropin, erythropoietin, insulin, oestrogen antagonists, amino acids, diuretics and analgesics (Kanayama et al., 2003; Parkinson and Evans, 2006).

There are no well-established guidelines for the management of steroid abuse. At first, treatment should address acute physical and behavioural symptoms. There is anecdotal evidence that haloperidol is effective in treating steroid-induced agitation related to psychosis and mania. The use of atypical anti-psychotics in these cases, although not well established yet, should also be considered. Another therapeutic option for agitation is benzodiazepines, especially lorazepam. Valproate semisodium may also be useful in patients with manic symptoms. SSRIs are likely to be the treatment of choice for depression associated with either long-term use or discontinuation of steroids (Allen et al., 2005; Trenton and Currier, 2005).

Once the acute behavioural symptoms have remitted, treatment should be focused on the management of the abuse itself. Detoxification and long-term rehabilitation may take place on an in-patient or out-patient basis, depending on the individual. NSAIDs may be useful for the headaches and muscle pains commonly associated with withdrawal from steroid use, whereas additional treatments may be required depending on the specific symptomatology (Brower, 1994).

AAS abusers are at a higher risk of dying violently because of impulsive/aggressive behaviour and suicide. Suicide has been associated not only with current steroid abuse but also with discontinuation of AAS use. It is suggested that suicides committed during steroid use have an impulsive character, whereas those occurring during withdrawal are more likely to be related to underlying severe depression (Thiblin et al., 2000). In any case, because of the high risk of relapse and suicide as well as for the effective management of depression, supportive psychotherapy and long-term rehabilitation are considered necessary.

### Acknowledgements

None.

### Statement of Interest

None.

### References

- Allen MH, Currier GW, Carpenter D, Ross RW, Docherty JP (2005). Treatment of behavioral emergencies 2005. *Journal of Psychiatric Practice* 11, 5–25.

- Blue JG, Lombardo JA** (1999). Steroids and steroid-like compounds. *Clinics in Sports Medicine* 18, 667–689.
- Brower KJ** (1994). Withdrawal from anabolic steroids. *Current Therapy in Endocrinology and Metabolism* 5, 291–296.
- Hall RC, Hall RC, Chapman MJ** (2005). Psychiatric complications of anabolic steroid abuse. *Psychosomatics* 46, 285–290.
- Kanayama G, Cohanne GH, Weiss RD, Pope HG** (2003). Past anabolic-androgenic steroid abuse among men admitted for substance abuse treatment: an underrecognized problem? *Journal of Clinical Psychiatry* 64, 156–160.
- National Institute on Drug Abuse (NIDA)** (2006). Report series: anabolic steroid abuse (<http://www.nida.nih.gov>). Accessed 20 June 2006.
- Parkinson AB, Evans NA** (2006). Anabolic androgenic steroids: a survey of 500 users. *Medicine and Science in Sports and Exercise* 38, 644–51.
- Porcerelli JH, Sandler BA** (1998). Anabolic-androgenic steroid abuse and psychopathology. *Psychiatric Clinics of North America* 21, 829–833.
- Thiblin I, Lindquist O, Rajs J** (2000). Cause and manner of death among users of anabolic androgenic steroids. *Journal of Forensic Sciences* 45, 16–23.
- Trenton AJ, Currier GW** (2005). Behavioural manifestations of anabolic steroid use. *CNS Drugs* 19, 571–595.
- Georgios Papazisis<sup>1,2</sup>, Dimitrios Kouvelas<sup>2</sup>, Anastasia Mastrogianni<sup>1</sup>, Anastasia Karastergiou<sup>1</sup>**  
<sup>1</sup> *D' Acute Ward, Psychiatric Hospital of Thessaloniki*  
<sup>2</sup> *Department of Pharmacology, School of Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece*