



## **Major depressive disorder caused by abrupt cessation of anabolic steroid use: Case report**

### **Transtorno depressivo maior causado pela interrupção abrupta do uso de esteroides anabolizantes: Relato de caso**

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#### **ABSTRACT**

This case report shows how the misuse of anabolic steroids can lead to psychological, physiological and somatic disorders and disturbances that significantly affect a person's life. The patient in question presents depressive symptoms, in addition to gynecomastia, after indiscriminate use of anabolic hormones followed by its sudden interruption. After laboratory, clinical and imaging evaluation, a diagnosis of major depressive disorder with anxiety components was made. A drug therapeutic intervention was proposed for symptomatic control, as well as a surgical evaluation for varicocele correction. This case reveals the importance of caution when using anabolic steroids for aesthetic purposes, which often lead to severe bodily and psychological changes.

**Keywords:** Anabolic Androgenic Steroids, Depressive Disorder, Gynecomastia.



## RESUMO

Este relato de caso mostra como o uso indevido de esteroides anabolizantes pode levar a transtornos e distúrbios psíquicos, fisiológicos e somáticos que afetam significativamente a vida de uma pessoa. O paciente em questão apresenta sintomas depressivos, além ginecomastia, após uso indiscriminado de hormônios anabolizantes seguido de súbita interrupção. Após avaliação laboratorial, clínica e por imagem, chegou-se ao diagnóstico de transtorno depressivo maior com componentes ansiosos. Foi proposta intervenção terapêutica medicamentosa para controle sintomático, bem como avaliação cirúrgica para correção de varicocele. Este caso revela a importância do cuidado ao se fazer uso de esteroides anabolizantes para fins estéticos, que muitas vezes levam a alterações corporais e psíquicas severas.

**Palavras-chave:** Esteroides Androgênicos Anabolizantes, Transtorno Depressivo, Ginecomastia.

## 1 INTRODUCTION

The indiscriminate use of steroids as a way to achieve better muscle development, loss of fat mass and improve athletic performance has been increasingly widespread among young people in general, which causes important physiological and psychological side effects.<sup>1</sup> Nowadays, there is a great abuse of this type of drug for anabolic (non-therapeutic) purposes, mainly by men, due to the increased concern for body aesthetics in this group.<sup>2</sup>

The search for the ideal body that fits the aesthetic standards established by society is what motivates young people to start using supplements and anabolics. Muscle dysmorphism is only the first psychological symptom in common among individuals before starting the use of anabolics, and after use, the psychic effects are much more significant.<sup>3</sup>

It was proven by an American study that the abusive use of anabolic androgenic steroids (AAS) is associated with increased incidence of mood disorder, mania, bipolar disorder and profound depression in 25% of the research participants.<sup>2</sup> In addition, the incorrect use of AAS was also related to aggressive acts in general, behavioral syndromes, property crimes, increased irritability, pathological jealousy, libido changes, psychosis, obsessive-compulsive and personality disorder.

It is noteworthy that the damages caused, with regard to psychological disorders, can be expressed through comorbidities and, if not treated, can lead to the death of the individual.<sup>3</sup>

## 2 MATERIALS AND METHODS

The data presented in this report were obtained through review of medical records, interviews with the patient and literature review.

This study was adapted according to the recommendations of the guidelines for CARE case reports.<sup>4</sup>



### 3 FINDINGS

#### 3.1 PATIENT INFORMATION

Male L.D. patient, 31 years old, attended psychiatric matrix support after weekly administration of Sustanon and Deposteron, 500 mg and 200 mg, respectively, for 3 months, and were suddenly stopped for 6 months. From this, symptoms of insomnia, excessive sadness, emotional lability, apathy, impulsivity, lack of financial control, binge eating, hypersexuality, anhedonia, thoughts and attempted self-extermination by hanging and self-mutilation began, concomitant with visual and auditory hallucinations of command voices. During the consultation, the patient found himself depressed, reporting mastalgia, increased breast volume and testicular pain, which began after the use of AAS.

He reported not being a smoker, drinker or user of illicit drugs. He denied pre-existing comorbidities. He had a close family history of major depressive disorder and anxiety disorder.

#### 3.2 CLINICAL FINDINGS

Physical examination revealed gynecomastia and topical testicles of apparently normal shapes and sizes that were mildly painful on palpation.

#### 3.3 DIAGNOSTIC EVALUATION

Imaging of the breasts and testicles was requested by ultrasonography in order to evaluate possible repercussions of the use of AAS. In addition, general and specific laboratory tests were requested in order to identify possible causes of the psychic disorder: blood count, glycated hemoglobin, fasting glucose, total cholesterol and fractions, triglycerides, vitamin B12, vitamin D, folic acid, urea, creatinine, sodium, potassium, abnormal sediment elements (EAS), uroculture, thyrostimulating hormone (TSH), lithemia, prolactin, folliculostimulating hormone (FSH), luteinizing hormone (LH) and testosterone free.

Analyzing the results of laboratory tests, it was found that all were within normal limits.

Ultrasonography of the breasts revealed the presence of a hypoechoic layer and imprecise limits in the retroareolar regions, suggestive of fibroglandular tissue, with a maximum thickness of 5.5 mm on the right and 7.4 mm on the left. No solid or cystic nodules were identified. Skin, subcutaneous layer and pectoral muscle presented their usual appearance. Due to the echographic aspect, bilateral gynecomastia was suggested.

Ultrasonography of the scrotum revealed topical testicles, with usual shape and normal dimensions bilaterally, with homogeneous testicular parenchyma texture. No focal lesions or diffuse changes or dilatations of the rete testis were observed. Epididymis, presented with preserved shapes, contours and echogenicity. A small amount of fluid was observed inside the scrotum, within the physiological limits. In



contrast, ectasia of left pampiniform plexus vessels was detected, with a tortuous path and a maximum caliber of 4.5 mm, suggestive of varicocele.

After the imaging and laboratory investigation, the diagnosis of major depressive disorder with anxious symptoms due to abrupt discontinuation of steroid hormones was reached.

### 3.4 THERAPEUTIC INTERVENTION

For symptom control, continuous use of quetiapine and lithium at a dose of 50 mg and 300 mg daily respectively was prescribed.

The patient was referred to the urology department for surgical evaluation after finding varicocele in the left scrotal pouch.

### 3.5 FOLLOW-UP, OUTCOME AND PATIENT PERSPECTIVE

Satisfied with the pharmacological intervention, when questioned, he denied recurrence of previous psychic symptoms. She reported having started the use of the prescribed drugs in the last consultation with good adaptation and tolerability.

### 3.6 DISCUSSION

The use of AAS to improve physical performance has increased considerably in recent years. The abuse of these drugs has not been restricted only to professional athletes, but has become an increasingly common practice in the general population by the desire to improve physical appearance through hypertrophy and increased muscle strength.<sup>5</sup>

In addition to AAS, the use of drugs such as human growth hormone (hGH), insulin and erythropoietin has gained prominence in improving athletic performance. Addressing the consequences of AAS use, it is important to remember that an androgen is a sex hormone responsible for promoting the development and maintenance of male secondary sexual characteristics, as well as anabolic effects, leading to increased skeletal muscle mass and strength. These drugs are products of the pharmaceutical industry, which, for years, has worked to develop androgens with preferentially anabolic activity and reduced or non-existent androgenic activity. However, although some steroids available to date have preferentially anabolic effect, most have androgenic effect.<sup>6</sup>

About 30% of AAS users develop addiction through 3 distinct pathways. These are the analog, androgenic and hedonic pathways. The anabolic pathway is linked to changes in body image pattern, which can often be accompanied by the presence of image dimorphism ("muscle dysmorphism"). The androgenic pathway is a consequence of the suppression of the hypothalamic-pituitary-gonadal axis, which can lead to the persistence of hypogonadism for prolonged periods after the patient ceases the use of AAS, leading to a



withdrawal syndrome. In some individuals, testosterone levels may not normalize permanently, risking direct toxic effects on the testicles, with high chances of irreversibility. In contrast, the hedonic pathway in chronic AAS use can act on mesolimbic dopamine synthesis and generate a sense of reward by a similar pathway to natural mechanisms, just like classic addictive drugs.<sup>7</sup>

The adverse effects of AAS abuse are related to disorders of the cardiovascular, neuroendocrine, neuropsychic, hepatic, renal, immune and dermatological systems. Regarding psychiatric symptoms, most of the studies conducted reveal symptoms of mania or hypomania (irritability, aggressiveness, exaggerated self-confidence, hyperactivity and psychotic symptoms) during the use of anabolic steroids as well as depressive symptoms (depressed mood, loss of interest in habitual activity, sleep changes, loss of libido, anorexia and ideation or attempt to commit suicide) upon their withdrawal.<sup>6</sup> It is possible to clearly observe some of these consequences in this case, with the presence of predominantly depressive symptoms, including suicidal ideation and psychosis.

In addition to the symptoms mentioned above, gynecomastia is a sign of severity among the adverse effects of AAS use, presenting itself as a consequence of an imbalance between the stimulatory effect of estrogen and the inhibitory effect of androgen. In about 10% of patients who present this symptom, primary or secondary hypogonadism is caused.<sup>8</sup> Considering all the symptoms and clinical history, the hypothesis of hypogonadism associated with behavioral changes and depressive symptoms due to the abrupt cessation of steroid use was raised, and was later refuted with the normality of laboratory tests.<sup>7</sup> However, the time taken into account the laboratory tests, which may have been sufficient to normalize hormone levels, since the use of AAS had ceased 6 months before the laboratory test.

### 3.7 INFORMED CONSENT

After dialogue about his health condition and follow-up with the patient, the patient authorized the use of his data to produce this case report, but the use of photographs about the findings during the physical examination was not authorized.

## 4 CONCLUSIONS

The use of AAS brings with it several negative aspects and, as observed in this case, the abrupt withdrawal of these can generate serious health consequences with severe psychosomatic changes. Therefore, it is recommended to restrict hormone replacement only for therapeutic purposes, avoiding its use for non-physiological purposes, such as aesthetic anabolics.



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