



Anabolic Androgenic Steroid Abuse In Young Males - Anabolic-Androgenic Steroid Use in Sports, Health, and Society

Anabolic androgenic steroid abuse in young males W. de Ronde, D. L. Smit Published 1 March 2020
Medicine Endocrine Connections TLDR This review summarizes 10 years experience with male abusers of anabolic androgenic steroids (AAS) and shares the views on the management of common health problems associated with AAS abuse. Expand View PDF

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CASE REPORT

Anabolic steroids abuse-induced cardiomyopathy and ischaemic stroke in a young male patient

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SUMMARY

We report a case of a 37-year-old man presented with acute stroke and hepatorenal impairment which were associated with anabolic-androgenic steroids (AAS) abuse over 2 years. Despite the absence of apparent symptoms and signs of congestive heart failure at presentation, an AAS-induced dilated cardiomyopathy with multiple thrombi in the left ventricle was attributed to be the underlying cause of his condition. Awareness of the complications of AAS led to the prompt treatment of the initially unrecognised dilated cardiomyopathy, and improved the liver and kidney functions. However, the patient was exposed to a second severe ischaemic event, which led to his death. This unique and complex presentation of AAS complications opens for better recognition and treatment of their potentially fatal effects.

BACKGROUND

The abuse of anabolic-androgenic steroids (AAS) has increased in recent years, being not confined only to bodybuilders or high-level sportsmen but also spread to casual fitness enthusiasts and subelite sportsmen and even women.¹ Supraphysiological doses and high-frequency usage of AAS may cause a wide spectrum of clinical manifestations which are usually ignored or at best unfulfilled, though some may be life-threatening.² A literature search revealed few case reports that suggested an association of intracoronary thrombosis, sudden death, myocardial necrosis, cardiomyopathy and stroke as possible consequence of AAS overuse. We report a particular case with a clinical scenario which indicates a strong association between AAS abuse and fatal cerebrocardio manifestations. A hypothesis for the underlying causation of these fatal manifestations is further addressed.

CASE PRESENTATION

A patient presented to the neurocritical care unit at Kasr Al-Aini Hospital with an acute right-sided weakness associated with a confusional state which followed a first-ever experienced generalised tonic clonic seizure.

The patient had a history of anabolic steroid abuse over the past 2 years. The most frequently used anabolic steroids were: methandienone (active ingredient) and methenolone acetate as reported by the caregiver. There was no history of alcohol or other substance abuse. The medical and family histories were unremarkable.

On examination, the patient was lethargic and confused. General examination revealed normal blood pressure and temperature. The patient had sinus tachycardia (pulse rate was 120/min), mild bilateral lower limb pitting oedema, but with no evidence of jugular venous congestion or bilateral basal crepitation. Also the patient had an enlarged tender liver with no stigmata of chronic liver disease. Neurological examination revealed right-sided hemiparesis (grade 3) with right-sided facial weakness.

INVESTIGATIONS

Laboratory testing showed increased haemoglobin concentration (18 gm/dL), increased serum transaminases (aspartate aminotransferase, 280 IU/L; alanine aminotransferase, 310 IU/L), coagulopathy (International Normalised Ratio 1.6), hyperbilirubinaemia (total bilirubin 2 mg/dL), renal impairment (creatinine 3.03 mg/dL, urea 110 mg/dL), hyponatraemia (122 mmol/L) and hyperkalaemia (5.8 mmol/L). Virology, drug screen and immune profile were negative and thyroid functions were within normal range.

Initial brain CT scan revealed two lesions, one less hypodense than the other. A diagnosis of chronic infarction in the left frontal lobe and a sub-acute left temporo-parietal infarction was proposed (figure 1). Further brain imaging with MRI confirmed such results. EEG did not elicit epileptiform activities and chest X-ray showed augmented cardiothoracic index. An abdominal ultrasound revealed hepatomegaly, mild ascitis and bilateral pleural effusion in addition to grade I nephropathy. During the performance of the abdominal ultrasound, the operator noticed intraventricular thrombus in the heart. Urgent echocardiography showed a dilated cardiomyopathy with an estimated ejection fraction of 13% and multiple thrombi in the left ventricle. Toxic cardiomyopathy secondary to AAS over use was suspected.

DIFFERENTIAL DIAGNOSIS

A diagnosis of severe toxic cardiomyopathy associated with anabolic steroids was made after ruling out other causes of non-ischaemic dilated cardiomyopathy, including infectious, autoimmune and metabolic causes.

TREATMENT

After initial correction of hyponatraemia with slow isotonic saline infusion, symptoms and signs of congestive heart failure became evident. The patient was transferred to the intensive care unit



To cite: Shamloul RM, Aborayah AF, Hashad A, et al. *BMC Case Rep* Published online: [date include Day Month Year] doi:10.1136/bcr-2013-203033

Abusing steroids can cause heart attacks and strokes, even in young athletes. Here's how: Steroid use can lead to a condition called atherosclerosis, which causes fat deposits inside arteries .

Consequences of Anabolic-Androgenic Steroid Abuse in Males; Sexual and .



Child sexual abuse associated with anabolic androgenic steroid use. Child sexual abuse associated with anabolic androgenic steroid use Am J Psychiatry. 1996 Oct;153(10) :1369. doi . Male Methandrostenolone / adverse effects* Substances Anabolic Agents .



OPEN ADHD symptoms and use of anabolic androgenic steroids among male weightlifters

Emilie Kildal^{1,2,3}, Bjørnar Hassel^{1,2} & Astrid Bjørnebekk¹

Use of anabolic androgenic steroids (AAS) is associated with adverse health effects. The factors that predispose to AAS use among athletes are poorly understood, but attention deficit/hyperactivity disorder (ADHD), which is known to occur among athletes more often than in the general population, is associated with risk behaviors, including substance abuse. We aimed to see if AAS use in male weightlifters was associated with ADHD symptoms, and test the link between ADHD symptoms and cognitive performance. Hundred and forty male weightlifters, 72 AAS users and 68 weightlifting controls (WLC), completed the Achenbach system of empirically based assessment (ASEBA) for ADHD symptoms and underwent cognitive examination. Self-reported ADHD symptom scores were significantly higher among AAS users compared to WLC, and scores in the range indicating clinically important ADHD was significantly more common in the AAS-using group. Age of onset of AAS use correlated inversely with ADHD scale score ($r = -0.35$; $p = 0.003$). ADHD score correlated inversely with cognitive scores for working memory ($r = -0.25$, $p < 0.001$), processing speed ($r = -0.24$, $p < 0.001$), verbal learning and memory ($r = -0.19$, $p = 0.03$), and problem solving ($r = -0.20$, $p = 0.02$). AAS use among weightlifters is associated with ADHD symptoms and corresponding lower cognitive performance. Recognising a relationship between ADHD symptoms and AAS use may guide drug prevention strategies in sports.

Abbreviations

AAS Anabolic androgenic steroids
WLC Weightlifting controls
ADHD Attention deficit/hyperactivity disorder
ASEBA Achenbach system of empirically based assessment

Use of anabolic androgenic steroids (AAS) is a serious abuse problem among professional and recreational athletes^{1–5}. AAS have anabolic properties, stimulating muscle growth⁶, and androgenic properties inducing masculine secondary sexual characteristics, and augments cognitive features like alertness^{7–9}. However, AAS use may have serious psychological and physiological consequences, such as major mood syndromes and cardiovascular disease^{10,11}. The main activity of AAS in the brain occurs via activation of widely distributed cytoplasmic androgen receptors, as has been shown in animal studies^{12–15}. This may explain the various effects that AAS have on cognition and mental state^{16,17,18}. Long term AAS use is associated with both structural brain abnormalities^{19–21} and cognitive and behavioral abnormalities^{22,23}. Several studies suggest an association between AAS use and aggressiveness, hostility, mood swings, and violent crime^{1,19,24–31}. Still, its massive impact on muscle growth has made AAS popular among athletes worldwide^{32–34}.

The impact of AAS doses may be difficult to determine for several reasons. More than 100 different AAS compounds have been synthesised, with three major classes that differ in molecular structure and metabolic half-lives, and hence physiologic effects. AAS include testosterone and its various synthetic derivatives with the three most common forms being (1) 19-nortestosterone derivatives (nandrolone phenylpropionate, nandrolone decanoate, methenolone enanthate), (2) C-17 β -ester derivatives (testosterone propionate, cypionate, enanthate, or undecanoate), and (3) 17 α -alkyl derivatives (stanozolol, oxymetholone, norethandrolone, danazol). Weightlifters commonly coadminister various AAS and administer drugs in cycles of use and nonuse lasting from weeks to months^{1,22,35,37}.

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Anabolic-androgenic steroids (AAS) represent a group of heterogeneous compounds, which include testosterone (T) and its derivate substances, largely used to enhance physical performance, sense of well-being and cosmetic appearance among athletes [1, 2, 3, 4].

Harm Reduction in Male Patients Actively Using Anabolic Androgenic .

Harm Reduction in Male Patients Actively Using Anabolic Androgenic Steroids (AAS) and Performance-Enhancing Drugs (PEDs): a Review

Alexis Bonnecaze, Thomas O'Connor, Cynthia Burns

OAmg

Abstract Introduction: Anabolic-androgenic steroids (AASs) are a complex cluster of synthetic derivatives of testosterone. AAS abuse is considered a major public health issue since it has increased among young/adolescent males. The use of steroids has a prevalence rate of 14% in young athletes and 30-75% in professional athletes or bodybuilders.

Anabolic Steroids and Other Appearance and Performance Enhancing Drugs .



1. The administration of AAS in a dose-dependent manner significantly increases muscle strength, lean body mass, endurance, and power. The effects are primarily seen when AAS use is accompanied by a progressive training program. Evidence Category A. 2.

Anabolic-androgenic steroid abuse and performance-enhancing . - PubMed

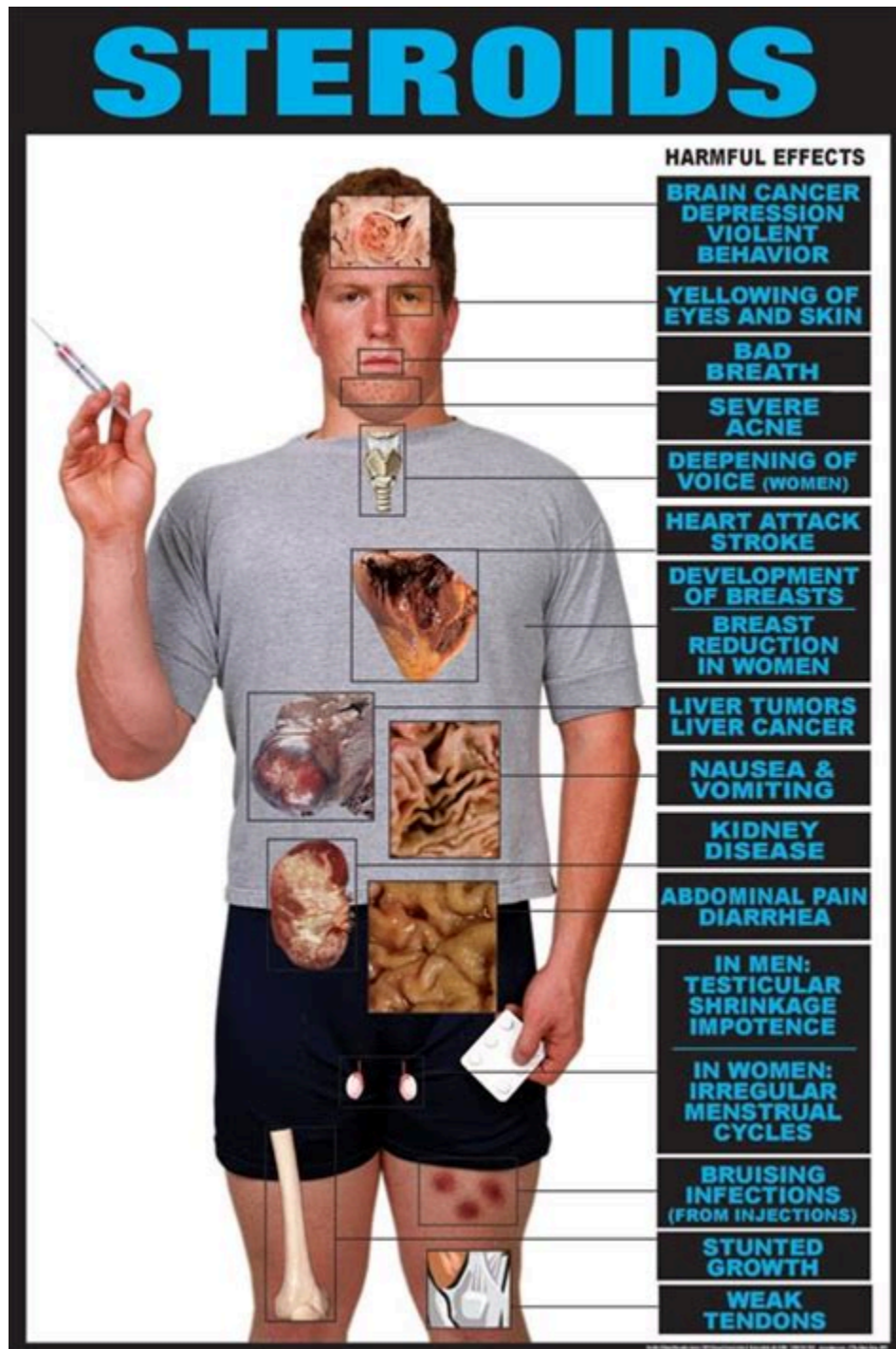
Performance-enhancing agents	AAS users	AAS nonusers	P value
	≥40 yrs (n = 67)	≥40 yrs (n = 76)	
Protein powder	57 (85.1)	60 (80.0)	.390
Creatine	49 (73.1)	44 (57.9)	.079
Multivitamin	43 (64.2)	50 (65.8)	.862
Fish oil	39 (58.2)	51 (67.1)	.301
Tamoxifen	38 (56.7)	1 (1.3)	<.001
Amino acids	34 (50.8)	29 (38.2)	.177
Clomiphene	27 (40.3)	1 (1.3)	<.001
Anastrozole	26 (38.8)	1 (1.3)	<.001
Flaxseed oil	26 (38.8)	13 (17.1)	.005
Caffeine	26 (38.8)	29 (38.2)	.999
Human growth hormone	24 (35.8)	0 (0)	<.001
Dehydroepiandrosterone	23 (34.3)	12 (15.8)	.012
Human chorionic gonadotropin	23 (34.3)	0 (0)	<.001
Ephedrine	19 (28.4)	10 (13.1)	.036
Clenbuterol	16 (23.9)	0 (0)	<.001
Levothyroxine	15 (22.4)	0 (0)	<.001
Tadalafil	14 (20.9)	1 (1.3)	<.001
Androstenedione	13 (19.4)	4 (5.3)	.010
Letrozole	12 (17.9)	0 (0)	<.001
Sildenafil	11 (16.4)	2 (2.6)	.007
Yohimbine	11 (16.4)	3 (4.0)	.021
Insulin	9 (13.4)	0 (0)	<.001
Insulin-like growth factors	8 (11.9)	0 (0)	.002
γ-Hydroxybutyric acid	4 (6.0)	0 (0)	.046

Abbreviation: AAS, anabolic-androgenic steroids.

^aData are no. (percentage) of survey respondents.

Anabolic-androgenic steroids abuse is on the rise among adolescent boys and young men, mostly in those seeking a 'shortcut' to an improved body image. This approach is associated with the risk of severe adverse health effects, some of which involve the liver and are linked to hepatic oxidative stress.

Anabolic Steroids: Uses, Abuse, and Side Effects - WebMD



. After a period of AAS abuse, cessation may result in anabolic steroid-induced hypogonadism (ASIH), a state of dysfunction that may involve a suppressed hypothalamic-pituitary-testicular.

Characteristics and Attitudes of Men Using Anabolic Androgenic Steroids .

Motivation for AAS Use	All, n = 2384 (%)
Improve physical appearance/gain muscle	1959 (82.17)
Improve strength	1192 (50)
Issues with self-esteem regarding body image	712 (29.87)
Bodybuilding/Physique competitions	472 (19.80)
Other	300 (12.58)
Performance in organized athletics	219 (9.19)
Peer pressure	54 (2.27)
History of being sexually abused	15 (0.63)

Anabolic androgenic steroids (AAS) abuse is a global health-related concern, as most of the related studies showed increasing trends and deleterious effects, mostly on sexual and fertility health. . (PEDs) to enhance sports, performance and /or physical appearance has progressively increased among young and middle-aged men. One of the most .

CASE REPORT

Anabolic steroids abuse-induced cardiomyopathy and ischaemic stroke in a young male patient

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Accepted 6 February 2014

SUMMARY

We report a case of a 37-year-old man presented with acute stroke and hepatorenal impairment which were associated with anabolic-androgenic steroids (AAS) abuse over 2 years. Despite the absence of apparent symptoms and signs of congestive heart failure at presentation, an AAS-induced dilated cardiomyopathy with multiple thrombi in the left ventricle was attributed to be the underlying cause of his condition. Awareness of the complications of AAS led to the prompt treatment of the initially unrecognised dilated cardiomyopathy, and improved the liver and kidney functions. However, the patient was exposed to a second severe ischaemic event, which led to his death. This unique and complex presentation of AAS complications opens for better recognition and treatment of their potentially fatal effects.

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The patient had a history of anabolic steroid abuse over the past 2 years. The most frequently used anabolic steroids were: methandienone (active ingredient) and methenolone acetate as reported by the caregiver. There was no history of alcohol or other substance abuse. The medical and family histories were unremarkable.

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DIFFERENTIAL DIAGNOSIS

A diagnosis of severe toxic cardiomyopathy associated with anabolic steroids was made after ruling out other causes of non-ischaemic dilated cardiomyopathy, including infectious, autoimmune and metabolic causes.

TREATMENT

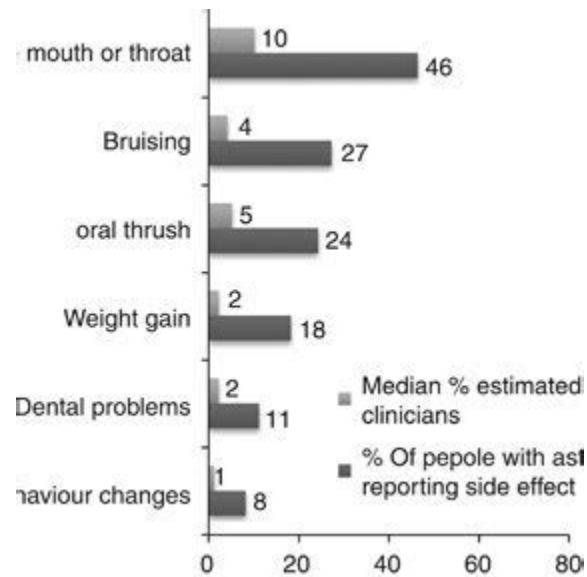
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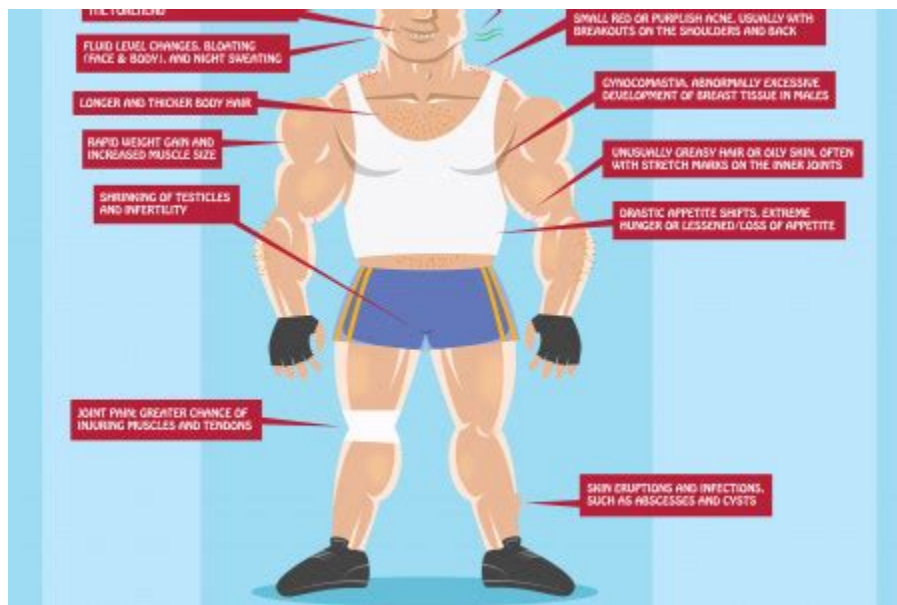
Anabolic-androgenic steroids abuse-induced seizures: A case report in a young male bodybuilder. 2022 Mar;96:22-24. doi: 10.1016/j.seizure.2022.01.010. 1, Fadi Hallal-Peche 2, Tara Kearney 3, 4 Evangelia Theochari 5 Antonio Valentin 6.

Health service engagement, side effects and concerns among men with .



Various studies have been conducted and generally reflect the findings of a Youth Risk and Behavior Surveillance System study, which estimated that among U. S. high school students, 4.9% of males.

Anabolic androgenic steroid abuse in young males



Abstract This review summarizes 10 years experience with male abusers of anabolic androgenic steroids (AAS). The typical user of AAS is male, aged between 20 and 40 and lifting weights. Illegal AAS are cheap and easily obtained via internet or local suppliers. AAS are mostly used in cycles with a duration between 6 and 18 weeks.

Teens and Steroids: A Dangerous Combo | FDA



Anabolic androgenic steroid abuse in young males Willem de Ronde 1 and Diederik L Smit 1 Author information Article notes Copyright and License information PMC Disclaimer Go to: Abstract This review summarizes 10 years experience with male abusers of anabolic androgenic steroids (AAS).

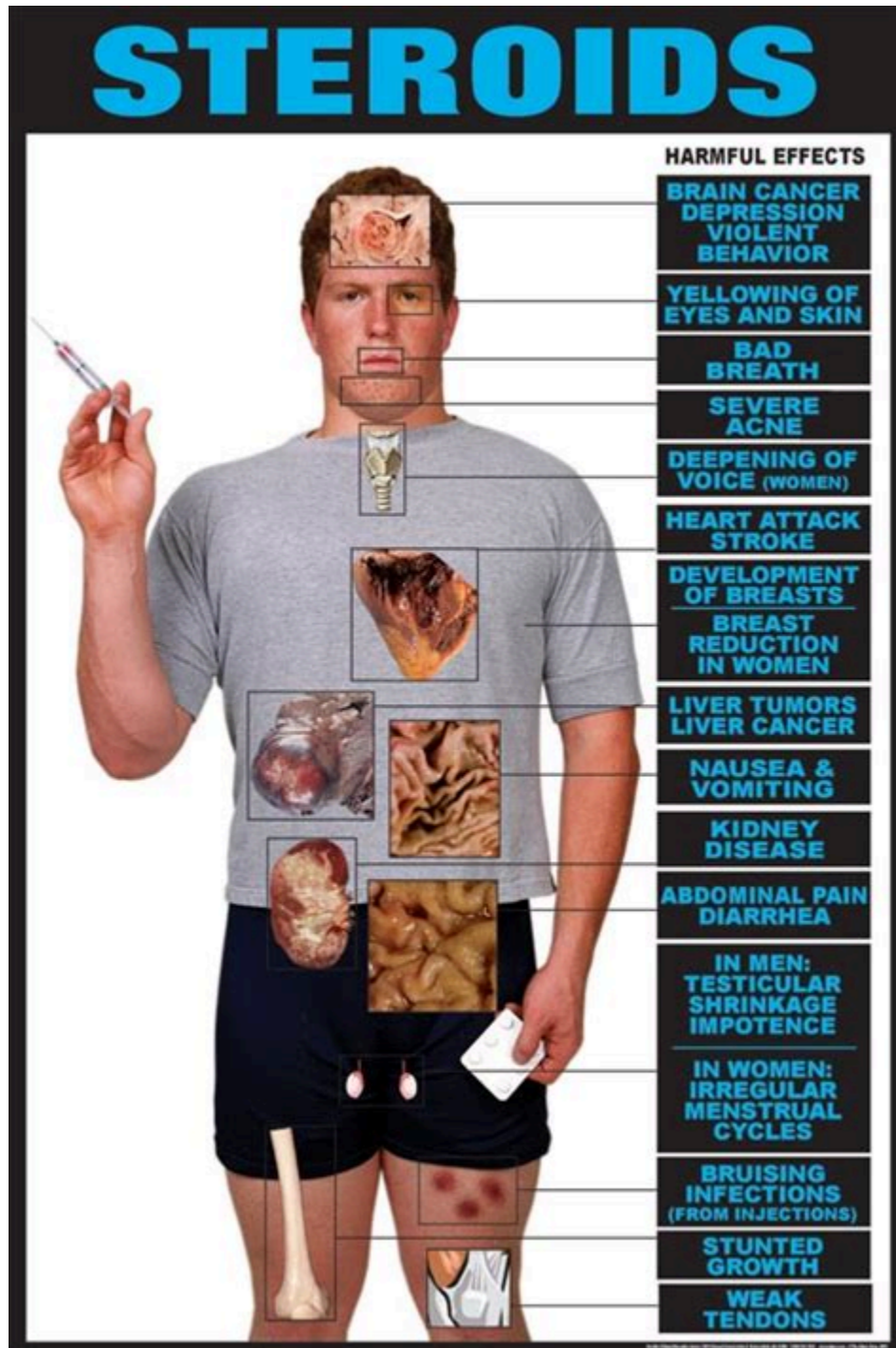
Anabolic androgenic steroid abuse in young males - PMC



Anabolic-androgenic steroids, often shortened to "anabolic steroids," "steroids," or "androgens," 2,3 are the most widely misused APED. These are synthetic substances similar to the male sex hormone testosterone. They promote the growth of skeletal muscle (anabolic effects) and the development of male

sexual characteristics (androgenic effects) in both males and females. 2

The deleterious effects of anabolic androgenic steroid abuse on sexual .



1. Introduction Anabolic-androgenic steroids (AAS) are synthetic variations of Testosterone with anabolic effects. The prevalence rate of AAS use among gym attendees has been shown up to 70% [1]. Side effects of AAS are diverse, from subtle mood disturbances to multiple organ failure.

Anabolic Steroid-Induced Myocardial Infarction in a Young Male

Cureus

Open Access Case Report

DOI: 10.7759/cureus.13054

Anabolic Steroid-Induced Myocardial Infarction in a Young Male

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Abstract

Misuse of androgenic-anabolic steroids (AAS) has been well known to increase the risk for a cardiac problem, including acute myocardial infarction (MI). Steroids once thought a magic drug providing immediate relief to patients, also have a darker aspect of its severe side effects. AAS are widely used these days, especially in teenagers, bodybuilders, and athletes. MI is thought to be a disease of old age, but young patients with MI without risk factors draw attention to the possibility of drugs such as cocaine, AAS abuse, and amphetamine.

In this article, we report the case of a 38-year-old African-American male, with a history of AAS abuse, who arrived at the emergency department with complaints of severe chest pain radiating to the left arm. An electrocardiogram (ECG) revealed ST-elevation MI (STEMI) and elevated troponin. The patient was transferred to the cardiac catheterization lab for an emergent catheterization which showed 100% stenosis of the left anterior descending artery and a drug-eluting stent was placed. An echocardiogram showed an ejection fraction of 35%. All blood workup was negative. The patient was discharged on aspirin, ticagrelor, statin, ACE inhibitor, and β -blocker after three days.

Chest pain in a young patient population secondary to MI is not uncommon these days and the most important thing to evaluate is drug history, including AAS use. Athletes, bodybuilders, and others who use steroids or other drugs that are responsible for MI should be under the supervision of physicians so that the complications of steroids are ascertained, and if steroids are needed for any medical illness, proper dosage and follow-up should be emphasized. Therefore, while taking history from a patient, it is essential for physicians to be aware of this association of steroids with coronary artery disease.

Categories: Cardiology

Keywords: anabolic steroid abuse, myocardial infarction, st-elevation myocardial infarction

Introduction

Risk factors for myocardial infarction (MI) in young people are highly significant and at this age drug abuse must always be considered. Athletes use androgenic-anabolic steroids (AAS) to increase their performance (protein synthesis in skeletal muscles is increased by AAS); however, there are critical adverse effects, including hepatic and endocrine dysfunction, and cardiovascular and behavioral changes have been reported [1].

Steroids have a broad spectrum of applications, ranging from treatment in medical emergencies and other diseases to abuse by athletes and other sports players. No doubt steroids have many good applications, but its overuse leads to serious consequences and sometimes even death [2].

An increased cardiovascular risk in those individuals who use these drugs has been shown [3]. ST-elevation MI (STEMI) is a life-threatening condition having 2.5-10% mortality in the first month [4]. Conventional risk factors play an important role in coronary heart diseases, and nontraditional risk factors also need to be considered as they are present in more than 50% of coronary artery disease cases [5]. In a previous study, more than 150 drugs were reported as possible causes of MI, out of which 39 drugs were thought as the main suspects that can cause MI: prednisone, betamethasone, and dexamethasone [6].

Case Presentation

A 38-year-old African American male with no significant past medical history (he was using anabolic steroid [unknown duration] for muscle building and athlete) came to the emergency department with complaints of severe chest pain that started 30 minutes previously, which were crushing in nature, radiating to his left arm, and associated with sweating, nausea, and breathlessness. He denied similar pain in the past during exertion or rest. The patient smoked three cigarettes per day for 10 years. His family history was nonsignificant for ischemic heart disease.

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Adolescents use a wide variety of drugs and supplements, including anabolic steroids, to improve their sports performance and physical appearance. Prevalence rates for steroid use generally range between 4% and 12% among male adolescents and between 0.5% and 2% for female adolescents. Although the short-term health effects of anabolic steroids .

Anabolic-androgenic steroids abuse-induced seizures: A case report in a .

Seizure: European Journal of Epilepsy 56 (2022) 22–24



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journal homepage: www.elsevier.com/locate/seizure



Anabolic-androgenic steroids abuse-induced seizures: A case report in a young male bodybuilder

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Keywords:
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Bodybuilder
Oestradiol
Seizures
Neurological androgenic effects

ABSTRACT

None

1. Introduction

Anabolic-androgenic steroids (AAS) are synthetic variations of Testosterone with anabolic effects. The prevalence rate of AAS use among gym attendees has been shown up to 70% [1]. Side effects of AAS are diverse, from subtle mood disturbances to multiple organ failure. In addition, AAS are often used in conjunction with other drugs to enhance performance or physique. "Steroid-accessory" drugs used by bodybuilders such as insulin, diuretics and thyroxine, can also precipitate medical emergencies including seizures (see supplementary section). To assess the potential link between AAS and seizures, we describe a case of a bodybuilder abusing AAS with exceptionally high oestradiol levels due to testosterone enanthate intramuscular injections, with no other recognized precipitating factors. In addition, a systematic review about AAS abuse-induced seizures was performed (see Supplementary section).

1.1. Case report

A 22-year-old male bodybuilder with a two-year history of AAS use was admitted to hospital following a witnessed tonic-clonic seizure

arising from sleep that lasted around one minute. Although the tonic-clonic seizure self-terminated, the patient was post-ictally confused and aggressive, requiring administration of midazolam by the ambulance crew. In accident and emergency (A&E), he required mechanical ventilation due to reduced respiratory effort due to midazolam and to avoid pulmonary aspiration because of presence of blood in mouth and airway. He was treated empirically (levetiracetam, meropenem, aciclovir) initially for a meningoencephalitis in the context of concomitant high-grade pyrexia and seizure. He subsequently developed a severe metabolic acidemia, rhabdomyolysis with acute kidney injury (AKI), acute respiratory distress syndrome and transaminitis. He underwent haemofiltration to manage his metabolic state. Electroencephalogram showed slow background activity, without ongoing epileptiform discharges or subclinical seizures, and non-convulsive status epilepticus was excluded. MRI and CT brain were unremarkable. The initial blood test showed high level of testosterone, oestradiol and prolactin. Free thyroxine (T4) was below normal range (Table 1). The urinary drug screen was negative, except for benzodiazepines (in the context of midazolam treatment).

After failed extubations on days 2 and 8 due to significant agitation and vomiting, he was successfully extubated on day 9 with no

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Background Recreational use of anabolic-androgenic steroids (AAS) is a public health concern worldwide associated with a range of physical and psychological side effects. Still, people who use AAS tend to be reluctant to seek treatment. This study aims to explore use characteristics, treatment-seeking behaviour, side effects and associated health concerns among men with AAS use. Methods The .

VIEWPOINT

Body Image Disorders and Abuse of Anabolic-Androgenic Steroids Among Men

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During the last several decades, the image of the idealized male body in many countries has shifted toward a substantially higher level of muscularity. Bodybuilding competitors, male models, and even children's action toys (eg, "G.I. Joe") have become significantly more muscular than their predecessors of the 1960s. Nowadays, young men are constantly exposed to muscular male images on magazine covers, in advertisements, on television, and in movies.

Perhaps as a consequence of these trends, young men have become increasingly concerned with their muscularity, reflected by an increasing prevalence of "muscle dysmorphia," a form of body image disorder characterized by an obsessive preoccupation with a muscular appearance.^{1,2} First described in the scientific literature less than 25 years ago, muscle dysmorphia has now become the subject of numerous reports and has been included as an official diagnosis in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*.³

Approximately 2.2% of US men have been reported to have body dysmorphic disorder, and among these men with body dysmorphic disorder, 9% to 25% have muscle dysmorphia, which would suggest the

years.⁴ Prior to the 1980s, AAS use was largely restricted to elite athletes. With the publication of popular books on how to use these drugs, starting in the 1980s, AAS use began to spread from the athletic world to the general population. Today, most AAS users are not competitive athletes but rather nonathlete weightlifters who use AASs largely to look leaner and more muscular. Within this increasing new population of AAS users, even the oldest members—those who first initiated AAS use as youths in the 1980s—are only now entering middle age and beginning to experience the combined effects of long-term AAS abuse and aging.

In their attempts to gain muscle and lose body fat, AAS users often combine highly supraphysiologic doses of AASs with other appearance- and performance-enhancing substances, such as human growth hormone, thyroid hormones, insulin, clenbuterol, and other potentially toxic substances.⁴ Users of AASs often display additional high-risk behaviors such as the ingestion of drugs of abuse (such as cocaine and opioids), unsafe sexual behaviors, and unsafe injection practices.^{5,6} Furthermore, a large population of individuals do not intentionally use illicit AASs but do use substantial amounts of over-the-counter herbal or dietary supplements purported to enhance performance and appearance. The sale of such supplements is largely unregulated, and many products have been found to contain illegal AASs, other anabolic compounds (eg, selective androgen receptor modulators), and even toxic contaminants with no anabolic properties at all.⁷ These supplements may therefore pose potential health problems for individuals who use these products, including large numbers of men and women in the US Armed Forces, whose consumption of such supplements is increasing and who may be unknowingly exposed to AASs and other potent drugs.⁷

Emerging evidence has implicated several adverse health effects of AAS use, including increased risk of premature death, cardiovascular disorders, psychiatric effects, prolonged suppression of the hypothalamic-pituitary-testicular axis, and possible long-term neurotoxic effects.^{8,9} Long-term exposure to supraphysiologic doses of AASs has been linked to myocardial dysfunction and stroke, clinically serious cardiomyopathy, and acceleration of atherosclerotic disease in young individuals known or believed to have used AASs.^{8,9} Also, during AAS exposure, users may develop manic or hypomanic symptoms, sometimes associated with aggression, violence, and even homicide.

Users of AASs may develop protracted hypogonadism following AAS withdrawal, which may sometimes

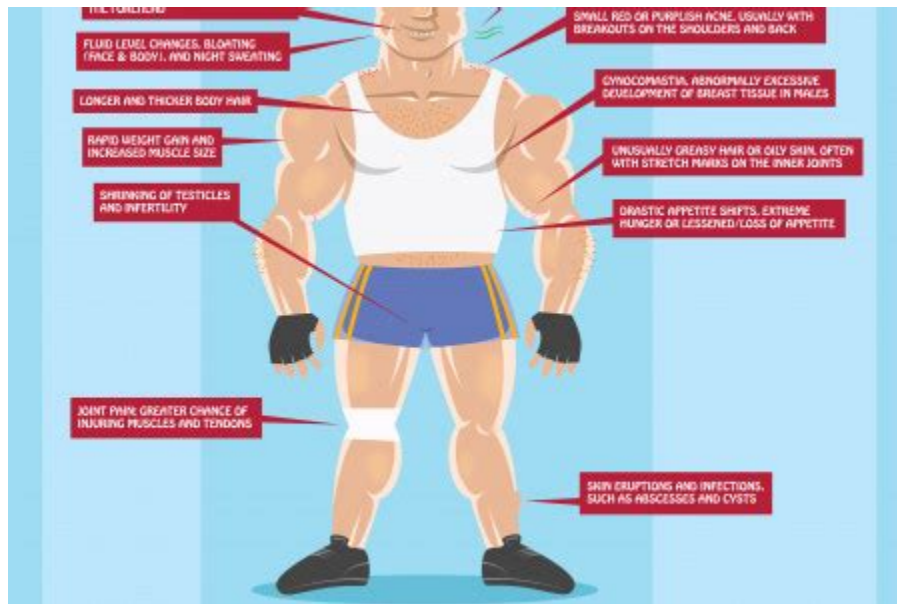
A recent analysis estimated that 2.9 million to 4.0 million individuals in the United States, nearly all of whom are male, have used AASs at some time in their lives....

possibility that hundreds of thousands of US men may have this syndrome.² Men with muscle dysmorphia describe dissatisfaction with their body size and shape and are preoccupied with the idea that their body is insufficiently muscular; these men show elevated rates of mood and anxiety disorders, obsessive and compulsive behaviors, substance abuse, and impairment of social and occupational functioning.^{1,3} Most men with muscle dysmorphia engage in weightlifting, many of them use dietary supplements, and in 2 studies, 10 of 23 men (44%)¹ and 11 of 24 men (46%)³ with muscle dysmorphia reported lifetime use of anabolic-androgenic steroids (AASs)—the family of drugs that includes testosterone and its many synthetic derivatives.

A recent analysis estimated that 2.9 million to 4.0 million individuals in the United States, nearly all of whom are male, have used AASs at some time in their lives; this analysis estimated that about 1 million men in the United States have experienced AAS dependence, wherein they continued to use AASs at high doses for

Abstract This review summarizes 10 years experience with male abusers of anabolic androgenic steroids (AAS). The typical user of AAS is male, aged between 20 and 40 and lifting weights. Illegal AAS are cheap and easily obtained via internet or local suppliers. AAS are mostly used in cycles with a duration between 6 and 18 weeks.

Anabolic androgenic steroid abuse in young males - EC



It is estimated that over 98% of those using AAS are male. 1 These compounds have become readily available through illicit internet sources. 8 Men are commonly motivated to use AAS to improve their muscularity and strength. 7 An increasing societal emphasis on body image is believed to have contributed to increasing AAS use among men. 9, 10 Many.

Anabolic-androgenic steroids abuse-induced seizures: A case report in a .

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Anabolic-androgenic steroids abuse-induced seizures: A case report in a young male bodybuilder

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KEYWORDS: Anabolic-androgenic steroids; Bodybuilder; Oestradiol; Seizures; Neurological androgenic effects

ABSTRACT

None

1. Introduction

Anabolic-androgenic steroids (AAS) are synthetic variations of Testosterone with anabolic effects. The prevalence rate of AAS use among gym attendees has been shown up to 70% [1]. Side effects of AAS are diverse, from subtle mood disturbances to multiple organ failure. In addition, AAS are often used in conjunction with other drugs to enhance performance or physique. "Steroid-accessory" drugs used by bodybuilders such as insulin, diuretics and thyroxine, can also precipitate medical emergencies including seizures (see supplementary section). To assess the potential link between AAS and seizures, we describe a case of a bodybuilder abusing AAS with exceptionally high oestradiol levels due to testosterone enanthate intramuscular injections, with no other recognized precipitating factors. In addition, a systematic review about AAS abuse-induced seizures was performed (see Supplementary section).

1.1. Case report

A 22-year-old male bodybuilder with a two-year history of AAS use was admitted to hospital following a witnessed tonic-clonic seizure arising from sleep that lasted around one minute. Although the tonic-clonic seizure self-terminated, the patient was post-ictally confused and aggressive, requiring administration of midazolam by the ambulance crew. In accident and emergency (A&E), he required mechanical ventilation due to reduced respiratory effort due to midazolam and to avoid pulmonary aspiration because of presence of blood in mouth and airway. He was treated empirically (levetiracetam, meropenem, aciclovir) initially for a meningoencephalitis in the context of concomitant high-grade pyrexia and seizure. He subsequently developed a severe metabolic acidemia, rhabdomyolysis with acute kidney injury (AKI), acute respiratory distress syndrome and transaminitis. He underwent haemofiltration to manage his metabolic state. Electroencephalogram showed slow background activity, without ongoing epileptiform discharges or subclinical seizures, and non-convulsive status epilepticus was excluded. MRI and CT brain were unremarkable. The initial blood test showed high level of testosterone, oestradiol and prolactin. Free thyroxine (T4) was below normal range (Table 1). The urinary drug screen was negative, except for benzodiazepines (in the context of midazolam treatment).

After failed extubations on days 2 and 8 due to significant agitation and vomiting, he was successfully extubated on day 9 with no

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In this article, we report the case of a 38-year-old African-American male, with a history of AAS abuse, who arrived at the emergency department with complaints of severe chest pain radiating to the left arm. An electrocardiogram (ECG) revealed ST-elevation MI (STEMI) and elevated troponin.

Most Common Clinical Side Effects of Anabolic-androgenic Steroids

Side Effect	Percent of Users Affected
Changes of libido	61%
Mood swings	57%
Reduced testicular volume	46%
Acne	43%
Erectile dysfunction	21%
Headaches	9%
Edema (water retention)	5%
Change in hair growth	5%

acne.org*

Use of anabolic androgenic steroids (AAS) is a serious abuse problem among professional and recreational athletes 1,2,3,4. AAS have anabolic properties, stimulating muscle growth 5, and androgenic .

Sexual Orientation and Anabolic-Androgenic Steroids in US Adolescent Boys

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KEY WORDS: sexual orientation, anabolic-androgenic steroids, adolescents, boys

ABBREVIATIONS

AAS—*anabolic-androgenic steroid*
CI—*confidence interval*
OR—*odds ratio*
SMM—*simultaneous multiple mediation*
YRBS—*Youth Risk Behavior Survey*

Dr Blashill conceptualized and designed the study, conducted the analyses, and drafted the initial manuscript; Dr Safren supervised all aspects of the study and provided editorial comments on the initial drafts of the manuscript, and both authors approved the final manuscript as submitted.

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WHAT'S KNOWN ON THIS SUBJECT: Anabolic-androgenic steroid misuse is not uncommon among adolescent boys, and initial use in adolescence is associated with a host of maladaptive outcomes, including cardiovascular, endocrine, and psychiatric complications.



WHAT THIS STUDY ADDS: This is the first known study to examine prevalence rates of anabolic-androgenic steroid misuse as a function of sexual orientation. A dramatic disparity was found, in that sexual minority boys reported misuse at a much higher rate than heterosexual boys.

abstract



OBJECTIVES: We compared the lifetime prevalence of anabolic-androgenic steroid (AAS) misuse among sexual minority versus heterosexual US adolescent boys, and secondarily, sought to explore possible intermediate variables that may explain prevalence differences.

METHODS: Participants were 17 250 adolescent boys taken from a pooled data set of the 14 jurisdictions from the 2005 and 2007 Youth Risk Behavior Surveys that assessed sexual orientation. Data were analyzed for overall prevalence of AAS misuse and possible intermediary risk factors.

RESULTS: Sexual minority adolescent boys were at an increased odds of 5.8 (95% confidence interval 4.1–8.2) to report a lifetime prevalence of AAS (21% vs 4%) compared with their heterosexual counterparts, $P < .001$. Exploratory analyses suggested that increased depressive symptoms/suicidality, victimization, and substance use contributed to this disparity.

CONCLUSIONS: This is the first known study to test and find substantial health disparities in the prevalence of AAS misuse as a function of sexual orientation. Prevention and intervention efforts are needed for sexual minority adolescent boys. *Pediatrics* 2014;133:469–475

2005;28 (3 Suppl):81-4. Androgenic-anabolic steroids (AAS) is an official definition for all male sex steroid hormones, their synthetic derivatives and their active metabolites. AAS are drugs with specific therapeutic indications, yet they are popularly known because of their worldwide non-therapeutic use in a large number of healthy individuals.

Child sexual abuse associated with anabolic androgenic steroid use



The widespread adoption of anabolic androgenic steroid (AAS) use has exacerbated an emerging worldwide public health epidemic. The true lifetime prevalence of AAS use is difficult to establish, but conservative estimates range from 1% to 5% worldwide and are higher in the United States (Anawalt, 2019). Increasing social acceptance of use, ease of acquisition through the internet (Fink et al .

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