“From Muscles to Misery": The Hidden Danger of Anabolic Steroids on Cardiac Health

Archana Ramalingam MD, Ebubechukwu Ezeh MD, Nayiri Derian MD (Marshall University)

BACKGROUND

Anabolic steroids, including testosterone, are widely used in the athletic community to enhance muscle growth and physical performance. However, their misuse can lead to severe adverse effects, including cardiovascular complications. The incidence of cardiovascular complications associated with the misuse of anabolic steroids, including testosterone, varies from 11% to 57% among anabolic steroid users(1). It is important to note that the actual incidence may be higher due to underreporting or unrecognized cases.We report a case of anabolic steroid-induced cardiomyopathy in a young male bodybuilder who experienced acute cardiac decompensation and atrial fibrillation following an increase in testosterone dosage.

CASE PRESENTATION

Our patient, a 31-year-old male bodybuilder who was admitted through Emergency department following the use of high-dose testosterone, presented with acute symptoms, including hemoptysis, atrial fibrillation, and cardiogenic pulmonary edema. Initial electrocardiogram findings indicated atrial flutter with rapid ventricular response. Further evaluations, such as transthoracic echocardiogram and transesophageal echocardiogram, confirmed severe left ventricular dysfunction and biatrial enlargement. The patient required mechanical ventilation due to acute respiratory distress.

Management strategies involved direct current cardioversion, pharmacological therapies (adenosine, diltiazem, amiodarone), and anticoagulation with apixaban. The patient's medication regimen included angiotensin-converting enzyme inhibitor, β-blocker, aldosterone antagonist, and oral amiodarone. Discontinuation of steroid use was emphasized.

IMAGES

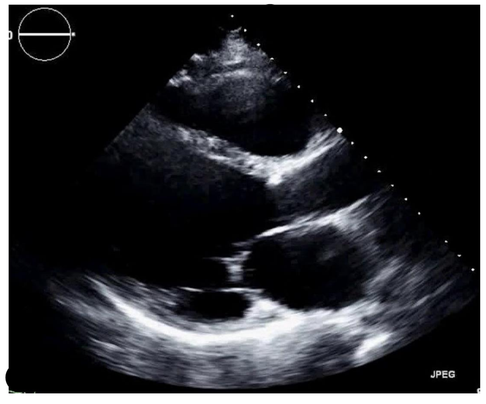


Figure 1: Echocardiographic PLAX view of dilated heart chambers in cardiomyopathy



Figure 2: Echocardiographic 4chamber view of dilated heart chambers in cardiomyopathy

Effects of Anabolic steroids on cardiovascular system

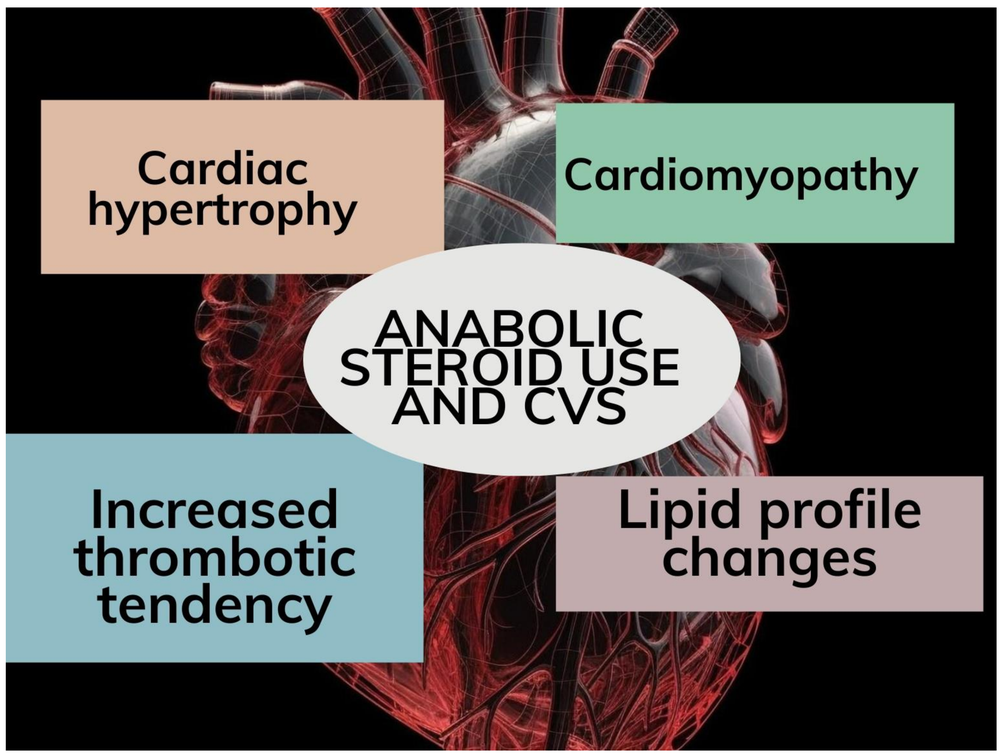


Figure 3: Illustrating the deleterious effects of Anabolic steroids on Cardiovascular system (CVS)

DISCUSSION

Anabolic steroid use is prevalent in the athletic community, where individuals seek to enhance muscle growth and physical performance. These synthetic derivatives of testosterone exert their effects by promoting protein synthesis and increasing muscle mass. The misuse of anabolic steroids is associated with a range of cardiovascular effects. These substances can lead to cardiac hypertrophy, cardiomyopathy, unfavorable changes in lipid profiles, and an increased risk of thrombotic events. Recognizing the potential cardiovascular risks of anabolic steroid use is crucial for healthcare professionals, athletes, and individuals involved in strength training. Education, prevention, and appropriate management strategies are essential to minimize the cardiovascular complications associated with anabolic steroid misuse and promote long-term cardiovascular health.

KEY TAKEAWAYS:

- Anabolic steroid misuse can lead to cardiomyopathy, atrial fibrillation, and heart failure.
- Prompt recognition and management of cardiovascular complications are essential.
- Healthcare professionals should educate athletes about the risks of anabolic steroid abuse.
- Monitoring cardiac health in steroid users is crucial to detect early signs of cardiovascular damage.

FUTURE DIRECTIONS:

Further research is needed to better understand the underlying mechanisms of anabolic steroid-induced cardiomyopathy and to develop effective prevention strategies. Long-term studies on the cardiovascular outcomes of individuals using anabolic steroids are warranted.

REFERENCES:

1.Baggish, A.L., Battle, R.W., Beckerman, J.G., Bove, A.A., Lampert, R.J., Levine, B.D., Link, M.S., Martinez, M.W., Molossi, S.M., Salerno, J., Wasfy, M.M., Weiner, R.B., Emery, M.S., 2017. Sports Cardiology. Journal of the American College of Cardiology 70, 1902–1918.. https://doi.org/10.1016/j.jacc.2017.08.055

2.Han HC, Farouque O, Hare DL. Steroid-induced cardiomyopathy. Med J Aust. 2015 Sep 7;203(5):226-7.e1. doi: 10.5694/mja14.01491. PMID: 26852057.

3.Sheikh T, Shuja H, Zaidi SR, Haque A. Glucocorticoid-induced cardiomyopathy: unexpected conclusion. BMJ Case Rep. 2020 Nov 9;13(11):e237173. doi: 10.1136/bcr-2020-237173. PMID: 33168535; PMCID: PMC7654122.

4.Petramala L, Concistrè A, Olmati F, Saracino V, Chimenti C, Frustaci A, Russo MA, Letizia C. Cardiomyopathies and Adrenal Diseases. Int J Mol Sci. 2020 Jul 17;21(14):5047. doi: 10.3390/ijms21145047. PMID: 32709015; PMCID: PMC7404306.

5.Ferenchick GS. Association of steroid abuse with cardiomyopathy in athletes. Am J Med. 1991 Nov;91(5):562. doi: 10.1016/0002-9343(91)90204-b. PMID: 1951424.

6.Youssef MY, Alqallaf A, Abdella N. Anabolic androgenic steroid-induced cardiomyopathy, stroke and peripheral vascular disease. BMJ Case Rep. 2011 Jun 30;2011:bcr1220103650. doi: 10.1136/bcr.12.2010.3650. PMID: 22693308; PMCID: PMC3132623.

Disclosures: none