

# Assessment of myocardial dysfunction in anabolic steroid users

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## Patient history/pathology

33 year old male, 175 cm, 87 kg, bodybuilder. Reports a decline in physical performance with decreased training loads, experiencing dyspnea at rest. Has no prior history of cardiovascular diseases, normotensive. Using testosterone on a weekly basis, and anabolic steroids daily for the past 6 months.

## Challenges

The challenges include the need for an assessment using advanced echocardiographic techniques both at rest and during isometric exercise to determine the presence of myocardial function alterations, considering that the use of two-dimensional echocardiography does not reveal functional changes.

## System, probe & device used

The Vivid E95 echocardiography system with the 4Vc-D phased array probe was used for image acquisition. Image post-analysis was conducted on the EchoPAC™ software only version 206. This analysis was performed both at rest and during isometric exertion using a leg press.

## Step-by-step procedure

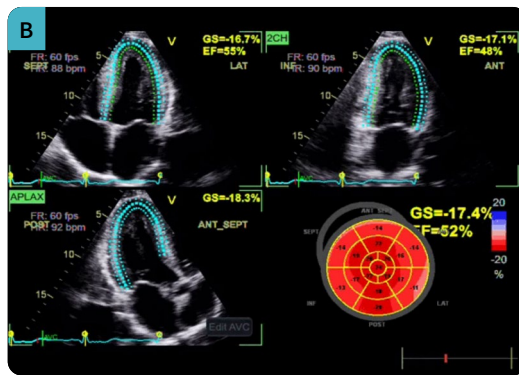
An echocardiographic analysis was performed both at rest and during isometric exercise on an extensor chair. The following measurements from two-dimensional echocardiography were analyzed: left ventricular end-diastolic diameter (LVEDD), left ventricular end-systolic diameter (LVESD), inferolateral wall thickness and anterior septal thickness, left ventricular ejection fraction (LVEF), left ventricular diastolic function, global longitudinal strain (GLS) of the left ventricle, myocardial work with all its variables, constructive work, wasted work, and myocardial efficiency.

## Conclusion

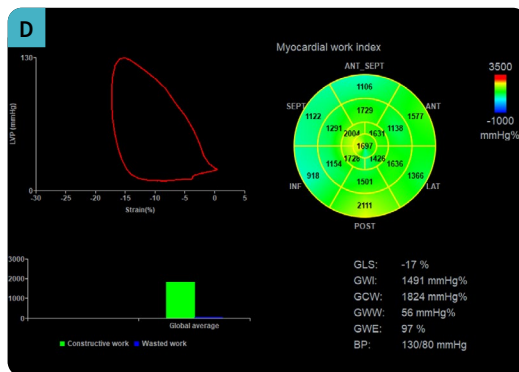
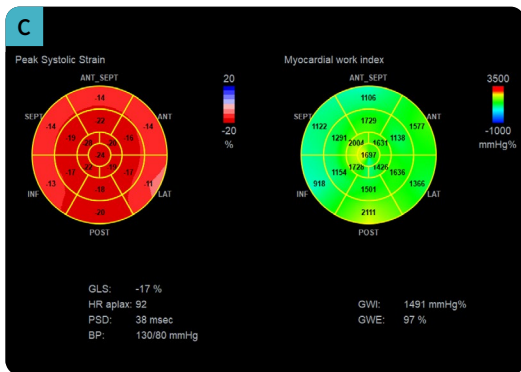
We identified the need to use advanced echocardiographic techniques to detect myocardial dysfunction in users of anabolic steroids. Additionally, we found that specific analyses simulating the athletes' training efforts are required, as myocardial dysfunction often becomes apparent only under physical stress. Consequently, we observed a significant increase in deconstructive work, which defines a decrease in myocardial efficiency.

## Imaging follow-up

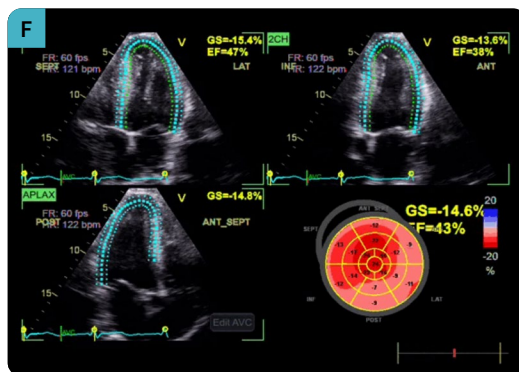
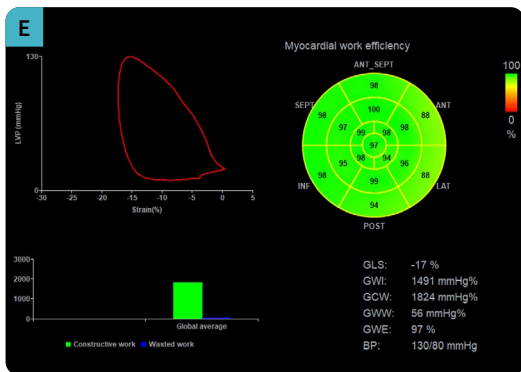
We emphasize the importance of analyzing left ventricular strain and myocardial work both at rest and during isometric exertion. This approach shows a significant decrease in myocardial efficiency, which cannot be detected through conventional two-dimensional echocardiography.



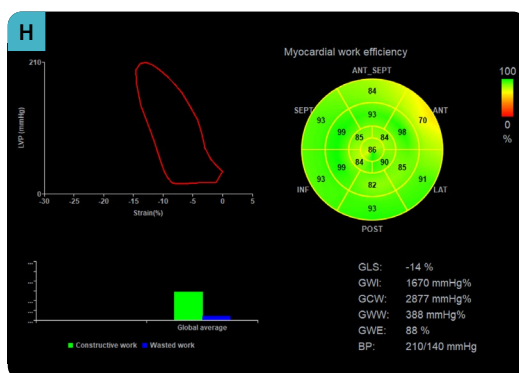
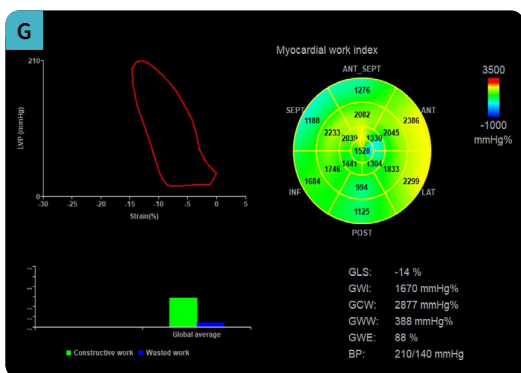
- A) Analysis of left ventricular ejection fraction by Simpson.
- B) Analysis of longitudinal strain at rest by AFI, observing the 4-chamber, 2-chamber and 3-chamber views.
- C) Analysis of longitudinal strain and myocardial work at rest.
- D) Analysis of myocardial work at rest.



- E) Analysis of myocardial efficiency at rest using myocardial work tool.
- F) Analysis of longitudinal strain by AFI during isometric exertion in leg press, observing 4-chamber, 2-chamber and 3-chamber views.



- G) Evaluation of myocardial work during isometric exertion in leg press, demonstrating a significant increase in constructive work and a decrease in efficiency.
- H) Analysis of myocardial efficiency by using myocardial work tool during isometric exertion.



Doctors are paid consultants for GE HealthCare and were compensated for participation in this article. The statements described here are based on their own opinions and on results that were achieved in their unique setting. Since there is no "typical" hospital and many variables exist, i.e. hospital size, case mix, etc., there can be no guarantee that other customers will achieve the same results.

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