Left ventricular systolic dysfunction induced by androgenic anabolic steroid use

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Patient history/ pathology

Preparticipation screening: master male athlete (athletics, 100-200m sprints), 49 years old, Caucasian. Without significant personal and family history. Symptoms of fatigue and progressive reduction in sporting performance. Unremarkable physical examination.

1st step investigations: ECG without pathological findings; Cardiopulmonary Exercise Testing (CPET) showing low functional capacity (66% predicted VO2max).

Challenges

- Investigation of the potential causes for the reduction of functional capacity in this athlete
- Recognize the relevance of transthoracic echocardiogram to clarify the clinical context
- Choose the most appropriate echocardiographic tools and modalities to evaluate the cardiac morphology and function
- Understanding the role of echocardiography in the comprehensive athletes' evaluation

System, probe & device used

GE HealthCare Vivid E95, Probe 4Vc-D

Step-by-step procedure

In the setting of this preparticipation screening, echocardiogram was very important to investigate the abnormal findings present in the initial evaluation (symptoms and abnormal CPET results). This echocardiographic evaluation integrated several modalities and tools to ensure a detailed evaluation of cardiac function and structure.

Conclusion

In the evaluation of this master athlete with fatigue, progressive performance reduction and abnormal CPET, the echocardiogram was a crucial exam, revealing a dilated LV with severe systolic dysfunction, in which both LVEF and Global Longitudinal Strain (GLS) were important tools. A deeper investigation established as the most probable causes a previous abuse of anabolic-androgenic steroids or myocarditis.

During athlete's preparticipation screening, even not being a mandatory exam, echocardiogram is essential, mainly for investigation of symptomatic individuals or specific clinical contexts, such as those abusing performance-enhancing drugs.

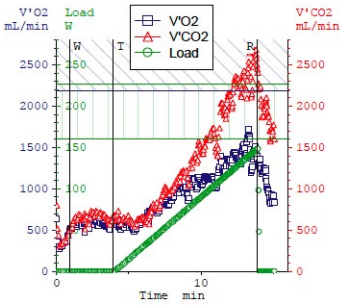
Imaging follow-up

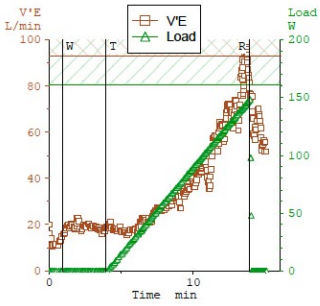
Cardiac Magnetic Resonance (CMR) was performed, showing a severe LV systolic dysfunction and extensive myocardial fibrosis.

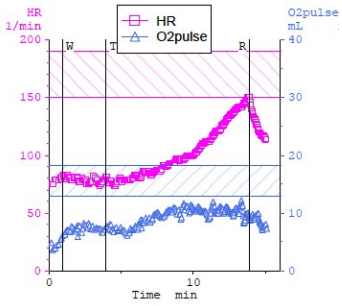
Echocardiographic revaluation 3 months after starting pharmacological therapy for heart failure.

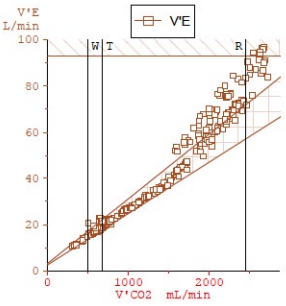
Echocardiographic follow-up at 6 and 12 months.

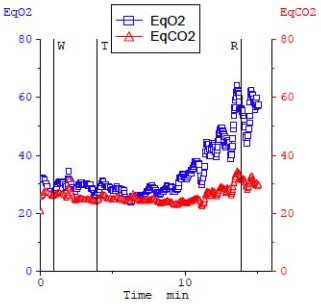
Summary (30 sec)		Rest	AT	VO2 Peak	Pred	AT/Pred (%)	VO2 Max/Pred (%)
Time	[min]	14:17	11:20	13:20	-	-	-
t-ph	[min]	00:24	07:25	09:24	-	-	-
Resposta Card. e Metabólica							
Load	[W]	0	109	139	194	56	72
RPM	[1/min]	61	63	59	-	-	-
V'O2	[mL/min]	871	1368	1725	2633	52	66
V'O2/kg	[(mL/min)/kg]	10.4	16.3	20.5	31.3	52	66
O2pulse	[mL]	6.5	11.8	12.1	15.5	76	78
HR	[1/min]	134	116	142	170	68	84
Psys	[mmHg]	170	150	160	-	-	-
Pdia	[mmHg]	80	85	85	-	-	-



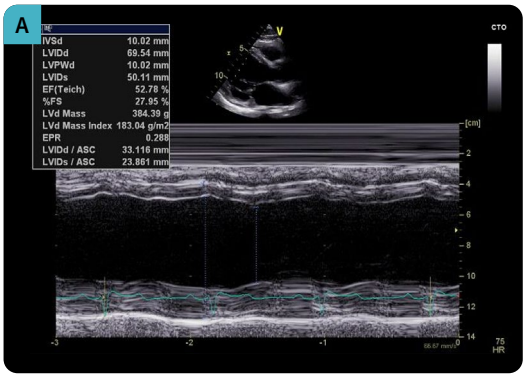


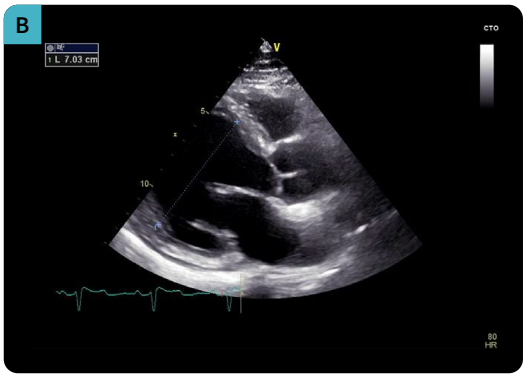




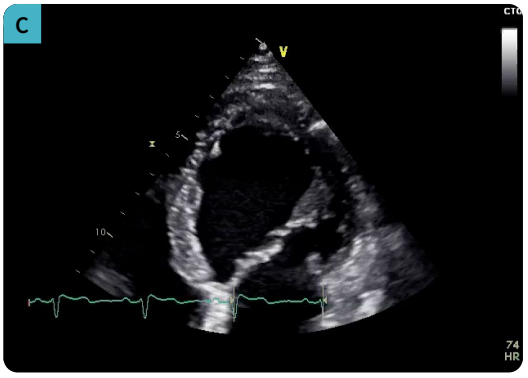


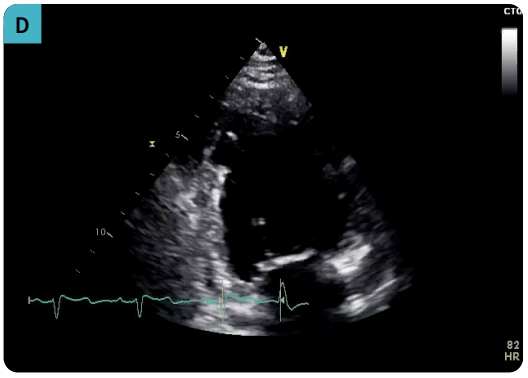
CEPT showing a reduced functional capacity with a predicted VO2max of 66%.



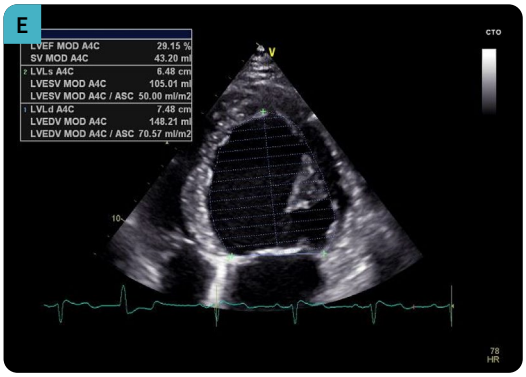


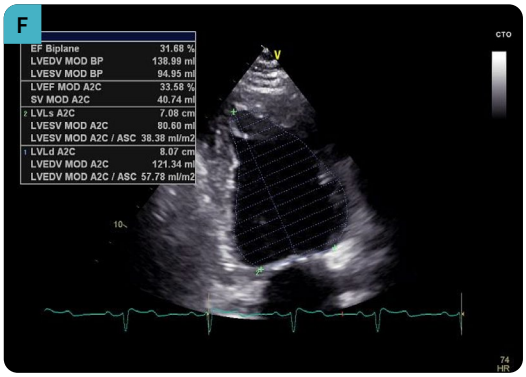
A-B) Eccentric LVH and LV dilation.



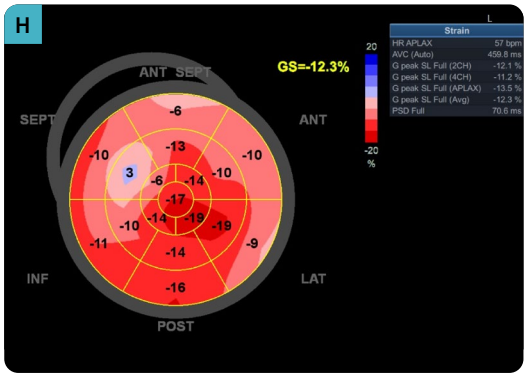


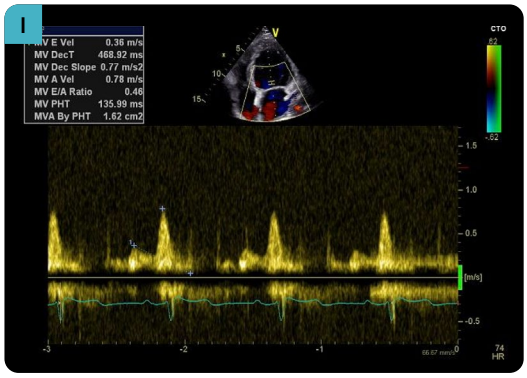
C-D) 2D 4 and 2-chamber views with dilated LV and diffuse hypokinesia.





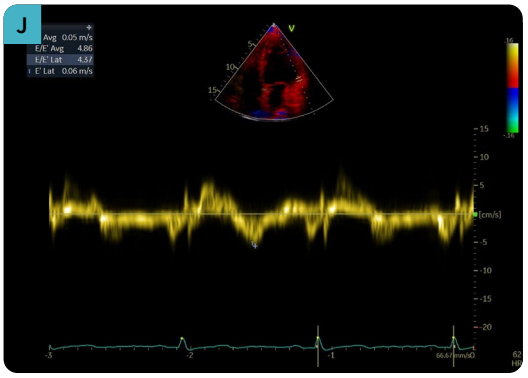
E-F) 2D showing a severe reduction in LVEF (32% by Simpson biplane).

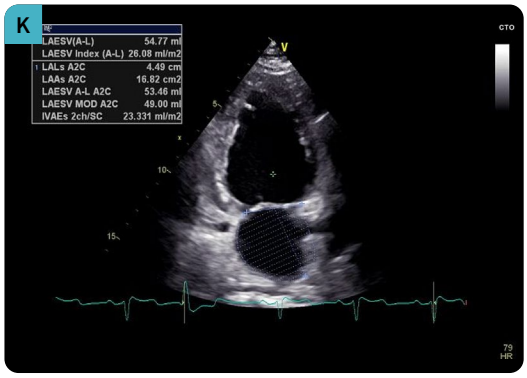


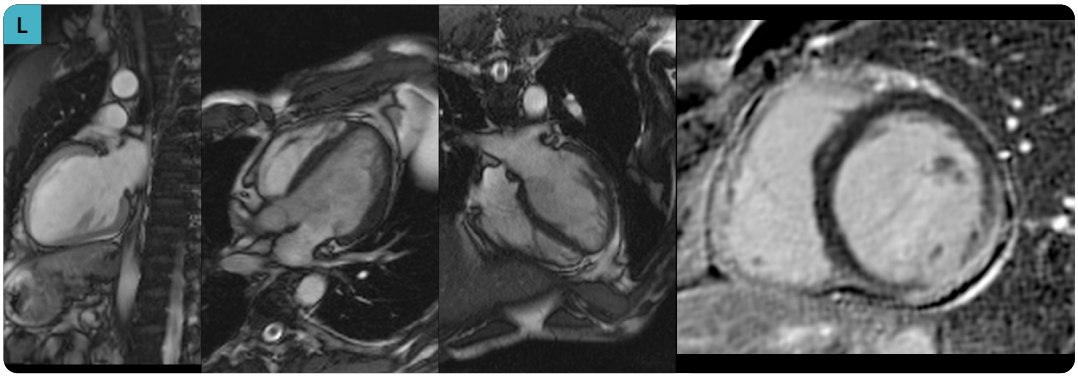


H) Speckle tracking showing a reduced GLS (-12,3%).

I-K) Additional data with a grade 1 diastolic dysfunction and dilated LA.







L) CMR showing LV dilation, systolic dysfunction (LVEF 35%) and infero-lateral subepicardial fibrosis.

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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