



Life is a breath

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1 INTRODUCTION

Transthoracic echocardiography (TTE) is an operator-dependent examination. Rigor in technical execution combined with theoretical knowledge of anatomy, pathophysiology, and technical concepts influences the final result of the ultrasound study. The learning curve in this diagnostic area is long and requires supervision to ensure consistent learning. There are now guidelines and recommendations developed by several professional organizations that guide and standardize the performance of TTE.

2 CLINICAL CASE

Clinical case of a 56-year-old Caucasian male, former smoker. As relevant clinical history, arterial hypertension, asthma and Scimitar syndrome stand out. The individual consulted his family doctor and reported a significant worsening of symptoms in the last month. The symptoms included easy tiredness and fatigue, dyspnea, although with adequate pO₂ and stable hemodynamic parameters. On auscultation, a clear diastolic murmur was audible.

The family doctor orders an ETT and cardiology consultation (urgent).

The individual went to a private clinic to have a TTE performed, and then (approximately two weeks later) went to our Cardiology Department for a specialty consultation. The objective clinical examination revealed the following data: BP 155/68 mmHg and 90 bpm, rhythmic and predominantly systolic murmur V/VI at the aortic focus. The TTE report described a greatly dilated left ventricle (82 mm), walls with normal thickness, slightly decreased global systolic function (LVEF 41%), left auricle of normal dimensions (3.1 cm), large dilation of the aortic root (52 mm, without reference to the ascending aorta), aortic and mitral valves thickened by fibrosclerosis, with good opening, slight mitral valve insufficiency, slight aortic valve insufficiency, and a PASP of 53 mmHg.

The cardiologist finds the objective clinical examination data discordant with the data resulting from the TTE. The great dilatation of the aortic root, the predominantly systolic murmur V/VI in the



aortic focus and the left ventricle with severe dilatation, lead to the suspicion of imposing aortic insufficiency. The decision was to request a new TTE, this time performed in our service.

The second TTE revealed significant differences from the first study: severe aortic insufficiency (IV/IV), ascending aorta with aneurysmal dilatation (74mm), severely dilated left atrium (83mL/m²) and increased left ventricular filling pressures. The remaining findings were superimposable to the previous examination.

The individual was referred for cardiac surgery. Prior to that he underwent aortography, which revealed a slightly calcified tricuspid aortic valve, ascending aorta aneurysm and severe aortic regurgitation. Coronary angiography showed no coronary artery lesions. The electrocardiogram in sinus rhythm (70bpm) and left ventricular hypertrophy criteria. Ventilatory tests showed VEMS below acceptable for surgery (47%), with improvement after bronchodilation (54%), and kinesitherapy was requested.

The proposal for surgery, taking into account the already known Cimitarra syndrome, included correction of anomalous pulmonary venous drainage and correction of ascending aortic dilatation and aortic insufficiency. Considering the recent clinical worsening, the request referred urgency in the procedure.

The surgery took place about three months after the diagnosis. The aortic root and ascending aorta were replaced with a Dacron tube #28, a St. Jude mechanical prosthesis #21 was implanted, and the Scimitar syndrome was corrected.

The echocardiogram performed 5 months after surgery showed significant improvement in cardiac structure and function, with special emphasis on the reduction of the dimensions of the left auricle and left ventricle, improvement of left ventricular ejection fraction and reduction of PASP. A normofunctioning mechanical prosthesis resolved the aortic valve insufficiency and the ascending aorta had normal dimensions. The individual reported an extraordinary improvement in his quality of life.

3 DISCUSSION

The echocardiographic study is a diagnostic moment that requires, on the one hand, a lot of technical preparation and on the other hand, a solid knowledge of anatomy, hemodynamics and cardiac pathophysiology. During the course of a TTE, the professional must be attentive to the data and integrate the knowledge, can serve that moment of assessment, never failing to interconnect the findings, thus avoiding the preparation of a report with data discordant with each other and discordant with the clinical context.

Dilatation of the ascending aorta and the aortic root predispose to the appearance of aortic insufficiency, of varying degree, which in turn will impact the structure of the left ventricular chamber.



The left ventricle dilates proportionally according to the severity of the valvular insufficiency. Ventricular dilatation is usually accompanied by systolic and diastolic dysfunction, which in the course of this clinical condition imposes increased dimensions of the left atrium and later increased pulmonary pressures.

In this specific case, the diagnostic error in the first TTE was essentially due to the difficult assessment of the aortic insufficiency, since it had a posterior orientation that prevented its visualization in the apical 5-chamber plane, the plane routinely used in these cases. In this plane, in fact, the insufficiency seemed to be only slight. However, using the slightly modified apical 3-chamber plane it was possible to observe a severe insufficiency, even the coanda effect. A more careful observation, taking into account the clinical context and knowledge of anatomy, hemodynamics and pathophysiology could have avoided the error. Also noteworthy is the difference in quantification of the left auricular chamber, which was first described as normal and later as severely dilated. International recommendations recommend quantifying the size of the left auricle by calculating its volume indexed to body surface area, rather than using its linear dimension.

The correction of the problem in the ascending aorta and aortic valve was successfully corrected according to current recommendations.

This individual had concomitant Scimitar Syndrome. This condition was already part of the medical history of this individual, but had never been corrected because it did not justify an intervention on its own. This is a rare condition. It arises due to the presence of a pulmonary vein, shaped like a Turkish sword called a scimitar, which drains from the right lung into the inferior vena cava instead of into the left atrium. It was successfully corrected.

4 CONCLUDING REMARKS

TTE is a low-cost, innocuous, non-invasive test that provides access to valuable information about the structure and function of the heart and great vessels. However, personal investment is crucial for a performance that respects good practices and recommendations in light of the best scientific knowledge. Today, there are guidelines that result from the efforts of groups of leading professionals, which allow professionals in the area to strengthen and update their knowledge, predictably reducing the possibility of error.



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