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Consensus document on transthoracic echocardiography in Portugal☆

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Abstract Echocardiography is the most widely used imaging technique in modern cardiological clinical practice, since it is readily available, portable and safe, and provides a comprehensive morphological and functional assessment at low cost compared to other imaging modalities. Recent technological advances have introduced new echocardiographic techniques and widened the clinical applications of echocardiography. However, these developments have also led to an increase in information, rendering interpretation of the data provided by the exam more complex; this may result in assessment errors by less experienced operators. Standardization of procedures and training in echocardiography is therefore essential to ensure quality and safety for patients. The present document aims to contribute to this end, recommending quality requirements for operators and echocardiography laboratories in Portugal.

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PALAVRAS-CHAVE
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Qualidade

Documento de Consenso e Recomendações para a realização de Ecocardiografia Transtorácica em Portugal

Resumo A ecocardiografia é o método de imagem mais usado na prática clínica diária da cardiologia moderna, dada a sua disponibilidade, portabilidade, ausência de efeitos biológicos deletérios relevantes e menor custo quando comparada com a maioria das outras modalidades de imagem. A evolução tecnológica das últimas décadas, com a introdução de novos e cada vez mais complexos métodos de avaliação ecocardiográfica, alargou ainda mais as indicações para a realização de um ecocardiograma; no entanto, conduziu igualmente ao aumento da informação produzida pelo exame e à maior complexidade da sua interpretação com potencial geração de erros de avaliação por operadores com menor experiência. De modo a assegurar a qualidade e a segurança dos exames minimizando os riscos para os pacientes e a necessidade de duplicação de exames, é necessário uniformizar a prática da ecocardiografia em Portugal. O presente documento pretende contribuir para este esforço, enumerando-se competências a adquirir e procedimentos a adotar de modo a garantir operadores e laboratórios qualificados.

Introduction

Echocardiography is the most widely used imaging technique in cardiological clinical practice, since it is readily available and provides a comprehensive morphological and functional assessment in real time and at low cost. It is thus the first-line examination for the majority of cardiovascular conditions and has a significant effect on subsequent diagnostic and therapeutic strategies.[1,2] Even a basic echocardiographic exam involves different imaging modes that provide supplementary data. Recent technological advances have further increased the information provided and widened the clinical applications of echocardiography. It is therefore essential to ensure that operators and echocardiographic laboratories fulfill quality requirements for performing and interpreting the exam.

Objective

The aim of the present document is to improve and standardize echocardiographic procedures in Portugal, setting out the competences to be acquired and the procedures to be adopted by operators and echocardiographic laboratories in order to ensure the quality and safety of echocardiographic exams. The three elements essential to the final quality of the exam will be addressed: the exam itself (procedure and report); the echocardiography laboratory; and the operator.

This document deals only with transthoracic echocardiography (TTE) in adults. Transesophageal echocardiography (TEE), pediatric echocardiography (TTE and TEE), exercise and pharmacological stress echocardiography, and intraoperative echocardiography (TTE and TEE) in cardiac surgery or during percutaneous interventions are generally excluded from these standards, given their specific characteristics and complexity; in the future they will be the subject of separate guidelines. In addition, although some of the areas dealt with may be more applicable to a hospital setting, the main quality principles set out in this document should be equally applicable to echocardiography in outpatient settings, albeit with minor adaptations if required.

The statutory regulation of medical acts such as echocardiography does not come under the jurisdiction of scientific societies, so these recommendations cannot overrule current laws. Nevertheless, this document was presented to and discussed with the College of Cardiology of the Portuguese Order of Physicians, and their formal and explicit agreement was obtained.

The echocardiographic exam

TTE involves an integrated combination of two-dimensional (2D) imaging, with pulsed- and continuous-wave spectral Doppler, color Doppler, M-mode and tissue Doppler.[3] Three-dimensional echocardiography is still at the consolidation stage for clinical purposes; its use when indicated is optional and depends on local availability and experience.[4,5]

A complete TTE study includes assessment of the morphology and function of all cardiac chambers, valves and great vessels from multiple views. This requires measurements using 2D, M-mode and spectral and tissue Doppler images; quantification of systolic and diastolic function; calculation of regurgitant and stenotic valve orifices; and estimation of filling pressures and pulmonary artery pressure.[3]

Although the sequence in which the information is acquired may vary depending on local practices and preferences,[3,6,7] a minimum dataset of cine-loops or still frames in different views is required for a complete TTE exam from which a high-quality final report can be derived (Table 1).

In each cine-loop, at least one and preferably three cardiac cycles, representative of a normal cycle, should be recorded. In cases of arrhythmias with significant R-R variability, a greater number of cycles or a longer acquisition