Developing the Swedish national certification for echocardiography

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Echocardiography is the most widely used important cardiac investigation and is considered the cornerstone diagnostic tool of myocardial and valvular function. Ascertain optimum quality of the echocardiographic examination is of utmost importance for accurate patient management.

Due to its availability, portability, and relatively low cost, echocardiography is increasingly used in not only different settings; in outpatient units, emergency rooms, cardiac wards outside structured echocardiographic laboratories, but also by increasing number of different specialties, cardiology, emergency medicine, anesthesia, and clinical physiology.

In Sweden echocardiography has been developed mainly within the specialty of clinical physiology, it has recently attracted cardiology trainees and has now become a recognized specialty in Sweden, Denmark and Finland.

The European Society of Cardiology and its largest subsidiary body, the European Association of Cardiovascular Imaging started a certification programme in 2004, its take up in Sweden has been minimal because of a number of reasons: Firstly, it is not mandatory and examinations take place just once a year at an annual congress which requires costly travel. Secondly, the practical element of the examination is logistically challenging where specifically collecting the 250 cases to be sent to the committee for assessment has created an administrative workload which can be very challenging for the candidate. Thirdly, the European examination is in English, which is often an additional barrier, at least for some of the echocardiographic practitioners.

EACVI has recognized the need for a wider acceptance of a certification of echocardiography, both on a national and European level, and is currently discussing a plan for facilitation of the exam by possible recognition of a national practical exam to be accepted as a part of the EACVI exam.

For these reasons, the Swedish Working Group of Echo (SWGE) has been mandated by the Swedish Heart Association (SHA) to design a national certification system for transthoracic echocardiography, with the intention of developing a unified system during 2015. The voting members of the SHA included various cardiovascular related healthcare professionals in Sweden, specifically cardiology; thoracic surgery, anesthesia and radiology; and clinical physiology. Both the SWGE and the SHA are keen to ensure that the curriculum is consistent with that of the EACVI, so that candidates will acquire skills recognized across the continent. Currently, the SWGE is in discussions with EACVI for the latter to recognize the recently proposed echocardiography national certification process.

Competence in practicing echocardiography will be assessed in two stages: theoretical and practical.

### Theoretical Exam

The theory exam will be conducted in the Swedish language and will form the first step of the certification process. It consists of four components.

1) To enter the programme, candidates are expected to have completed at least three and preferably six months of education and training at one of the well established national Echocardiography Departments. Such lab should be staffed with a renowned team in the field.

2) In conjunction, candidates will be expected to access the EACVI syllabus (www.escardio.org) and the SWG syllabus (www.ekokardiografi.se), and to study these in their own time. While the broad content of the two syllabuses is similar, there are few difference in the areas of emphasis between them. The latter emphasizes the importance of the need for patient referral for other investigations, such as stress echocardiography, rather than detailed knowledge of these specialized techniques.

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4) Finally, the echocardiography syllabus will be delivered on a two day course before/during the annual meeting of the Swedish Heart Association Society, in order to discuss difficult issues and adequately explain any potentially unclear issues in the scientific and practice of echocardiographic techniques in different cardiac diseases.

### Practical Exam

Some months later, the successful candidates will be invited to proceed to the practical echocardiography examination day.
This day will consist of two echo examinations performed by the candidate who will be required to write and submit a full report. The supervising examiner will also conduct echocardiographic examinations of the same patients as a reference, against which the candidates study will be assessed. The candidate will also be asked to assess some other standard cases with different pathologies and to give opinion on the benefit of echocardiography in the management of such cases.

Certification

Successful candidates will be granted a certificate of competence in echocardiography from the Swedish Heart Association.

A certificate is proposed to be granted for five year in concordance with EACVI recommendations, and a re-certification is proposed to be granted based on a written proof for performing a minimum of 100 TTE examinations/year during the five year period.

Current Status

The online test has a growing library of questions, currently around 100, with an ultimate goal of five times that number. This has been used by over 100 echocardiographers to date.

The plans for the programme and the course is near completion and will be sent to the SHA for review during October 2014. Twenty reference labs have indicated a wish to join the programme. A test course is scheduled for April 2015 in Orebro in conjunction with the Swedish Cardiovascular Annual Conference (Spring-meeting).

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Myocardial Contrast Echocardiography: Ready for the prime time

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The advancement in imaging technology coupled with development of ultrasound contrast agents (UCAs) has made it possible to detect and localize coronary artery disease at the bedside. Despite plethora of data published¹, commercially available agents are still approved only for left ventricular opacification; but the true potential of these unique red blood cell tracers resides in the non-invasive assessment of myocardial perfusion during myocardial contrast echocardiography and that too with high spatial and temporal resolution than any other non-invasive bedside technique.

Several landmark publications¹ in the last two decades ushered the development of myocardial perfusion imaging using UCAs and it was viewed by many to be a bright new era for MCE. However, 2007 saw regulatory authorities¹ raising safety concerns and the future of MCE was put into jeopardy. Subsequent multicentre analyses on the use of UCAs²,³,⁴, ⁵, and ⁶ included patients with a range of clinical settings and confirmed their favourable risk-benefit profile and this renewed the industry efforts to pursue for formal approval of UCAs for myocardial perfusion. What sets MCE apart from other non-invasive techniques is its ability to assess function and perfusion simultaneously in a cost effective manner.

Clinical studies have clearly demonstrated the efficacy and feasibility of myocardial contrast echocardiography for detecting perfusion abnormalities in patients with coronary artery disease⁷,⁸ and quantifying the degree of myocardial blood flow mismatch during pharmacologic stress⁹, ¹⁰. Many studies have demonstrated concordance between MCE and SPECT for assessment of myocardial perfusion during rest and stress¹. A meta-analysis of eight studies¹¹ comparing sensitivity and specificity of MCE with those of SPECT/ dobutamine stress echocardiography for the detection of stable CAD showed superior sensitivity of MCE vs SPECT¹. Recent multicentre studies confirmed these observations¹², ¹³. The superior sensitivity of MCE is due to its better spatial and temporal resolution compared to SPECT. This translated into superior prediction of outcome compared to SPECT. This was demonstrated in a single centre study of approximately 300 patients where MCE was compared to SPECT-head to head¹². In another head to head study, MCE was compared to cardiac magnetic resonance (CMR) for the detection of CAD¹⁴. In this study, vasodilator MCE demonstrated similar sensitivity, specificity, accuracy and reproducibility for the detection of angiographically proven CAD (defined as >70% stenosis in a major coronary artery). Achieving a favourable diagnostic performance in identifying the extent and functional significance of coronary stenosis, the overall data points out towards MCE having a sensitivity of 83% and specificity of 80% for detection of significant CAD¹⁴. MCE also provides higher sensitivity as well as incremental prognostic value over and above wall motion (WM) in patients with stable CAD which is independent of the type of stress modality used¹⁵, ¹⁶, ¹⁷, and ¹⁸. MCE during both dobutamine stress and high-dose dipyridamole stress echocardiography provided independent and incremental prognostic information over clinical factors, resting left ventricular function and wall motion in predicting hard clinical events such as MI and...