Radna skupina za ehokardiografiju i slikovne metode u kardiologiji Hrvatskoga kardiološkog društva u 2015. godini

Working Group on Echocardiography and Cardiac Imaging Modalities of the Croatian Cardiac Society in 2015

Vlatka Rešković Lukšić[1,2]*,
Jadranka Šeparović Hanževački[1,2]

[1]Radna skupina za ehokardiografiju i slikovne metode u kardiologiji, Hrvatsko kardiološko društvo, Hrvatska
[2]Medicinski fakultet Sveučilišta u Zagrebu, Klinički bolnički centar Zagreb, Zagreb, Hrvatska

[1]Working Group on Echocardiography and Cardiac Imaging Modalities, Croatian Cardiac Society, Croatia
[2]University of Zagreb School of Medicine, University Hospital Centre Zagreb, Zagreb, Croatia

RECEIVED:
June 10, 2016
ACCEPTED:
June 25, 2016

CITATION: Cardiol Croat. 2016;11(7):234–236. | **DOI:** http://dx.doi.org/10.15836/ccar2016.234

***ADDRESS FOR CORRESPONDENCE:** Vlatka Rešković Lukšić, Klinički bolnički centar Zagreb, Kišpatićeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-1-2367-501 / E-mail: vlatka.reskovic@gmail.com

ORCID: Vlatka Rešković Lukšić, http://orcid.org/0000-0002-4721-3236
Jadranka Šeparović Hanževački, http://orcid.org/0000-0002-3437-6407

Hrvatska je već nekoliko godina prepoznata kao ravnopravna članica Europskoga društva za srčano oslikavanje (EACVI, prema engl. *European Association of Cardiovascular Imaging*). To potvrđuju brojne aktivnosti Radne skupine na nacionalnoj i europskoj razini tijekom prethodne godine.

Kao u Europi, i u nas je prepoznata važnost cjelovitog, kompleksnog i mulitimodalnog oslikavanja u skladu sa sve zahtjevnijim potrebama kompleksne srčane patologije s kojom se danas susrećemo. Istodobno s razvojem tehnologije razvija se sve složeniji pristup analizi srčane morfologije i hemodinamike, što nam je stavilo na raspolaganje neslućene mogućnosti prikaza i hemodinamskih izračuna. Međutim, takvi postupci podrazumijevaju i rad visoko educiranog liječnika specijalista/supspecijalista na analizi prethodno snimljenih i arhiviranih podataka, što može trajati od najmanje 30 minuta pa i do nekoliko sati.

Napredak ehokardiografije posljednjih godina prati razvoj nekoliko novih metoda koje su već implementirane u našu svakodnevnu kliničku praksu. To uključuje studiju deformacije s pomoću 2D *speckle tracking* metode ili tkivnog doplera, iz koje možemo dobiti vrijedne informacije o funkciji miokarda npr. kod ishemijske bolesti srca (IBS), pri praćenju učinka kardiotoksične terapije, kardiomiopatijama, miokarditisu itd. Tkivni dopler iskorištava se i za studiju disinkronije s pomoću koje vrlo uspješno odabiremo pogodne kandidate za ugradnju resinkronizacijskog uređaja te pratimo oporavak funkcije miokarda uz resinkronizacijsku terapiju. Također, metoda

For several years, Croatia has been recognized as an equal member of the European Association of Cardiovascular Imaging (EACVI). This was confirmed by numerous activities of our Working Group at the national and European level over the past year.

As in Europe, we have also recognized the importance of comprehensive, complex, and multi-modality imaging due to the increasingly demanding needs of complex heart pathology we are faced with today. In parallel with the development of technology, a more and more complex approach to the analysis of heart morphology and hemodynamics is being developed, providing unprecedented possibilities for imaging and hemodynamic calculations. However, these procedures require the engagement of highly educated specialist/subspecialists for the analysis of archived images and data, which can last from a minimum of 30 minutes to as much as several hours.

Advancements in echocardiography over the last few years have been accompanied with the development of several new methods that are already being implemented in our daily clinical practice. This includes deformation analysis using the 2D speckle tracking method or tissue Doppler imaging, which can provide valuable information on myocardial function in, for instance, coronary heart disease (CHD), following the effects of cardiotoxic therapy, cardiomyopathies, myocarditis, etc. Tissue Doppler imaging is also used for dyssynchrony study, which allows very successful selection of appropriate candidates for the implantation of resynchronization devices

koja je posljednjih godina sve više u uporabi jest stres ehokardiografija koja se primjenjuje ne samo kod IBS-a za procjenu inducibilne ishemije i vijabilnosti nego sve više i kod bolesti srčanih zalistaka te nekih vrsta kardiomiopatija. Pri analizi valvularnih grešaka, osobito kod kompleksnih bolesti i onih koje zahvaćaju dva ili više zalistaka, osim konvencionalnih metoda koje uključuju obojeni dopler, hemodinamska mjerenja i 2D prikaze, posljednjih godina ovakvi su pregledi nezamislivi bez primjene trodimenzijske (3D) transtorakalne (TTE) i transezofagijske (TEE) ehokardiografije.

Na primjer, procjena mitralne regurgitacije počinje transtorakalnim ehokardiografskim pregledom s mjerenjima hemodinamike, procjenom etiologije I težine greške na osnovi volumetrijskih kvantitativnih te semikvantitaivnih metoda, a potom slijedi transezofagijska ehokardiografija (TEE) uz 3D, odnosno 4D TEE. Podatci se analiziraju naknadno, a podrazumijevaju ne samo rekonstrukciju 3D slike kojom procjenjujemo morfologiju zalistka nego i visokospecifična mjerenja kao što su veličina anulusa, visine koaptacije i koaptacijske areje, kuta "tentinga" itd., a radi odluke o daljnjemu optimalnom modalitetu liječenja. Naime, različite etiologije valvularnih grešaka impliciraju i različite odluke o vremenu kada je potrebno intervenirati te na koji način. U tome nam može pomoći i stres TTE u opterećenju npr. za praćenje pogoršanja insuficijencije, razvoja plućne hipertenzije, ili, kod stenotičnih grešaka, za praćenje porasta gradijenta u naporu, promjene u veličini stenotične areje te procjenu kontraktilne rezerve. Od vrhunskog se ehokardiografičara očekuje da, u slučaju potrebe za kardiokirurškim zahvatom, operateru predoči točne mjere regurgitirajućih volumena, stenotičnih areja, veličine i površine anulusa te analizu morfologije zalistka te definira konkomitantne greške, kao i da ehokardiografski prati cijeli bolesnikov intraoperativni I postoperativni tijek. Naši zadatci postaju još zahtjevniji razvojem perkutanih metoda zamjene i reparacije zalistaka, koje su se u svijetu već počele primjenjivati.

Stoga je za kvalitetno izvođenje novih metoda i njihovu implementaciju u svakodnevnu kliničku praksu, neizostavna kontinuirana edukacija liječnika ehosonografičara te stjecanje novih znanja i vještina, a nužno je omogućiti dovoljno vremena za obavljanje ovako složenih pretraga. U skladu s tim, uvedeni su novi dijagnostičko-terapijski postupci (DTP).

Ipak, da bi određeni laboratorij mogao izvoditi kompleksne pretrage, osoblje koje u njemu radi treba biti akreditirano, a postupci standardizirani. Na taj se način inzistira na koherentnom, kvalitetnom i ujednačenom pristupu ehokardiografiji u cijeloj našoj zemlji. U skladu s preporukama stručnoga Ehokardiografskog udruženja (EACVI)[1], Radna skupina za ehokardiografiju i slikovne metode u kardiologiji Hrvatskoga kardiološkog društva zalaže se za standardiziranje ehokardiografskog pregleda, što je prvi korak prema ujednačenoj i usporedivoj kvaliteti ehokardiografskih nalaza i njihovoj primjenjivoj vrijednosti te, u konačnici, u svrhu dobrobiti i zaštite bolesnika[2,3].

Drugi je korak je akreditacija. Tijekom prošle godine održan je ispit iz Nacionalne akreditacije, nekoliko je kandidata završilo pisani dio ispita, a jedan i cjeloviti postupak akreditacije. Akreditacija članova Radne skupine važna je i da bi se moglo pristupiti nacionalnoj i europskoj akreditaciji ehokardiografskih laboratorija, a to će nam pak omogućiti sudjelovanje u brojnim

and monitoring of myocardial function recovery due to resynchronization therapy. Furthermore, stress echocardiography is a method that has seen increasingly common use in recent years and is used not only in CHD for the assessment of inducible ischemia and viability, but increasingly also in valvular heart disease, as well as in some cardiomyopathies. When dealing with valvular heart disease, especially complex or multiple valve disease, the conventional methods include color Doppler imaging, hemodynamic measurements, and 2D imaging, but over the last few years these examinations have become inconceivable without the use of 3D transthoracic (TTE) and transesophageal echocardiography (TEE).

For instance, the assessment of mitral regurgitation begins with a TTE with hemodynamic measurements, determination of etiology and severity quantification using volumetric quantitative and semi-quantitative methods. This is followed by transesophageal echocardiography (TEE) with 3D or 4D TEE. The data is analyzed later, not only by 3D image reconstruction for visualization of valve morphology, but also by preforming very specific measurements of annulus size, coaptation height and coaptation areas, tenting angle, etc., in order to decide on further optimal treatment options. This is because different etiologies of valvular diseases indicate different decisions on when and how the intervention should be performed. Exercise stress can also help in this process by, for instance, recognizing progression of valve regurgitation or development of pulmonary hypertension in exertion, or, in case of valvular stenosis, for measurement of gradient increase, valvular area change and assessment of contractile reserve during exercise. When cardiac surgery is expected, a good echosonographer should be able to provide the surgeon with exact measurements of regurgitant volumes, stenotic areas, annulus sizes and areas; to precisely analyze valve morphology and define concomitant valve diseases, as well as to follow up, by the means of echocardiography, the patient's whole intraoperative and postoperative period. With the development of new percutaneous methods of valve reparation and replacement that are already used worldwide, more and more is to be expected from us.

Thus, to achieve quality standards of practicing this new methods and their implementation in daily clinical practice, continuous education and the acquisition of new knowledge and skills is required; it is also necessary to ensure there is enough time to perform these complex examinations. Consequently, new diagnostic-therapeutic procedures (DPT) have been introduced.

However, for a laboratory to be capable of performing complex examinations, the personnel employed must be accredited and the procedures standardized. This ensures a coherent, consistent, and high-quality approach to echocardiography throughout our country. In line with the recommendations of the European Association of Cardiovascular Imaging (EAVCI)[1], the Working Group on Echocardiography and Cardiac Imaging Modalities of the Croatian Cardiac Society advocates the standardization of echocardiographic examinations as the first step towards consistent and comparable quality in echocardiographic data and their applicability, which is ultimately for the benefit and safety of the patients[2,3].

The second step is accreditation. The National Accreditation exam was held last year, with several candidates completing the

europskim projektima i registrima. Jedan je od njih *EuroEndo*, europski registar endokarditisa koji upravo počinje uključivanjem prvih pacijenata, a uključeno je šest hrvatskih centara.

U svibnju 2015. godine objavljeni su rezultati istraživanja EACVI-a "Cardiovascular imaging practice in Europe"[4]. U studiji je sudjelovala 41 europska zemlja, uključujući i Hrvatsku. Cilj je bio utvrditi sadašnje stanje pojedinih metoda oslikavanja u Europi. Rezultati su pokazali da smo u ovom području među vodećim europskim zemljama. Naime, naš program Nacionalne akreditacije redovito se održava još od 2011. godine, a postoji u samo petini ispitanih zemalja. Međutim, cijene pretraga u Hrvatskoj još su uvijek niže nego u Europi (npr. transezofagijski UZV i stres ehokardiografija u petini su zemalja cijenom iznad 200 eura). Lista je čekanja i u drugim zemljama dugačka, dok se u nas formira prema prioritetima u skladu s medicinskim indikacijama.

Što se tiče aktivnosti Radne skupine u Hrvatskoj, najveći je događaj svakako bio kongres *CroEcho 2015.* koji je održan u Opatiji od 28. do 30. svibnja 2015. Na kongresu je sudjelovalo više od 360 domaćih i inozemnih sudionika, predavača te izlagača, čime je potvrđen status najvećega ehokardiografskoga skupa u regiji. Velik dio programa skupa bio je posvećen edukativnim sadržajima iz ehokardiografije putem Tečaja osnova ehokardiografije, na kojemu su organizirane interaktivne slikovne vježbaonice s primjerima iz kliničke prakse. Polaznici su imali prigodu sudjelovati i u radionicama napredne ehokardiografije s temama dvodimenzijske analize deformacije miokarda, trodimenzijske ehokardiografije te procjene mehaničke disinkronije. Kvalitetu skupa prepoznao je Europski odbor za akreditaciju u kardiologiji (EBAC), a Tečaj osnova ehokardiografije Edukacijski odbor EAVCI-ja.

Osim CroEchoa, tijekom prethodne su godine u suradnji s Radnom skupinom za bolesti srčanih zalistaka prevedene ESC-ove džepne smjernice za liječenje bolesti srčanih zalistaka. Također su u tijeku prijevodi preporuka EACVI-ja. Naglasak u aktivnostima Radne skupine i dalje je na edukaciji te se već nekoliko godina redovito održavaju radionice na terenu u sklopu projekta "Echo u gostima" po cijeloj zemlji. Najavljujemo da će se ove godine održati 4 radionice (o temama, mjestima održavanja i terminima radionica informacije se mogu potražiti na *web*-stranici http://croecho.kardio.hr/), a sljedeći CroEcho 2017. održat će se od 4. do 6. svibnja 2017.

written part of the examination and one completing the whole accreditation procedure. The accreditation of Working Group members is important in order to apply for national and European accreditation of echocardiographic laboratories, which will in turn allow us to participate in many European projects and registries. One of these is EuroEndo, the European registry for endocarditis, which is just starting to include the first patients with the participation of six Croatian centers.

The results of the EACVI study "Cardiovascular imaging practice in Europe"[4] were published in May 2015; 41 European countries participated in the study, including Croatia. The goal was to establish the current state of particular imaging methods in Europe. The results showed that we are among the leading European countries in this area: our National Accreditation program has been regularly held already since 2011, and such programs exist in only a fifth of the examined countries. However, examination costs in Croatia are still lower than in Europe (e.g. transesophageal ultrasound and stress echocardiography are priced at over 200 EUR in a fifth of the examined countries). Waiting lists are long in other countries as well, and in Croatia the list is based on medical indications.

Regarding the activity of the Working Group in Croatia, the most significant event was certainly the CroEcho 2015 congress that was held in Opatija from the 28th to the 30th of May, 2015. More than 360 Croatian and foreign participants, lecturers, and presenters attended the congress, which confirms its status as the larges echocardiographic gathering in the region. A large part of the congress program was dedicated to educational content from echocardiography as part of the Teaching Course that included interactive imagining workshops with examples from clinical practice. Participants could also attend workshops in advanced echocardiography on the topics of 2D myocardial deformation analysis, 3D echocardiography, and mechanical dyssynchrony assessment. The quality of the congress was recognized by the European Board of Accreditation in Cardiology (EBAC), and the quality of the Teaching Course by the Education Board of EAVCI.

In addition to CroEcho, the ESC pocket guidelines for the treatment of valvular heart disease were translated with the cooperation of the Working Group for Valvular Heart Disease. The translations of EACVI recommendations are also in progress. Education is still the focus of the activities of the Working Group, and field workshops have regularly been held across the country for the past several years as part of the "Echo on wheels" project. We can announce that 4 workshops will be held this year (information on the topics, locations, and schedules of the workshops can be found on the webpage http://croecho.kardio.hr/), and the next CroEcho 2017 will be held from May 4 to May 6, 2017.

LITERATURE

1. Evangelista A, Flachskampf F, Lancellotti P, Badano L, Aguilar R, Monaghan M, et al; European Association of Echocardiography. European Association of Echocardiography recommendations for standardization of performance, digital storage and reporting of echocardiographic studies. Eur J Echocardiogr. 2008;9(4):438-48. **DOI:** http://dx.doi.org/10.1093/ejechocard/jen174
2. Popescu BA, Andrade MJ, Badano LP, Fox KF, Flachskampf FA, Lancellotti P, et al; European Association of Echocardiography, Derumeaux G, Kasprzak JD, Roelandt JR. European Association of Echocardiography recommendations for training, competence, and quality improvement in echocardiography. Eur J Echocardiogr. 2009;10(8):893-905. **DOI:** http://dx.doi.org/10.1093/ejechocard/jep151
3. Cosyns B, Garbi M, Separovic J, Pasquet A, Lancellotti P; Education Committee of the European Association of Cardiovascular Imaging Association (EACVI). Update of the echocardiography core syllabus of the European Association of Cardiovascular Imaging (EACVI). Eur Heart J Cardiovasc Imaging. 2013;14(9):837-9. **DOI:** http://dx.doi.org/10.1093/ehjci/jet140
4. Lancellotti P, Płońska-Gościniak E, Garbi M, Bucciarelli-ducci C, Cosyns B, Cardim N, et al. Cardiovascular imaging practice in Europe: a report from the European Association of Cardiovascular Imaging. Eur Heart J Cardiovasc Imaging. 2015;16(7):697-702. **DOI:** http://dx.doi.org/10.1093/ehjci/jev116