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ACADEMY OF SCIENCES AND ARTS OF BOSNIA AND HERZEGOVINA
DEPARTMENT OF MEDICAL SCIENCES
COMMITTEE FOR CARDIOVASCULAR PATHOLOGY

XII and XIII International Scientific Symposium „Diagnostics in Cardiology and Grown-Up Congenital Heart Disease (GUCH)"

WEBINAR

15th of April 2021
Academy of Sciences and Arts of Bosnia and Herzegovina
Bistrik 7, 71000 Sarajevo

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PROGRAM

16:45-17:00 SIGNIN-IN OF LECTURERS AND PARTICIPANS TO THE BigBlueButton LINK http://bbb.anubih.ba/b/anu-g3g-klz-k2h FOR THE SYMPOSIUM

P R O G R A M

17:00-17:15 *Welcoming Address and Opening of the Symposium*

17:15-17:30 UNIV. PROF. DR. DANIEL ZIMPFER
Surgical Treatment of Congenital Aortic Valve Disease

17:30-17:45 PROF. DR. HAKAN UÇAR
Cardiovascular Manifestations in Patients with COVID-19

17:45-18:00 PROF. DR. SAMO VESEL
Prenatal Detection of Congenital Cardiac Anomalies

18:00-18:15 PROF. DR. AMINA KURTOVIĆ-KOZARIĆ
Genetics of Cardiomyopathy

18:15-18:30 PROF. DR. IDA JOVANOVIĆ
MRI in Paediatric Cardiology

18:30-18:45 MSC. GORAN VUKOMANOVIĆ
New Integrated Telemedicine Diagnostic Approach for Detecting Intermittent Cardiac Arrhythmias

18:45-19:00 PROF. DR. TUGCIN BORA POLAT
Performing and Interpreting Targeted Neonatal Echocardiography

19:00-19:15 ACADEMICIAN, PROF. DR. SENKA MESIHOVIĆ-DINAREVIĆ
Update in Diagnostics Cardiology

19:15-19:30 PROF. DR. AIDA PILAV
Diagnostics of Preventable Diseases in Cardiology

19:30-19:45 PROF. DR. ZUMRETA KUŠLJUGIĆ AND PROF. DR. NABIL NASER
Adult Congenital Heart Disease - ACHD

19:45-20:00 CLOSING REMARKS

ABSTRACTS

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SURGICAL TREATMENT OF CONGENITAL AORTIC VALVE DISEASE

Daniel Zimpfer

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CARDIOVASCULAR MANIFESTATIONS IN PATIENTS WITH COVID-19

Hakan Uçar

Abstract

Adults with COVID-19 present with a broad spectrum of clinical cardiac presentations:

- Some patients manifest no clinical evidence of heart disease,
- Some have no symptoms of heart disease but have cardiac test abnormalities (such as serum cardiac troponin elevation, asymptomatic cardiac arrhythmias, or abnormalities on cardiac imaging), and
- Some have symptomatic heart disease.

Cardiac complications include myocardial injury, heart failure (HF), cardiogenic shock, multisystem inflammatory syndrome, and cardiac arrhythmias including sudden cardiac arrest.

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PRENATAL DETECTION OF CONGENITAL CARDIAC ANOMALIES

Samo Vesel

Abstract

Congenital cardiac anomalies are the most frequent among all congenital anomalies. They can be found in 7 out of 1000 live born infants. However, not all congenital heart anomalies are equally important. Approximately a half of them are mild and do not necessitate almost any attention after once diagnosed, but another half need to be treated with cardiac surgery or congenital cardiac intervention even during the first year of life or life expectancy for these patients is significantly reduced.

Prenatal diagnostics of congenital cardiac anomalies is based on the echocardiographic evaluation the four-chamber view and the outflows of both great arteries of the foetal heart in the second trimester of pregnancy. The evaluation is a part of foetal ultrasound anomaly scan universally performed. When a query of congenital heart anomaly is raised by gynaecologist during a screening ultrasound examination, a woman should be referred to foetal cardiologist who will establish an exact diagnosis and counsel expecting parents regarding the heart condition and treatment that will be necessary after birth.

The talk will discuss the technique of prenatal cardiac examination, the most frequent anomalies found, the overall detection rates, and the advantages of prenatal diagnosis when facing newborns with congenital cardiac anomalies.

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GENETICS OF CARDIOMYOPATHY

Amina Kurtovic-Kozaric

Abstract

Heart failure is a leading cause of morbidity and mortality. Around 4% of patients with heart failure carry a pathogenic genetic aberration that causes cardiomyopathy and subsequently leads to heart failure. There are five types of primary genetic cardiomyopathies that can give rise heart failure: hypertrophic cardiomyopathy (HCM), dilated cardiomyopathy, arrhythmogenic cardiomyopathy (ACM), restrictive cardiomyopathy (RCM), and left ventricular noncompaction (LVNC). If genetic cardiomyopathy is suspected, genomic/genetic testing is recommended because it provides the underlying cause for the diagnosis, prognostic parameters, and possibility to test family members at risk. Testing should be conducted as part of a multidisciplinary approach by a team of adult or pediatric cardiologists, geneticists, and genetic counselors. Here we will discuss 1) different genomic testing approaches and the management of variants of uncertain significance, 2) management of patients with suspected genetic cardiomyopathy in a multidisciplinary team, and 3) the associations between genotypes and phenotypes of most commonly mutated genes such as MYH7, TNNT2, TPM1, MYBPC3, TTN, and others. In conclusion, genetic testing of patients with cardiomyopathies helps with proper diagnosis, prognosis, treatment, and identification of relatives at risk.

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MRI IN PAEDIATRIC CARDIOLOGY

Ida Jovanović

Abstract

Cardiac magnetic resonance imaging (CMR) has become increasingly important for managing children and grown ups with congenital heart disease (CHD). Echocardiography is still the first line diagnostic tool in children and adults suffering from CHD. However, there are situations when echocardiography fails, first of all in patients with poor acoustic windows. CMR provides a powerful tool, giving precise anatomical and physiological information in complex CHD. Extra-cardiac anatomy, including the great arteries, systemic and pulmonary veins, can be delineated with high spatial resolution. Vascular and valvular flow can be assessed, shunts can be quantified, and myocardial function can be measured accurately with high reproducibility, regardless of ventricular morphology. Besides, CMR is unique in tissue characterization in myocardial diseases and cardiomyopthies.

The technical challenges related to the use of CMR in CHD patients can be summarized as:

1. The anatomical structures to be visualized are highly complex and individualized;

2. Small children have small organs which requires MR acquisitions with high spatial resolution; 3. Faster heart rates in pediatric patients necessitate high-speed image acquisition particularly in contrast enhanced CMR;

4. Patient cooperation during the extended scan time is needed to avoid image blurring and artefacts caused by physiological motion.

New guidelines for the performance of CMR in children and adults with CHD, including disease specific protocols have recently been published.

CMR devices and sequences are developing very fast. Future of paediatric CMR are: novel accelerated imaging techniques using artificial intelligence, advanced motion correction, foetal heart imaging and interventional CMR.

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NEW INTEGRATED TELEMEDICINE DIAGNOSTIC APPROACH FOR DETECTING INTERMITTENT CARDIAC ARRHYTHMIAS

Goran Vukomanović

Abstract

Palpitations and irregular heart rhythm are among the leading causes for emergency electrocardiogram (ECG) in children and adults. For the vast majority of children with palpitations, but also to a large number of adults normal ECG is registered because the symptoms disappear until the patient reaches the medical institution.

Aim of this presentation is to describe a new complete telehealth solution enabling comfortable electrocardiography (ECG) recording as well as quick, automatic and precise diagnosis of cardiac arrhythmias based on the novel artificial intelligence (AI) algorithms. Humeds monitors, tracks and analyses 3-lead and 6-lead ECG signals on mobile device in real time, reacts to any occurring arrhythmias in a matter of seconds and allows results sharing and obtaining medical expert opinion promptly. Humeds is simple to use, anytime and anywhere, the whole procedure is discrete and lasts only 30 seconds. The clinical quality of the captured 3-lead ECG has been shown to be as good as with 12-lead Schiller ECGs, within margins of statistical error, and confirms that Humeds can be used for fast recording and cardiac rhythm interpretation of the ECG signals required by medical experts.

Conclusion: new integrative telehealth diagnostic platform provides accurate diagnosis of cariac arrhythmias and lets medical professionals share ECG recordings, either through the web platform itself or via mobile application, where additional medical expertise is required.

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PERFORMING AND INTERPRETING TARGETED NEONATAL ECHOCARDIOGRAPHY

Tugcin Bora Polat

Abstract

Targeted Neonatal Echocardiography (TNE) is increasingly used in the neonatal intensive care units to support clinical decisions. TNE is proposed to "describe the bedside use of echocardiography to deeply assess myocardial function, quantitative and qualitative indexes of pulmonary and systemic hemodynamics, intracardiac and extracardiac shunts, organ blood flow and tissue perfusion." The primary goals of TNE are to provide non-invasive information on the underlying cardiovascular pathophysiology causing hemodynamic instability and the response to treatment in an individual patient over time.

In this paper, we evaluate intelligible differences between echocardiographic studies in neonates with the suspicion of congenital heart disease (CHD) and studies performed on neonates without any clinical suspicion of CHD. If CHD has been excluded, following studies in children with anatomically normal hearts can focus on hemodynamic or functional evaluations.

The first diagnostic scanning should always be a extensive study of both anatomy and function that is to be clarified by a pediatric cardiologist within a reasonable time frame. Some structural defects can be difficult to diagnose using echocardiography and need considerable training and ongoing practice. Once significant CHD have been excluded, more attentive studies can be conducted and interpreted by a trained performer for specific indications, as defined later in this paper.

We propose to use the phrase TNE for the more sophisticated studies. The goals, to evaluate the contemporary requirements of TNE; to describe recommendations for the performance of TNE; and to put forward performers' needs for practise will be reviewed.

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UPDATE IN DIAGNOSTICS CARDIOLOGY

Senka Mesihović-Dinarević

Abstract

Cardiovascular medicine is an area of clinical practice with a continually rapid expansion of knowledge, guidelines, best practices and new technology in adult cardiovascular medicine as well as in paediatric cardiology medicine. Cardiovascular diseases /CVD/ are the leading cause of mortality in the world and causes major costs for the health sector and economy. Cardiovascular imaging indices have a significant impact on the prevention, diagnosis, and treatment of cardiac diseases. Advanced imaging technologies have dramatically improved our ability to detect and treat cardiovascular disease at an early stage. Multimodality imaging techniques /echocardiogram, cardiac computerized tomography, magnetic resonance imaging, simulation 3D models, artificial intelligence/ are being used more frequently as their utility is better appreciated. Coronavirus disease 2019/COVID-19/ exerts an unprecedented global impact on public health and health care delivery. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing COVID-19 has reached pandemic levels since March 2020. Patients with cardiovascular (CV) risk factors and established CVD represent a vulnerable population when suffering from COVID-19, and have an increased risk of morbidity and mortality. Severe COVID-19 infection is associated with myocardial damage and cardiac arrhythmia. Diagnostic workup during SARS infection revealed electrocardiographic changes, sub-clinical left ventricular (LV) diastolic impairment and troponin elevation. All professionals in cardiovascular medicine, as a part of lifelong learning process, have the continuous imperative in reviewing novelties, with results data from numerous researches in order to treat all patient according to best practices and evidence-based medicine, especially on this journey through corona pandemic cardiovascular disease.

Key words: diagnostics, cardiology, up date

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DIAGNOSTICS OF PREVENTABLE DISEASES IN CARDIOLOGY

Aida Pilav

Abstract

Despite many efforts to diagnose and treat preventable cardiac diseases, more specifically to detect known risk factors, these diseases continue to be the leading cause of morbidity and mortality in countries. Bosnia and Herzegovina belongs to high-risk countries.

According to published WHO research, the main barriers to adequate management of preventable diseases in cardiology are the lack of unique clinical guides, inadequate training of health workers in the management of cardiac diseases, inadequate access of patients to health services and insufficient use of modern health technologies.

What is proving inevitable in the current moment and in the modern environment is the proactive role of the health care system in digital health as a support to cardiovascular health in Europe, which is included in the current action plan of the European Society of Cardiology (ESC). The future is focused on the digital transformation of health care and the need for efficient and safe innovation in order to improve the efficiency of health practices, and thus by improving the diagnosis of preventable diseases, finally preventable cardiac diseases.

Successful implementation requires multidisciplinary approaches, from mass dissemination of recommendations through public health education programs directly in the field to clinical treatments for patients. All this requires the involvement of numerous actors, from the strategic to the operational level of management within the health care system in the country.

Key words: Cardiac disease, prevention, digital health

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ADULT CONGENITAL HEART DISEASE -ACHD

Nabil Naser, Zumreta Kušljigić

Abstract

To date, the prevalence of CHD worldwide is ~9 per 1000 newborns, with substantial geographic variation. Congenital heart defects (CHD) are more common than those found in all age groups, including the fetus. The latest knowledge in the world for the last 50 years about their origin, diagnosis and therapy has contributed to their care. However, in underdeveloped countries, millions of children born with CHD do not have adequate diagnosis, therapy, or prevention.

Since 2006, The World Society for Pediatric and Congenital Heart Surgery has been promoting the care of children with CHD from fetal to adulthood, regardless of the economic status of patients, with recommendations for education, diagnostic and therapeutic care for all. Since 1970, more than 70 population epidemiological studies have been published worldwide with a questionnaire on genetics, sociodemography, medical-obstetric data, exposure to environmental risks and drugs, risk assessment and prevention of heart defects. Since adult patients with CHD now present in increasing numbers at advanced ages, including the elderly, the term grown-up CHD no longer appears appropriate and was therefore replaced with adult CHD (ACHD) according to the ESC guidlines published in 2020 year.

Due to medical, surgical, and technological evolutions over the past decades, >90% of individuals with CHD who are

born, now survive into adulthood.5 As a result, the prevalence of CHD in the community has increased and now by far exceeds the number of children with CHD. CHD can be classified as mild, moderate, or severe. ACHD have an anamnestic long asymptomatic period, followed by a feeling of fatigue, shortness of breath on exertion, palpitations, arrhythmias, respiratory infections, and bacterial endocarditis. The diagnosis is made by clinical examination, ECG, X-ray of the lungs and heart, biomarkers, echocardiography, Cardiac magnetic resonance imaging (CMRI), Computed tomography (CT), cardiopulmonary exercise testing and cardiac catheterization. Congenital heart defects in adults include: atrial septal defect (ASD), atrial septal defect and anomalous pulmonary venous connection, ventricular septal defect (VSD), atrioventricular septal defect (AVSD), patent ductus arteriosus (PDA), left ventricular outflow tract obstruction (LVOTO): valvular aortic stenosis, supavalvular aortic stenosis, subaortic stenosis, coarctation of the aorta (CoA), Aortopathies including Marfan syndrome, right ventricular outflow tract obstruction (RVOTO), Ebstein's anomaly, Tetralogy of Fallot, Pulmonary atresia with ventricular septal defect, transposition of the great arteries, congenitally corrected transposition of the great arteries (ccTGA), univentricular heart, patients after Fontan operation and coronary anomalies. To date, ~90% of patients with mild, 75% with moderate, and 40% with complex heart defects reach the age of 60 years.

Secundum ASD (80% of ASDs; located in the region of the fossa ovalis and its surrounding). The ASD type secundum

is the communication between the left and right atria placed lower towards the mitral valves. It is often associated with anterior mitral valve fissure and consequent mitral regurgitation (MR). Device closure has become the first choice for secundum defect closure, when feasible, based on the morphology (includes stretched diameter ≤38 mm and sufficient rim of 5 mm except towards the aorta).

Primum ASD [15%; synonyms: partial AV septal defect [atrioventricular septal defect (AVSD) with communication on the atrial level only], partial AV canal; located near the crux, AV valves are typically malformed, resulting in various degrees of regurgitation. The shunt volume depends on RV/LV compliance, defect size, and LA/RA pressure. If the defect is large, it burdens the pulmonary circulation and gives symptoms. It can be treated by surgical or catheter interventional treatment.
VSD is mostly diagnosed and – when indicated – treated before adulthood. Spontaneous closure is frequent in childhood. Several locations of the defect within the interventricular septum are possible, and these can be divided into four groups according to their location within the RV: perimembranous/paramembranous/subaortic/conoventricular (most common, ~80% of VSDs), muscular/trabecular (up to 15-20%), Outlet (with or without malalignment of the outlet septum) and Inlet/AV canal/AVSD type. Due to the increased blood flow on the left side, the pulmonary circulation is burdened. Surgical closure can be performed with low operative mortality (1–

2%) and good long-term results. Transcatheter closure has become an alternative, particularly in residual VSDs, in VSDs that are poorly accessible for surgical closure, and in muscular VSDs that are located centrally in the interventricular septum.

Patent ductus arteriosus (PDA) is the persistent communication between the proximal left PA and the descending aorta just distal to the left subclavian artery. It can be associated with a variety of CHD lesions, however, in adults, it is usually an isolated finding. PDA originally results in L–R shunt and LV and LA volume overload. In adults, calcification of the PDA may cause a problem for surgical closure. Device closure is the method of choice, even if cardiac operations are indicated due to other concomitant cardiac lesions, and can be successfully performed in the vast majority of adults with a very low complication rate.

Ebstein anomaly is characterized by abnormally formed and apically displaced leaflets of the tricuspid valve. The anterior leaflet usually originates at the annular level but is enlarged and sail-like, while the septal and posterior leaflets are displaced towards the RV apex and often tethered to the endocardium. Clinical symptoms determine the treatment. Conservative therapy can alleviate symptoms temporarily and create a beneficial basis for the following operation. Surgical repair remains challenging and should only be performed by surgeons with specific experience in this lesion.

CoA is considered as part of a generalized arteriopathy, and not only as narrowing of the aorta. It occurs as a discrete stenosis or as a long, hypoplastic aortic (arch)

segment. Typically, CoA is located in the area where the ductus arteriosus inserts, and only in rare cases occurs ectopically (ascending, descending, or abdominal aorta). Associated lesions include bicuspid aortic valve (up to 85%), ascending aortic aneurysm, SubAortic stenosis or SupraAortic stenosis and (supra)mitral valve stenosis. Patients with CoA who reach adolescence demonstrate very good long-term survival up to age 60 years. The natural course may be complicated by left heart failure, intracranial haemorrhage (from berry aneurysm), infective endocarditis, aortic rupture/dissection, premature coronary and cerebral artery disease, and associated heart defects.

ACHD represent a challenge for clinicians. Their early recognition and follow-up in adolescence will contribute to better care of these patients. Importantly, the care for ACHD patients is a lifelong process and also requires advance care planning strategies.

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