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Nova metoda procjene interventrikulske disinkronije iz jednog srčanog ciklusa

Novel technique for assessment of interventricular dyssynchrony from a single cardiac cycle

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Uvod: Procjena interventrikulske disinkronije u kandidata za liječenje resinkronizacijskom terapijom srca (CRT) zasniva se na pulsnim Dopplerom (PWD) utvrđenoj razlici između preejekcijskih intervala lijeve (LV) i desne klijetke (DV), tzv. interventrikulskom mehaničkom kašnjenju (eng. inter-ventricular mechanical delay, IVMD). Nemogućnost istovremenog mjerenja obaju intervala može, u kontekstu značajne ovisnosti dobivenih vrijednosti o trenutnom opterećenju srca, dovesti do bitnih razlika u rezultatu. Cilj je istraživanja bio provjeriti mogu li se podaci izvedeni metodom oslikavanja miokarda obojanim Dopplerom (CDMI) iz prikaza brzina gibanja listića aortne (AV) i pulmonalne valvule (PV) upotrijebiti u kvantifikaciji IVMD koristeći samo jedan srčani ciklus.

Metode: Standardan ehokardiografski pregled dopunjen akvizicijom CDMI podataka proveden je na 15 zdravih (34.1±10.1 god.) i 50 CRT ispitanika (62.2±11.1 god.). PWD je korišten u određivanju preejekcijskih intervala (vrijeme od početka QRS-kompleksa do pojave protoka u LV/RV izgonskom traktu). Za izračunavanje IVMD korištena je prosječna vrijednost triju uzastopnih ciklusa. Koristeći CDMI prikaz AV i PV u kratkoj parasternalnoj osi učinjena je ekstrakcija brzina gibanja listića obiju valvula iz jednog ciklusa, što se u trenutku otvaranja valvule grafički prikazuje jasnim šiljkom. IVMD je izračunat kao interval između otvaranja AV i PV, tzv. IVOD (eng. *inter-valvular opening delay*). U analizi podataka korištena je korelacija po Pearsonu.

Rezultati: Postoji jaka korelacija između IVMD izvedenog iz PWD i CDMI (r=0.92, p<0.001), nešto naglašenija među zdravim ispitanicima (r=0.971 vs r=0.886).

Zaključak: CDMI analiza gibanja listića AV i PV je nova metoda u evaluaciji interventrikulske disinkronije, s potencijalnom komparativnom prednošću uštede na vremenu pretrage.

Background: Pulsed-wave Doppler is used to assess inter-ventricular dyssynchrony in cardiac resynchronization therapy (CRT) candidates by measuring the inter-ventricular mechanical delay (IVMD), defined as the time difference between the LV and RV pre-ejection periods. The lack of possibility of simultaneous measurement of the both intervals may due to substantial dependence on obtained values of current cardiac workload cause significant result differences. The aim of the study was to evaluate whether color Doppler myocardial imaging (CDMI) velocity data derived from the aortic (AV) and pulmonary valve (PV) cusps motion can be used for IVMD quantification from only a single cardiac cycle.

Methods: 15 healthy individuals (34.1±10.1 years) and 50 CRT patients (62.2±11.1 years) underwent standard echocardiographic examination extended with CDMI data acquisition. PW Doppler was used to determine pre-ejection periods (the interval from the beginning of the QRS complex to the beginning of the LV/RVOT flow). Data was averaged from 3 consecutive cardiac cycles before IVMD was calculated. CDMI was performed from the parasternal short axis view followed by extraction of velocity traces from a single cycle velocity data-set of both AV and PV cusps motion, in which valve openings are represented by distinct spike. IVMD was calculated as the interval between the AV and PV opening the so-called IVOD (inter-valvular opening delay). Pearson correlation analysis was applied to evaluate findings.

Results: A strong correlation between PW Doppler and CDMI derived IVMD was found (r=0.92, p<0.001), somewhat more pronounced among healthy individuals (r=0.971 vs r=0.886).

Conclusion: CDMI of the AV and PV cusps motion is a novel, non-time consuming method in the evaluation of inter-ventricular dyssynchrony.

Metoda intrakardijalnog elektrograma za optimizaciju atriventrikularne i interventrikularne odgode: usporedivost sa standardnom ehokardiografskom metodom

Intracardiac electrogram method for atrioventricular and interventricular delay optimization: comparibility to standard echocardiographic method

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Uvod: Studije su dokazale da ehokardiografska (ECHO) optimizacija atrioventrikularne (AV) i interventrikularne (VV) odgode u kardijalnoj resinhronizacijskog terapiji bolesnika dovodi do poboljšanja minutnog volumena smanjujući disinkroniju lijeve klijetke (LV). Intrakardijalni elektrogram (IEGM) je nova metoda koja se temelji na analizi atrijske intrinzične depolarizacije i interventrikularnog odgode provodljivosti s neodređenom kliničkom vrijednošću. Cilj ove studije je bio odrediti učinkovitost IEGM u odnosu na konvencionalnu ECHO vođenu CRT optimizaciju.

Metode: 8 bolesnika kojima je prethodno ugrađen Medtronic CRT (3F/5M, 62.5±10.5 god.) podvrgnuto je optimizaciji koji se temelji na IEGM s optimalno dobivenim AV i VV odgodama. Naknadno su izmjereni MR dp/dt i LVOT VTI kao ehokardiografski markeri učinkovitosti resinhronizacije. Ehokardiografski vođena optimizacija AV i VV disinkronije nakon čega se koristi PW Doppler mitralnog ulaznog i LV/RV izlaznog trakta radi mjerenja interventrikularnog mehaničkog odgode. Korelacijska analiza prema Pearsonu koristila se za ocjenu nalaza.

Rezultati: Snažna korelacija između ECHO i IEGM vođenih mjerenja je povezana: LVOT VTI (cc=0,979, p=0,896), dp/dt (cc=0,993 p=0,977), konačni AV (cc=0,948, p=0,967) i VV odgoda (cc=0,980, p=0,787). Međutim, statistički značaj nije postignut zbog malog broja ispitanika.

Zaključak: IEGM se pokazao učinkovitim kao standardna ECHO CRT optimizacija uz prednost što kraće traje. Zbog trenutnog nedostatka znanstvenih dokaza potrebne su druge studije.

Background: Studies have shown that echocardiographic (ECHO) optimization of atrioventricular (AV) and interventricular (VV) delays in cardiac resyncronization therapy (CRT) patients results in improvement of cardiac output by reducing left ventricular (LV) dyssynchrony. Intracardiac electrogram method (IEGM) is a novel technique based on the analysis of atrial intrinsic depolarization and interventricular conduction delay with yet undetermined clinical value. The aim of this study was to determine the efficacy of the IEGM compared to conventional ECHO-guided CRT optimization.

Methods: 8 patients previously implanted with Medtronic CRT (3F/5M, 62.5±10.5 yrs) underwent IEGM-based delay optimization with optimal AV and VV delays obtained. Subsequently, MR dp/dt and LVOT VTI as echocardiographic markers of resynchronization effectiveness were measured. ECHO-guided optimization of the AV and VV dyssynchrony followed using PW Doppler of the mitral inflow and LV/RV outflow tract to measure interventricular mechanical delay, respectively. Pearson correlation analysis was used to evaluate findings.

Results: A strong correlation between ECHO and IEGM-guided measurements was found, as follows: LVOT VTI (cc=0.979, p=0.896), dp/dt (cc =0.993 p=0.977), the final AV (cc=0.948, p=0.967) and VV delay (cc=0.980, p=0,787). However, the statistical significance was not achieved due to small studied sample.

Conclusion: The IEGM proved to be as effective as the standard ECHO CRT optimization with the advantage of being less-time consuming. Due to present lack of scientific evidence further studies are required.

Promjene naprezanja i torzije lijeve klijetke u hipertenzivnih bolesnika: 2-D "speckle tracking" studija

Changes in stress and torsion of left ventricle in hypertensive patients: 2-D "speckle tracking" study

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Cilj: "Speckle tracking" ehokardiografija (STE) uvedena je kao nova metodu za procjenu deformacijske dinamike lijeve klijetke (LV). Cilj našeg istraživanja bio je utvrditi dinamiku STE parametara u različitim fazama arterijske hipertenzije.

Metode: 43 hipertenzivna pacijenta s normalnom ejekcijskom frakcijom (EF) razvrstani su u 3 grupe (g) prema indeksu mase lijeve klijetke (LVMI), te simptomima i znakovima zatajivanja srca (SZZS): 1. 17 pacijenta s ??normalnim LVMI (94 ± 13 g / m^2) bez SZZS (11 žena, starosti 50 ? 16 godina, gA); 2. 15 pacijenata s povećanim LVMI (151 ± 18 g / m^2) bez SZZS (9 žena, starosti 69 ± 9, gB); 3. 11 pacijenata s povećanim LVMI (172 ± 35 g / m^2) i SZZS (6 žena, starosti 77 ± 4, gC). Kod svih pacijenta, uz standardne ehokardiografske parametre, izmjerili smo globalni longitudinalni strain (GLS) i rotaciju LV iz bazalnog (RotB) i apikalnog (RotA) presjeka. LV uvijanje ("twist") definirano je kao apsolutna razlika između RotB i RotA, a LV torzija kao LV uvijanje podijeljeno dijastoličkom duljinom LV između apeksa i mitralni ravnine.

Rezultati: prikazani su u **Tablici 1**.

(* P <0,05 C vs A i B)

Aim: "Speckle tracking" echocardiography (STE) has been introduced as a new method to assess deformation dynamics of left ventricle (LV). The aim of our study was to determine the dynamics of the STE parameters in various stages of hypertension.

Methods: 43 hypertensive patients with normal ejection fraction (EF) are classified into 3 groups (g) according to left ventricular mass index (LVMI), and symptoms and signs of heart failure (SSHF): 1. 17 patients with normal LVMI (94 ± 13 g / m^2) without SSHF (11 women, aged 50 ± 16 years, gA); 2. 15 patients with elevated LVMI (151 ± 18 g / m^2) without SSHF (9 women, aged 69 ± 9, gB), 3. 11 patients with elevated LVMI (172 ± 35 g / m^2) and SSHF (6 women, aged 77 ± 4, gC). In all patients, using standard echocardiographic parameters, we have measured the global longitudinal strain (GLS) and the rotation of the basal LV (RotB) and apical (Rota) section. LV twist is defined as the absolute difference between RotB and RotA, and LV torsion as well as LV twist divided by LV diastolic length between the apex and mitral plane.

Results: as shown in **Table 1**.

Group	EF	E/Em	GLS	RotB	RotA	Twist	Torsion
A	65±4	5.5±1	-17.6±2.5	-5.6±1.2	7.3±4.3	12.1±6.4	1.6±0.9
B	61±6	7.5±2	-15.1±4.9	-5.1±1.1	8.2±2.7	14.0±2.2	1.8±0.5
C	62±9	9.1±3*	-10.5±3.6*	-5.7±3.3	9.4±3.3*	15.9±2.9	2.0±0.9

Zaključak: U našoj populaciji hipertenzivnih pacijenata sa LV hipertrofijom i SZZS značajno je smanjen GLS, a uvijanje i torzija su očuvani. To je u skladu s ranijim zapažanjima da se smanjena kontraktilnost miokarda nalazi u većine pacijenata s "dijastoličkim zatajivanjem srca" i da doprinosi njegovoj patofiziologiji. Iako je torzijska mehanika općenito očuvana, povećana apikalna rotacija i trend povećanje torzije kompatibilni su sa dobnom razlikom među grupama naših pacijenata.

Conclusion: In our population of hypertensive patients with LV hypertrophy and SSHF, GLS has been significantly reduced, while twist and torsion are preserved. This is in compliance with earlier observations that reduced myocardial contractility is present in the majority of patients with "diastolic heart failure" and that it contributes to its pathophysiology. Although the torsional mechanics is generally preserved, increased apical rotation and torsion increasing trend is compatible with the age difference between the groups of our patients.

Teška hipoplazija stražnjeg mitralnog kuspisa s očuvanom funkcijom zaliska

Severe hypoplasia of the posterior mitral leaflet with preserved valve function

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Uvod: Kongenitalne malformacije mitralnog zaliska su relativno rijetke i prisutne sa širokim spektrom morfoloških anomalija i visokom pojavnosti istodobnih srčanih anomalija. Anomalije listića uključuju rascjep listića, hipoplaziju ili ageneziju listića i pomoćno tkivo zalistka. Kliničke tegobe povezane s nepostojanjem jednog od mitralnih listića su često opisivane rano u životu te većinom nisu u skladu sa životom.

Primjer slučaja: Predstavljamo slučaj 26-godišnje žene koja je primljena na Odjel za kardiologiju nakon što je pregledana u Sveučilišnoj bolnici za infektivne bolesti zbog visoke temperature i akutnog faringitisa. EKG je pokazao AV blok 2. stupnja tip 1 s frekvencijom klijetki od 67/min. Rtg snimka srca i pluća je bila uredna. Laboratorijski nalazi su bili u granici normalnih vrijednosti. Ehokardiografija je utvrdila mitralni zalistak s većim prednjim listićem i teškom hipoplazijom stražnjeg listića. Funkcija mitralnog zalistka je bila očuvana. Srčane šupljine su bile normalne i ejekcijska frakcija lijeve klijetke je bila normalna. U 24-satnom EKG-u je registriran intermitentan AV blok tip 1 koji je vjerojatno nastao zbog povišenog tonusa vagusa.

Zaključak: Primarne kongenitalne anomalije mitalnog zalistka su relativno rijetke i obično uzrokuju mitralnu insuficijenciju ili stenozu. Koliko nam je poznato, postoji malo slučajeva teške kongenitalne hipoplazije i agenezije stražnjeg mitralnog listića u literaturi te je izuzetno rijetko da zalistak ima zadržanu funkciju.

Introduction: Congenital malformations of the mitral valve are relatively rare and present with a wide spectrum of morphologic abnormalities and high incidence of concomitant cardiac anomalies. Leaflet abnormalities include cleft leaflet, leaflet hypoplasia or agenesis, and accessory valvular tissue. The clinical problems related with the absence of one oft he mitral leaflet have been usually described early in life and are mostly incompatible with life.

Case report: We represent a case of a 26- year old female who was admitted in Cardiology Department after she has been examined in University Hospital for Infectious Diseases because oft he high temperature and acute pharingitis. ECG showed second degree AV block type 1 with ventricular frequency of 67/min. A chest radiograph was normal. Laboratory findings were all in the range of normal limits. Echocardiography showed mitral valve with big anterior leflet and severe hypoplasia of the posterior leaflet. The function of the mitral valve was preserved. Cardiac chambers were normal and left ventricular ejection fraction was normal. A 24-hour ECG showed intermittent AV block type 1 which was probably due to elevated vagal tone.

Conclusion: Primary congenital mitral valve abnormalities are relatively rare and usually lead to mitral insufficiency or stenosis. As far as we know, few cases of severe congenital hypoplasia and agenesis of the posterior mitral leaflet appear in the literature and are extremely rare that valve has a preserved function.

Anomalna korda tendineja u lijevom atriju, prikaz slučaja

Anomalous chorda tendinea in the left atrium, case presentation

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Prikazujemo slučaj 45-godišnjeg bolesnika u kojega je rutinskim ultrazvučnim pregledom u sklopu obrade arterijske hipertenzije otkrivena anomalna korda tendineja jedinstvene i do sada u literaturi neopisane lokalizacije u lijevom atriju, između stražnjeg dijela mitralnog prstena i kumarinskog grebena. Anomalija je prvo detektirana transtorakalnim, a potom dokazana transezofagealnim ultrazvukom srca. Budući da u bolesnika nije bilo simptoma ni posljedica po hemodinamiku, nije bilo niti potrebe za revizijom terapije. Anomalne su korde najčešće asimptomat-

We present a case of a 45-year-old patient in whom the routine ultrasound examination within the workup of hypertension detected anomalous chorda tendinea of specific localization in the left atrium not yet described in the literature, which is between the posterior part of the mitral ring and cumarine ridge. The anomaly was first detected by transthoracic and then by proved transesophageal heart ultrasound. Since the patient showed no symptoms or consequences on hemodynamics, there was no need for a revision of the therapy. Anomalous chorda are usually asymp-

ske te su kao takve u pravilu slučajan nalaz, no mogu se prezentirati različitim kliničkim slikama, kao što su poremećaji ritma ili pak mogu oponašati bolesti valvularnog aparata, bilo u smislu opstrukcije ili insuficijencije. Iako su najčešće asimptomatske, u ehokardiografskoj su praksi važne zbog potrebe za razlikovanjem od drugih kliničkih entiteta.

tomatic, and as such they are usually an incidental finding, but they may be presented by different clinical features, such as rhythm disorders or can imitate diseases of valvular apparatus, either in terms of obstruction or insufficiency. Although they are usually asymptomatic, in echocardiographic practice they are important because of the need to differentiate against other clinical entities.

Ruptura aneurizme nekoronarnog sinusa Valsalve — uzrok akutnog srčanog zatajivanja

Rupture of an aneurysm of the noncoronary sinus of valsalva — cause of acute heart failure

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Aneurizma sinusa Valsalve uključuje manje od 1% prirođenih srčanih grešaka. Ruptura aneurizme se može manifestirati različitim nizom simptoma od asimptomatskog šuma do kardiogenog šoka. Nekoronarni sinus je rjeđe zahvaćen.

Predstavljamo slučaj rupture aneurizme nekoronarnog sinusa Valsavinog kao uzroka akutnog srčanog zatajivanja.

52-godišnja žena je zaprimljena u bolnicu nakon iznenadnog početka dispneje kao respiratornog poremećaja s arterijskim tlakom od 110/70 mmHg, srčanim ritmom od 98/min i brojem respiracija 34 udisaja/min; obostrano bazalno šumovi do srednjih plućnih polja. Auskultacija je pokazala S3 i S4 galop, sistolički-dijastolički kontinuirani šum stupnja 5/6 koji se najbolje čuje uz desni rub sternuma. Transtorakalna i transezofagealna ehokardiografija je otkrila sinus aneurizme Valsalve s shuntom aorta-desni atrij i mali atrijski septalni defekt s lijevo-desnim shontom. Učinjen je kateterizacija srca. Bolesnica je poslana na hitan kardiokirurški zahvat. Deset dana nakon operacije, bolesnica je otpušten kući u dobrom stanju s povlačenjem simptoma.

Kirurški zahvat rupture aneurizme sinusa bi se trebala obaviti odmah zatvaranjem defekta i korekcijom bilo kojih pridruženih lezija (npr. ASD). Rezultati i dugogodišnja prognoza nakon kirurškog zahvata su općenito odlični.

Aneurysms of the sinus of Valsalva comprise less than 1% of congenital cardiac defects. Rupture of the aneurysm can present with a variety of symptoms ranging from an asymptomatic murmur to cardiogenic shock. The noncoronary sinus is involved less frequently.

Here we present a case of ruptured aneurysm of the noncoronary sinus of valsalva as a cause for acute heart failure.

A 52-year-old woman was admitted to our institution after the sudden onset of dyspnoea in respiratory distress, with a blood pressure of 110/70mmHg, heart rate of 98 beats/min, and respiratory rate of 34 breaths/min; bibasilar crackles to the mid-lung fields. Auscultation revealed an S3 and S4 gallop, a grade 5/6 continuous systolic-diastolic cardiac murmur best heard at the right sternal border. Transthoracic and transoesophageal echocardiography revealed sinus of Valsalva aneurysm with an aortic-right atrial shunt and small atrial septal defect with left-right shunt. Cardiac catheterization was performed. Patient was sent to urgent cardiac surgery. Ten days after surgery, the patient was discharged home in good condition with resolution of her symptoms.

Surgical correction of ruptured sinus aneurysms should be performed promptly by a patch closure of the defect and repair of any associated lesions (e.g. ASD). Results and long-term prognosis after surgical repair are generally excellent.

Opstrukcija izlaznog trakta lijeve klijetke u okruženju akutnog koronarnog sindroma

Left ventricle outflow tract obstruction in the setting of acute coronary syndrome

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Kod opstrukcije izlaznog trakta lijeve klijetke (LVOTO) stupanj opstrukcije ovisi o kontraktilnosti srca i uvjetima opterećenja. Prolazno apikalno baloniranje lijeve klijetke može iznositi 1% do 2% svih slučajeva infarkta miokarda s elevacijom ST-segmenta (STEMI) i do 12% STEMI prednje stijenke kod žena. Ehokardiografija pruža idealan alat za neinvazivno i hitnu dijagnostiku.

Prikazujemo dva slučaja s dinamičnim LVOTO u akutnom koronarnom sindromu u našoj instituciji bez mogućnosti invazivne kardiologije tijekom 24sata/dnevno.

74-godišnja žena manifestirala se teškom boli u prsnom košu; EKG je pokazao skraćenje QT-intervala s uzlaznim dijelom pozitivnog T vala u odvodima V2-V4 i normalnom vrijednosti troponina T. Ehokardiografija je pokazala hipokineziju apikalnog septalnog segmenta, SAM prednjeg mitralnog listića, LVOTO s gradijentom 81mmHg. Dvojna antiagregacija, antikoagulacijska terapija i beta blokator su primjenjeni intravenozno. Nakon 12 sati razvila se u EKG slika prednjeg STEMI s porastom razine troponina T i akinezijom apikalnog segmenta. Angiografija je pokazala značajnu proksimalnu stenozu LAD; implantiran je stent.

70-godišnja žena manifestirala se teškom boli u prsnom košu, elevacijom ST u odvodima II, III, aVF, V2-V3 s porastom razine troponina T. Ehokardiografija je pokazala hipokineziju svih apikalnih segmenata lijeve klijetke i LVOTO s gradijentom od 90 mmHg. Ordinirana je fibrinoliza. Angiografija nije pokazala značajnu koronarnu stenozu. Funkcija lijeve klijetke se normalizira u roku od 2 mjeseca.

Učestalost dinamičkog LVOTO kao komplikacija STEMI je nejasna. Rana kateterizacija ostaje metoda izbora za sprječavanje mogućnosti STEMI.

In dynamic left ventricle outflow tract obstruction (LVOTO), the degree of obstruction depends on cardiac contractility and loading conditions. Transient LV apical ballooning may account for 1% to 2% of all ST-elevation myocardial infarction (STEMI) cases and up to 12% of anterior STEMI in women. Echocardiography provides an ideal tool for noninvasive and urgent diagnosis.

We report two cases with dynamic LVOTO in acute coronary syndrome in our institution without possibility for invasive cardiology 24h/day.

A 74 year old woman presents with severe chest pain; ECG reveled shortening of QT interval with brick upstroke of positive T wave in V2-V4 leads and normal values of Troponin T. Echocardiography showed hypokinesis of apical septal segment, SAM of anterior mitral leaflet, LVOTO with gradient of 81mmHg. Dual antiagregation, anticoagulation therapy and beta blocker intravenously were administered. 12 hours later she developed ECG picture of anterior STEMI with a rise in troponin T level and akinesis of apical segments. The angiography showed significant proximal LAD stenosis; stent was implanted.

A 70 y. old women presented with severe chest pain, ST elevation in II, III, aVF, V2-V3 leads with rise in troponin T level. Echocardiography reveled hipokinesis of all apical segments of left ventricle and LVOTO with gradient of 90mmHg. Fibrinolysis was administered. Angiography showed no significant coronary stenosis. Left ventricular function normalized within 2 months.

The actual incidence of dynamic LVOTO as a complication of STEMI is unclear. Early catheterization remains the method of choice to address the possibility of STEMI.

Takotsubo kardiomiopatija — stresom inducirana kardiomiopatija

Takotsubo cardiomyopathy — stress induced cardiomyopathy

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Takotsubo kardiomiopatija karakteristična je po tranzitornoj sistoličkoj disfunkciji apeksa i/ili srednjeg segmenta lijevog ventrikula koji oponaša infarkt miokarda, u odsustvu signifikantne koronarne bolesti srca, s učestalosti 2% od ukupnog postotka suspektnih akutnih koronarnih sindroma. U 80% do 100% slučajeva javlja se u žena u dobi od 61 do 76 godina. Za rano postavljanje dijagnoze iznimno je značajna ehokardiografija. Kriteriji za dijagnozu stresom inducirane kardiomiopatije: novonastale abnormalnosti u EKG-u (elevacija ST-segmenta i/ili inverzija T-vala), srednje povišene vrijednosti biljega nekroze miokarda u serumu, ehokardiografski verificirana tranzitorna hipokinezija, akinezija ili diskinezija srednjeg segmenta lijevog ventrikula sa ili bez učešća apeksa, uredna koronarografija.

U radu su prikazane dvije bolesnice kod kojih su klinička slika, elektrokardiografske promjene, laboratorijski biljezi lezije miokarda, ehokardiografski nalaz, koronarografija, ukazivali da se radi o Takotsubo kardiomiopatiji.

Takotsubo cardiomyopathy is characterized by transient apical systolic dysfunction and/or mid-segment of the left ventricle acting like myocardial infarction in absence of significant coronary artery disease, with prevalence of 2% of the total percentage in patients with suspected acute coronary syndrome. The cases are 80-100% of patients are women age 61 to 76. To diagnose cardiomyopathy early, echocardiography is very significant.

Diagnostic criteria for stress induced cardiomyopathy: recent ECG abnormalities (ST-segment elevation and/or inverse T-wave), mid-elevated levels of markers for myocardial necrosis in serum, transient ventricular hypokinesia verified by echocardiogrphy, akinesia or dyskinesia of the mid-segment of the left ventricle with or without apical involvement, normal coronography.

The study shows two female patients with clinical pictures, electrocardiogram change, value of markers of myocardial injury, echocardiography report indicating Takotsubo cardiomyopathy.

Divovska aneurizma aorte kod bolesnika s Marfanovim sindromom

Giant Aortic Aneurysm in patient with Marfan syndrome

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Marfanov sindrom je nasljedni poremećaj vezivnog tkiva koji zahvaća muskuloskeletni, kardiovaskularni i očni sustav. Najčešća kardiovaskularna komplikacija kad pacijenata s Marfanovim sindromom je progresivno proširenje korijena aorte koje može dovesti do disekcije aorte, rupture ili aortalne regurgitacije.

Ovdje prikazujemo slučaj 34-godišnjeg muškarca s tjelesnim obilježjima Marfana koji je primljen na naš odjel s jednogodišnjom anamnezom zaduhe, promuklosti, kašlja i otežanog gutanja. Transtorakalnim ultrazvukom srca otkrivena je velika aneurizma aorte i značajna aortalna regurgitacija. MSCT-om je potvrđena ogromna aneurizma ascendentne aorte, luka aorte i silazne aorte. Pacijent je podvrgnut kirurškom popravku aorte. Nakon zahvata se potpuno oporavio.

Rano prepoznavanje bolesnika s Marfanovim sindromom je vrlo važno. Kod osoba s Marfanovim sindromom transtorakalni ultrazvuk srca trebao bi se koristiti za inici-

Marfan syndrome (MFS) is a heritable disorder of the connective tissue that affects musculoskeletal, cardiovascular, and ocular systems. The most common cardiovascular complication in patients with MFS is progressive aortic root enlargement which may lead to aortic dissection, rupture or aortic regurgitation.

We report here a case of a 34-year-old male with physical characteristics of Marfan who was admitted to our department with a one-year history of dyspnea, hoarseness, cough and dysphagia. Transthoracic echocardiogram revealed a big aortic aneurysm and significant aortic regurgitation. MSCT confirmed a huge aneurysm of ascending aorta, aortic arch and the descending aorta. The patient underwent surgical aortic repair. After surgery he recovered completely.

Early recognition of patients with Marfan syndrome is very important. In patients with Marfan syndrome, transthoracic echocardiogram should be used for initial assess-

jalnu procjenu aorte i srčanih zalistaka kao i za redovito praćenje aorte s ciljem otkrivanja i kvantificiranja progresije dilatacije aorte. Kada aorta dosegne dovoljnu veličinu da prijeti disekcija, ruptura aorte ili značajna regurgitacija preporuča se profilaktička rekonstrukcija aorte kako bi se izbjegle po život opasne posljedice ovog poremećaja.

ment of the ascending aorta and heart valves as well as regular monitoring of the aorta in order to detect and quantify progression of aortic dilation. When aorta reaches a sufficient size to threaten dissection, rupture or serious aortic regurgitation, prophylactic aortic reconstruction is recommended in order to avoid life-threatening consequences of this disorder.

Akutna teška insuficijencija aortnog zalistka zbog endokarditisa

Acute severe aortic valve insufficiency due to endocarditis

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Enteroccoccus faecalis predstavlja treći najčešći uzrok bakterijskog endokarditisa. Akutni endokarditis nativnog zalistka često uključuje normalne zalistke i obično ima agresivan tijek posebno kod osoba koje su slabije.

Iznosimo slučaj bolesnika s kroničnim bubrežnim zatajenjem i endokarditisom kojeg je uzrokovao Enterococcus faecalis na normalnim nativnim zalistcima.

49-godišnja žena s kroničnim bubrežnim zatajenjem liječenim hemodijalizom, zbog policistične bubrežne bolesti Potter III, sekundarnog hipoparatireoidizma i anemičkog sindroma je primljena u bolnicu. Bolesnica je bila uobičajenog zdravstvenog stanja do iznenadnog početka febrilnog stanja. Po prijemu je bila dispnoična, s arterijskim tlakom 100/40 mmHg, frekvencijom 120/min, obostranim šušnjevima do srednjih plućnih polja i novim dijastoličnim šumom 3/6. Vrijednosti laboratorijskih nalaza po prijemu su bile sljedeće: C-reaktivni protein 57,6; prokalcitonin 5,15, leukociti 11,2 109/L; hemoglobin 9,0 g/dL; hematokrit 28,8 mL/dL; kalij 5,4 mEq/L; urea 17,4 mg/dL te kreatinin, 619 mg/dL. Hemokulture su sadržavale Enteroccoccus faecalis, a bolesnici su primjenjeni antibiotici prema antibiogramu: usklađene doze vankomicina i gentamicina obzirom na hemodijalizu. Transtorakalna ehokardiografija je pokazala veliku i mobilnu vegetaciju na desnom koronarno kuspisu aortnog zalistka, kao i perforaciju kuspisa s posljedičnom teškom aortnom regurgitacijom. Izvršene su konzultacije s različitim kardiokirurškim centrima zbog hitnog kirurškog liječenja akutnog endokarditisa, ali je preporučeno samo konzervativno liječenje. Tri dana poslije razvio se kardiogeni šok; bolesnica je priključena na mehaničku ventilaciju uz hemodinamsku potporu, no nažalost bolesnica je preminula.

Ehokardiografija se mora obaviti brzo kada se sumnja na infektivni endokarditis; to je važno za dijagnozu, ocjenu težine bolesti, praćenje srčane funkcije i pravovremeno otkrivanje indikacija za urgentnu/hitnu kirurgiju.

Enteroccoccus faecalis is the third-most-common cause of bacterial endocarditis overall. Acute native valve endocarditis frequently involves normal valves and usually has an aggressive course specially in persons who are debilitated.

We report the case of a patient with chronic renal failure and endocarditis caused by Enterococcus faecalis on presumed normal native valves.

A 49-year-old woman with a history of chronic renal failure (on hemodialysis) due to polycystic renal disease Potter III, secondary hypoparathyreodidysm and anemic syndrome was admitted to our institution. The patient had been in his usual state of health until the sudden onset of febrile state. On admission she was dyspnoic in respiratory distress, with a blood pressure of 100/40 mmHg, heart rate of 120 beats/min, bibasilar crackles to the mid-lung fields and new 3/6 diastolic murmur. Admission laboratory values were as follows: C-reactive protein 57,6; procalcitonin 5.15, leucocytes 11.2 109/L; hemoglobin 9.0 g/dL; hematocrit 28.8 mL/dL; potassium 5.4 mEq/L; urea 17.4 mg/dL and creatinine 619 mg/dL. Haemocultures grew Enteroccoccus faecalis, and the patient was given antibiotics according to antibiogram: vancomycin and gentamycin adjusted doses considering haemodyalisis. Transthoracic echocardiography revealed huge, mobile vegetation on right coronary cusp of aortic valve, as well as perforation of the cusp with subsequent severe aortic regurgitation. Consultations with different cardiosurgery centers, for urgent surgical treatement of acute endocarditis, were made, but only conservative treatment was recommended. Three days after, cardiogenic shock developed; patient was put on mechanic ventilation with hemodynamic support; unfortunately patient died.

Echocardiography must be performed rapidly when infective endocarditis is suspected; it is important for the diagnosis, assessment of the severity of the disease, monitoring of cardiac function and prompt setting of indication for urgent/emergent surgery.

Procjena naprezanja desnog ventrikula i plućnog protoka kod sportašica u Hrvatskoj

Evaluation of right ventricular strain and pulmonary flow in female athletes in Croatia

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Svrha: Specifična adaptacija lijevog ventrikula na vježbe izdržljivosti je iscrpno proučavana, koristeći i osnovne i moderne ekokardiografske metode. Podaci o funkciji desnog ventrikula, posebice uzimajući u obzir isključivo sportašice, su veoma rijetki, no iznimno važni, naročito uzimajući u obzir značaj rane dijagnoze disfunkcije miokarda desnog ventrikula i prevencije iznenadne smrti. Stoga smo naš trud usmjerili ka definiranju naprezanja desnog ventrikula u srcu sportašica te smo odabrali 18 sportašica, članica hrvatskih nacionalnih timova uključujući borilačke vještine i alpinizam.

Metode: 18 zdravih žena sportašica (29±8 godina) je podvrgnuto ehokardiografskom ispitivanju proširenom na prikupljanje CDMI podataka prije i odmah nakon testa uz vježbanje. Funkcionalni status je potvrđen uz vršnu potrošnju kisika na spiroergometru (VO2 srednje 57,11, SD 6,37 ml/kg/min). RV timing je procijenjen mjerenjem otvaranja i zatvaranja trikuspidne i pulmonarne valvule u anatomskom M-modu. Longitudinalno naprezanje je procijenjeno pomoću tkivnog Dopplera i snimanjem naprezanja na bazalnom, srednjem i apikalnom segmentu slobodnog ventrikularnog zida desno. Također, izmjerili smo učinke vježbe na parametre pulmonarnog vaskularnog protoka kao što su vrijeme akceleracije i brzine vršnog protoka kroz pulmonarnu valvulu.

Rezultati: Usporedba podataka prikupljenih u stanju mirovanja i odmah nakon fizičkog napora je provedena pomoću Wilcoxon testa rangiranih znakova. Uspoređujući bazalne, srednje i apikalne segmente slobodnog ventrikularnog zida desno zabilježili smo značajno LPSS povećanje u srednjem segmentu RV (W=5, predviđeni kritični W=14, p=0,0048). Razlika između bazalnog i apikalnog segmenta nije bila statistički značajna (p=0,109 odnosno p=0,831). Također je došlo do značajnog smanjenja PVAcct zajedno s povećanjem maksimalne PV brzine (W=0, p=0,016 za oboje).

Zaključci: Ova studija daje novo svjetlo na funkciju naprezanja slobodnog ventrikularnog zida desno kod sportašica tijekom vježbi. Najznačajnije naprezanje je mjerljivo u srednjem segmentu slobodnog zida RV, a također su izmjerene značajne promjene u protoku kroz pulmonarnu valvulu. Za bolji uvid specifičnosti odziva desnog ventrikula sportašica na naprezanje, potrebno je daljnje istraživanje i usporedba sa ženama koje se ne bave aktivnim sportom.

Purpose: Specific adaption of the left ventricle to endurance training has been studied in extenso, using both basic and modern echocardiographic methods. Data on right ventricular function, especially considering solely female athletes, has been scarce, but itís importance, especialy considering the importance of early diagnosis of right ventricle myocardium disfunction and prevention of sudden death. So we have centered our effort on defining right ventricular strain in female athlete heart, and chose for the subjects 18 athletes, members of Croatian national teams including martial arts and alpine climbing.

Methods: 18 healthy female athletes (29±8 years) underwent echocariographic examination extended with CDMI data aquisition before and immediately after exercise test. Functional status was confirmed with peak oxigen consumption on spiroergometry (VO2 mean 57.11, SD 6.37 ml/kg/min). RV timing was assessed by measuring tricuspid and pumonary valve opening and closure on anatomic M-mode. Longitudinal strain was assessed using tissue doppler imaging and strain imaging on basal, mid and apical segment of the right ventricular free wall. Also, we measured the effect of exercise on the parameters of pulmonary vascular flow such as acceleration time and peak flow velocities over pulmonary valve.

Results: Comparison between the data collected at resting state and immediately after physical effort was performed with Wilcoxon signed-rank test. Comparing the basal, medium and apical segments of the right ventricular free wall we noted a significant LPSS increase in the medium segments of the RV (W=5, predicted critical W=14, p=0.0048). The difference between basal and apical segments was not statistically significant (p=0.109 and p=0.831, respectively). There was also a significant decrease in PVAcct coupled by an increase in PV maximal velocity (W=0, p=0.016 for both).

Conclusions: This study sheds new insights on the function of the right ventricular free wall strain in female athletes during exercise. Most significant strain is measurable in the mid segment of the RV free wall and significant changes in flow over the pulmonary valve have also been measured. Further investigation and comparison both with a female non-athlete and male athleteís right ventricle is needed for better insights in the specificity of female atheteís right ventricular response to strain.

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Aortna insuficijencija u profesionalnih vaterpolista

Aortic insufficiency in professional water polo players

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Na uzorku od 17 aktivnih vaterpolista mjerene su srčane strukture, sistolička i dijastolička funkcija srca i stanje valvularnog sustava. Populacija pripada dubrovačkim športašima. Kod dvojice vaterpolista radi se o blagoj aortnoj insuficijenciji uredne sistoličke funkcije, bez dilatacije ascedentne aorte i prihvatljivim vrijednostima lijeve klijetke te oni mogu sudjelovati u svim športovima pa tako i u vaterpolu, uz redovite ultrazvučne kontrole jednom godišnje. Liječničke mjere poduzete nakon ultrazvučnih kontrola mogu donekle spriječiti daljnje pogoršanje aortne insuficijencije i shodno tome prateće komplikacije. Iako pred kardiolozima i liječnicima športske medicine stoji zadaća upozoravati športaše i njihove roditelje na moguće posljedice nastavka bavljenja športom kod postojanja valvularne srčane greške, držim da roditelji, športski klubovi te konačno sami športaši moraju snositi odgovornost za posljedice koje mogu nastati ukoliko se nastave baviti vrhunskim športom.

In the 17 professional water polo players we measured the structure, systolic and diastolic heart function and the condition of the valves. Water polo players belong to Dubrovnik's professional sportsmen. At two of them we found mild aortic insufficiency with normal systolic function, without dilatation of the ascending aorta and with the acceptable measures of the left ventricle, so they can participate in water polo matches with the annually performed echo of the heart. These controls can prevent worsening of the aortic insufficiency and complications. Parents, sport clubs and sportsmen themselves, have to participate in the responsibility for the consequences in a case that they continue with the professional sport, and not only cardiologists and sport medicine doctors.