Zatajivanje srca
Heart failure
URIC ACID AND MORTALITY IN PATIENTS WITH ACUTE HEART FAILURE – RESULTS OF THE ACUTE HEART FAILURE DATABASE REGISTRY

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Study objective: To explore the prognostic role of serum UA measurement in the hospital and long-term mortality assessment in the AHF subjects from the Acute-HEart FAILABLE Database registry (AHEAD).

Patients and Methods: The study included 1255 patients who were admitted to the AHEAD participating centres with acute decompensated CHF, de novo HF or cardiogenic shock between September 2006 and October 2009.

Mean age of the cohort was 73.4 years, female population represented 43%, median hospital stay was 8 days, the mean hospital mortality was 7.6%.

Results: Median UA concentration of the AHF patients was 432 umol/l (7.26 mg/dl), median eGFR was 49.0 ml/min, NT-proBNP level was 5510 pg/ml. Among other laboratory variables UA concentration > 515 umol/l (8.67 mg/dl) was associated with increased hospital mortality (p < 0.001). UA concentration > 500 umol/l (8.41 mg/dl) were associated with increased long term mortality (p < 0.001).

Conclusion: Increased UA levels were associated with increased hospital and long-term mortality in the patients with acute heart failure syndromes.

MORTALITY RISK FACTORS IN HEART TRANSPLANT PATIENTS

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Introduction: We investigated parameters that influence survival, development of cardiac allograft vasculopathy (CAV) and graft cellular rejection (GR).

Methods: 99 HTx patients, follow-up 8 years, mean age 49 ±14 years. NT-proBNP, troponin T (TnT) and systolic pulmonary artery pressure (PAPs) were analysed as predictors of GR (expressed as rejection ratio – RR) in early postHTx period (1st trimester), intermediate (4.–12.month) and late postHTx period (> 12.months). Pretransplant conditions, such as diabetes mellitus (DM), COPD, renal failure (RF), BMI, pulmonary vascular resistance (PVR) and cardiac index (CI) were put into correlation with mortality. Average TnT, NT-proBNP, CRP, left ventricle ejection fraction (EFLV), PAPs, heart frequency (Fr), piroximone dose (PR), cyclosporine (CyA), mycophenolate-mofetil concentration (MM) and CMV infection were correlated to RR, as well as lipid profile and postHTx hypertension (HA), steroid diabetes (SDM), RF and CMV infection that were analysed as mortality predictors.

Results: Fr statistically significantly (p=0.05) correlated with higher RR and PAPs. NT-proBNP, TnT and CMV infection have no influence on rejection. One unit higher BMI increased mortality for 7% and DM
for 22% while COPD, PVR and CI did not influence survival. Development of SDM significantly increased mortality while hypertension reduced mortality. Higher CyA concentration and PR dose as well as higher concentration of HDL reduced significantly the risk of developing CAV. MM concentration did not influence CAV.

**Conclusion:** Fr and PAPs could be noteworthy markers for predicting cellular rejection. DM and higher BMI proved to be significant risk factors for mortality, as well as developing SDM. Posttransplant hypertension prolonged survival, probably presenting the overall positive effects of antihypertensives. Higher values of HDL and stronger immunosuppressive therapy with corticosteroids and cyclosporine reduced the incidence of graft vasculopathy.

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### NEOVISNI UTJECAJ EJEKCIJSKE FRAKCIJE I BUBREŽNE FUNKCIJE NA SERUMSKIE RAZINE ELEKTROLITA

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**Cilj rada:** Da bi istražili neovisni utjecaj zatajivanja srca i bubrega na elektrolitski status u okviru kardiorenalnog sindroma, uspoređili smo vrijednosti ejekcijske frakcije (EF) i klirensa kreatinina sa serumskim razinama elektrolita.

**Ispitanici i metode:** U ovo su prospektivno istraživanje bili uključeni susjedi bolesnici koji su zbog akutnog popuštanja srčane funkcije bili hospitalizirani na Odjelu za kardiologiju, Klinike za unutarnje bolesti KBC Split, Križine. Za svakog bolesnika, temeljem razgovora s bolesnikom, popunjen je upitnik koji je sadržavao podatke o općim, antropometrijskim, te podacima o prethodnim kardiovaskularnim i drugim bolestima i stanjima. Statistička obrada podataka napravljena je t-testom i linearom regresijom u univariatnoj, te multiplem regresijom u multivariatnoj analizi. U svim analizama vrijednost p<0.05 smatrana je statistički značajnom.

**Rezultati:** Uključeno je 37 bolesnika, prosječne dobi 74,1±7,8, indeksa tjelesne mase 27,8±4,1, NYHA stupnja 3,4 te srednjeg trajanja srčanog zatajenja od 7,7 godina. Trenutnih pušača je bilo 10,8%, bivših pušača 35,1%, bolesnika sa šećernom bolešću 56,8%, hipertenzijom 59,5%, hiperlipidemijom 37,8%, te s preboljšim infarktom miokarda 13,5%.

U univariatnoj analizi, veličina EF nije značajno korelirala sa klirensom kreatinina niti sa serumskim razinama klorida i kalcija (p>0.05 u svim slučajevima). Za razliku od toga, serumskà razina kalija značajno je obrnuto korelirala (r=−0,404; p=0,013), a slični, statistički neznačajni trendovi, zapaženi su za razine natrija i magnezija. U multivariatnoj analizi, u kojoj je učinjena prilagodba, odnosno odračunat utjecaj klirensa kreatinina, serumskie razine natrija (β=−0,275; p=0,09) i kalija (β=−0,365; p=0,05) su zadržale razine povezanosti opažene u univariatnoj analizi.

**Zaključak:** Istraživanje ukazuje na neovisni utjecaj EF i bubrežne funkcije na serumskie razine elektrolita i ukazuje na daljne aspekte kompleksnosti kardiorenalnog sindroma.
HEART FAILURE WITH AND WITHOUT ATRIAL FIBRILLATION. IS THERE CLINICAL AND ECHOCARDIOGRAPHIC DIFFERENCES?

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Atrial fibrillation is common condition among patients with heart failure. Neurohormonal activation, electrophysiologic parameters, and mechanical factors can be pathophysiological mechanisms by which HF predisposes to AF and AF exacerbates HF. Atrial fibrillation may be associated with deterioration of the LV function.

The aim of our study was to evaluate the presence of AF in patients with chronic heart failure and its association with basic clinical and echocardiographic characteristics of these patients.

We evaluated 54 hospitalized patients (men age 62±11, men 36 and women 21) with decompensated chronic heart failure. Clinical and echocardiographic assessment were done in all patients. Atrial fibrillation was present in 27 pts and sinus rhythm (SR) in 26 pts. The group of pts with AFF were older than the patients in SR (65±8 vs. 59±7), and more men than women had atrial fibrillation. There was no gender differences in group of pts with sinus rhythm. The two groups of patients didn’t differ significantly for echocardiographic parameters. EF was similar in AF and SR patients (41,3±14,1% vs. 42,5±16,1%, NS). There were no significant differences in LV volumes and dimensions (LVDD: 61,7±9 vs 61,4±11,3mm, LVDs: 49,6±13,1 vs 48,4±9mm, NS) and no wall thickness differences among two groups. Left atrial dimensions didn’t differ among pts with and without atrial fibrillation (44,2±4,7 vs 43,1±5,5mm, NS)

We could conclude that the presence of atrial fibrillation among patients with decompensated chronic heart failure does not predict worse LV functional parameters compared with heart failure patients with sinus rhythm.

TACHYCARDIA – INDUCED CARDIOMYOPATHY (TIC): A REVERSIBLE STATE

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Tachycardia-induced cardiomyopathy (TIC) is defined as a condition characterized by atrial or ventricular myocardial dysfunction as a result of prolonged and increased atrial or ventricular rates. There is no underlying structural heart disease, and the condition is reversible upon control of the arrhythmia. The prevalence of the disease can’t be truly estimated as it is mainly described in case reports.

During 2011 we established the diagnosis of tachycardia induced cardiomyopathy in 4 patients. All of them were male, at the age of 40–55, with no previous cardiovascular disease. At the time of presentation two patients had atrial fibrillation, and the other two of them atrial flutter, with fast ventricular rate (130–160 bpm. All of them presented with symptoms and signs of congestive heart failure. The duration of the arrhythmias was approximately 4–8 weeks before hospitalization. On admission, echocardiographic parameters were consistent with dilated cardiomyopathy with moderately to severe reduced ejection fraction (25–40%). In all cases there was no structural heart disease, no signs of inflammation or metabolic disturbances. Coronary angiography showed normal coronary arteries. In all cases there was resolution of the ventricular dysfunction following appropriate treatment of the arrhythmias and achieving and maintaining sinus rhythm. During the follow-up period of 12–18 months the patients are in NYHA I functional class, with echocardiographic dimensions and volumes within normal ranges, on beta blockers, ACE inhibitors, ASA or OAT. Two of them had few episodes of AF of short duration.
The recognition of tachycardia-induced cardiomyopathy is important as appropriate treatment (rhythm and/or rate control) has a good outcome. It needs to be taken into consideration in the differential diagnosis of idiopathic dilated cardiomyopathy.

POVEZANOST SERUMSKIH RAZINA KORTIZOLA S EJEKCIJSKOM FRACIJOMJ LIJEVE KLIJETKE OVISNO O POSTOJANJU SINDROMA NISKOG TRIJODTIRONINA

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Cilj rada: Procijeniti povezanost kortizola s ejekcijskom frakcijom lijeve klijetke (EF) ovisno o postojanju sindroma niskog trijodtiromina (SNT3) u muškaraca sa zatajivanjem srčane funkcije.

Ispitanici i metode: U ovo su prospektivno istraživanje uključeni susjedni bolesnici koji su zbog akutnog popuštanja srčane funkcije bili hospitalizirani na Odjelu za kardiologiju, Klinike za unutarnje bolesti KBC Split, Križine. Za svakog bolesnika, temeljem razgovora s bolesnikom, popunjen je upitnik koji je sadržavao podatke o općim, antropometrijskim, te podacima o prethodnim kardiovaskularnim i drugim bolestima. Statistička obrada podataka napravljena je t-testom i linearnom regresijom u univarijatnoj, te multiplom regresijom u multivarijatnoj analizi. U svim analizama vrijednost p<0.05 smatrana je statistički značajnom.

Rezultati: Uključeno je 45 bolesnika, prosječne dobi 74,8±7,3 godina i indeksa tjesne mase 27,8±4,1, te srednjeg trajanja srčanog zatajenja od 7,9±8,6 godina. Prosječna je vrijednost serumskie razine kortizola bila 622,6±400 nmol/l, T3 1,3±0,6 nmol/l, T4 105,4±22,6 nmol/l, TSH 1,71±0,9 mmj/l, dok je prosječna vrijednost EF bila 48,2±14%. Bolesnici sa SNT3 imali su prosječno više vrijednosti kortizola (767,2 mmj/l nasuprot 541,5 nmol/l), te niže prosječne vrijednosti EF (45,8% nasuprot 49,7%). U univarijatnoj analizi, u bolesnika sa SNT3 niže serumskie razine kortizola (r=–0,685; p=0,02) i više razine T3 (r=0,534; p=0,03) značajno su bile povezane sa većim vrijednostima EF, što u bolesnika bez SNT3 nije bio slučaj (p>0,05 u oba slučaja). U multivarijatnoj analizi, razine kortizola bile su značajno povezane sa EF (β=–0,576; p=0,003), dok serumskie razine T3 nisu igrale značajnu ulogu u ovom međuodnosu (β=–0,208; p=0,24).

Zaključak: U bolesnika sa zatajivanjem srčane funkcije postoji linearna povezanost serumskie razine kortizola sa vrijednostima EF, što je posebice izraženo u bolesnika sa SNT3.

6.7.

CLINICAL PROFILE OF FEMALES AND MALES WITH HEART FAILURE – RESULTS FROM CROATIAN HEART FAILURE REGISTRY

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Heart failure (HF) have high morbidity. In 2005 the Croatian Society of Cardiology established Heart Failure Registry of in-hospital patients. The aim of this trial was to assess the clinical profile of females and males with HF.

Results: 2203 HF patients were analysed (median age 76 y): 1175 (53.3%) males (m) and 1028 (46.7%) females (f). Acute HF was diagnosed in 744 (34.5%) patients, while 1412 (65.5%) manifested as chronic HF. History of myocardial infarction was recorded in 406 (22.7%) patients, and diabetes type II in 683 (31%). Males were frequently smokers (m=14.8%, f=6.4%, P=<0.001). Atrial fibrillation (AF) existed in 1014 (53.7%) patients. Males had lower hemoglobin values (m=58%, f=44.8%, P=<0.001), and females
had higher ALT (f=33%, m=27%, P=0.012), cholesterol (f=36.8%, m=29.1%, P=0.009), tryglicerides (f=36.1%, m=28.3%, P=0.014) and uric acid (f=82.9%, m=76.4%, P=0.007). Preserved left ventricular systolic function (LVEF>50%) was recorded in 37.8% patients. Males had frequently reduced LVEF (<50%), than females (m=70%, f=50.7%).

The leading »triggers« of HF were hypertension (AH) in 1099 (55.5%) patients, AF in 977 (51.3%), acute coronary syndrom (ACS) in 330 (19.7%) and infections in 327 (19.6%) patients. ACS was important »trigger« of HF in males (m=22.1%, f=17%; P=0.010), and hypertension in females (f=58.7%, m=52.7%, P=0.009). COPD was frequeat in males (m=19.7%, f=14.7%, P=0.009), as renal dysfunction (m=23%, f=14.8%, P=0.001). No gender differences were found regarding the frequency of drug prescription (ACEi or ARB).

In-hospital mortality was 13.8% (m=12.6%, f=14.4%).

**Conclusion:** Clinical profile of females and males with HF could be different. ACS was important »trigger« of HF in males, and hypertension in females. Males had frequently reduced LVEF than females. Males had lower hemoglobin, and females had higher values of ALT, cholesterol, tryglicerides and uric acid. No differences were found regarding the ACEi/ARB prescription.

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**SHORT TERM EFFECT OF CRT ON HEART FAILURE BIOMARKERS: ST2, GALECTIN-3, NT-PROBNP AND CERULOPLASMIN**

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**Study objective:** to assess short-term effect of CRT on heart failure biomarkers

**Population and methods:** levels of soluble ST2, galectin-3, NT-proBNP and ceruloplasmin were measured before and after CRT device implantation in 18 patients. Mean age was 68 years, mean LV EF was 29%, ischemic aetiology of CHF had 66% patients and 33% had atrial fibrillation. Mean interval between first and second measurement was 66 days.

**Results:** mean galectin (GAL) level was 1.26 ng/ml before and 0.67 ng/ml after CRT (p = 0.0002), sST2 level was 38,15 ng/ml, and 35,88 ng/ml after CRT, (p = 0.55), mean NT-proBNP was 1927 pg/ml, and 1996 pg/ml after CRT (p = 0.75), ceruloplasmin level was 0.24 g/l and 0.27 g/l after CRT (p < 0.0001). ST2 levels correlated significantly with NT-proBNP (r = 0.66, p = 0.004) and ceruloplasmin (r = 0.77, p < 0.001) at baseline, correlation of galectin-3 with other biomarkers was not significant. Ceruloplasmin level correlated with NT-proBNP (r = 0.579, p = 0.015).

**Conclusion:** short-term CRT was associated with significant decrease of GAL, but not with significant change of sST2 and NT-proBNP. Short-term CRT was associated with consistent increase of ceruloplasmin level, which correlated with NT-proBNP and sST2 significantly.

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**TERAPIJSKA HIPOTERMIJA U JEDINICI KARDIOLOŠKE INTENZIVNE SKRBI – »UPDATE«**

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**Uvodi:** Terapijska hipotermija (TH) odnedavno se koristi u našoj Ustavnovi. TH do ciljne temperature (T) od 32–34°C kroz 24 sata koristi se kod bolesnika u komi nakon uspješne reanimacije zbog (izvan)bolnič...
kog kardijalnog aresta, radi poboljšanja neurološkog ishoda i preživljenja. Ovdje prezentiramo rezultate korištenja TH u Odjelu intenzivnog kardiološkog liječenja.

Metode: Ukupno je 18 bolesnika (13 M, 5 Ž, srednja dob 55.8 godina) liječeno TH nakon izvan- i unutarbolničkog aresta, uvjetovano hemodinamskom i ritmološkom stabilnosti. Svi pacijenti mehanički su ventilirani uz adekvatnu miorelaksaciju i sedaciju. Arterijski i venski tlak te centralne T mjereni su invazivno. Indukcija TH provođena je infuzijama hladne fiziološke otopine, livažnom želuca te hladnim paketima koji su uz pokrivač za hlađenje korišteni za održavanje ciljne T. Nakon 24 sata TH slijedilo je pasivno zagrijavanje uz izbjegavanje hipertermije. Redovito su kontrolirane vrijednosti acidobaznog statusa, glukoze, elektrolita, kologracije i krvne slike. Svim pacijentima učinjen je i CT mozga uz konzultaciju neurologa.

Rezultati: 8 bolesnika (44%) preživjelo je uz potpuni neurološki oporavak. Inicijalni ritam je u 61% bolesnika bio VF, u 22% VT, te u 17% PEA. Većina bolesnika (83%) doživjela je izvanbolnički arest. Najčešća etiologija aresta (67%) bila je infarkt miokarda, u 22% kardiomiotipija. Prosječno vrijeme od dolaska na Odjel do postizanja ciljne T bilo je oko 5h, oko 2h od započinjanja protokola. Deset bolesnika (55%) zahtijevalo je inotropnu potporu. 83% bolesnika imalo je periproceduralne komplikacije, najčešće infektivne (pneumonija, sepsa), a u 11% zabilježena je koagulopatija uz krvenje. Zbog malih brojeva detaljnije statističke analize u svrhu predikcije preživljenja nisu moguće. Samo je 1 od 3 bolesnika s PEA-om preživio, 1 od 3 bolesnika s unutarbolničkim arestim preminuo te da je samo 1 preživjeli bolesnik inicijalno zahtijevao inotropnu potporu. Preživljenje muškaraca (6 od 13) i žena (2 od 5) se ne razlikuje značajno (46 vs 40%). Tijekom perioda uvodenja TH (2008.–2010. g) preživljenje je bilo 37%, dok je u posljednje 2 godine više: 50%.

Zaključak: Uvođenje TH kao metode liječenja značajno poboljšava preživljenje i neurološki oporavak bolesnika. Potrebno je ohrabriti uvođenje TH u drugim ustanovama uz stvaranje lokalnih registara i protokola u svrhu poboljšanja ishoda bolesnika.

DYNAMIC TRICUSPID VALVE STENOSIS INDUCED WITH PACEMAKER LEAD

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Introduction: Isolated severe tricuspid valve stenosis is a very rare disease and most often results from rheumatic fever. Severe tricuspid valve stenosis due to transvenous pacemaker leads implantation is very uncommon.

Case presentation: Patch closure of the primum atrial septal defect and a repair of the anterior mitral leaflet cleft were performed in the patient at the age of five. Because of postoperative complete atrioventricular block she had subsequently a pacemaker implanted abdominally with epicardial leads. At the age of fourteen she was upgraded to a left chest wall pacemaker with transvenous leads. Nine years later she started to complain on exercise intolerance and fatigue. She had no leg swelling. The ultrasound exam showed tricuspid stenosis (mean pressure gradient 12 mmHg). Right-heart catheterization showed typical tall and spiky a-wave as well as small v-wave. Mean transtricuspid pressure gradient was elevated (7.54 mm Hg). However, we observed a significant respiratory variation of this gradient, with the minimal gradient occurring at the end of inspiration (4.06 mm Hg). Cardiac index was significantly reduced. The patient was sent to surgery where the looped atrial lead was found to be fused with a free edge of anterior tricuspid leaflet as well as the ventricular lead with a septal leaflet. Old pacemaker leads were then extracted and the repair of tricuspid valve was performed. Two new epicardial leads were then placed. Postoperative echo control showed a reduction of mean diastolic gradient.

Conclusion: The severity of tricuspid stenosis in our patient was dynamic with a reduction during inspiration. We assume this is due to caudal heart motion during an inspiration that results in straightening of the lead’s loop. Such a dynamic stenosis is probably the reason why our patient has developed only the symp-
toms of reduced cardiac output, i.e. exercise intolerance and fatigue, while the manifestations of systemic venous stasis were not present.

**LONG-TERM PROGNOSIS IN PATIENTS WITH PERIPARTUM CARDIOMYOPATHY**

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Peripartum cardiomyopathy (PPCMP) is a rare and idiopathic form of cardiomyopathy presenting with heart failure secondary to LV systolic dysfunction. It affects women at the end of pregnancy or in the months following delivery.

The aim of our study was to determine the long-term prognosis in patients with peripartum cardiomyopathy.

During 2008–2011 year, 14 patents, at the age of 17 to 40 years, with diagnosis of peripartum cardiomyopathy were admitted to our hospital. All the patients were prospectively evaluated, for the mean follow-up period of 18 months (12–24 months). Eleven (78%) pts had history of preeclampsia, according their pregnancy history. Twelve (85%) pts were admitted to our hospital immediately post partum, because of acute congestive heart failure which needed immediate and aggressive heart failure treatment. Two (15%) pts presented heart failure symptoms two months after delivery. At the admission, all the pts had documented LV systolic dysfunction. Tree of them (21.5%) had severely impaired LV systolic function (EF= 25–30%), five (36.5%) pts had EF of 30–40%, and 6 (43%) pts had mild to moderate LV systolic dysfunction with EF= 40–45%. During the hospitalization, clinical and functional improvement and stabilization was achieved in all patients. During the follow-up period, the mortality rate was zero, and only one patient was re-hospitalized because of worsening heart failure symptoms. Complete recovery of LV systolic function was observed in 10 pts (71%) with PPCMP. In four (29%) pts there was persistence of LV systolic dysfunction determined with echocardiography. Otherwise, they were clinically compensated and in lower NYHA functional class with optimal medical treatment for heart failure.

Peripartum cardiomyopathy is associated with significant cardiac functional deterioration. Early diagnosis and appropriate medical treatment allows good functional recovery in majority of these pts and good long-term prognosis.