Kardijalna kirurgija
Cardiac surgery

11.1.

SURGERY IN INFECTIVE ENDOCARDITIS: EMERGENCY VS. URGENCY – THE ROLE OF ECHOCARDIOGRAPHY

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Introduction: Surgical treatments are used in approximately half of patients with infective endocarditis (IE) due to severe complications. Optimal timing for early surgery is important.

Methods: We present three differemt cases with IE and indication for early surgery.

Results: Female, age 49, on chronic haemodialysis treatment, admitted due to fever and congestive heart failure with new early diastolic murmur. Laboratory revealed CRP 57,6, Fibrinogen 4,0, Prokalcitonin 5,15, Leukocytosis 11,2; positive blood culture for Enterococcus faecalis. Appropriate antibiotic regimen was started. Transthoracic echocardiography (TTE) has shown mobile vegetation and perforation of the aortic valve leaflet with severe regurgitation. The »emergency« surgery was indicated. Male, age 32, presented with fever and history of Tetralogy of Fallot operation 17 years ago; 2003. aortic valve replacement and 2005. pace maker implantation. Physical examination reveled gallops, pleural friction rub. Laboratory showed milde elevated CRP and Prokalcitonin 0.316ng/mL, positive blood culture for Enterococcus faecalis. Appropriate antibiotic regimen was started. TTE has shown big vegetation on mechanic aortic valve and severe regurgitation. Severe congestive heart failure developed on third day. The indication for »urgency« surgery was made. Male, age 66, with sepsis (Streptococcus viridans), and new holosystolic murmur over the apex. Laboratory findings: erythrocyte sedimentation rate of 125, leukocytosis, CRP 73,6, prokalcitonin 0,06ng/L; TTE has shown large vegetation on anterior mitral leaflet with microperforation and severe mitral regurgitation. After complition of antibiotic regimen, surgery was performed.

Conslusion: In IE, sometimes surgery has to be performed without any delay as »emergency« (within 24h) or »urgency« (within few days), whereas in some cases can be postponed in 1–2 weeks of antibiotic treatment depending on the clinical and echocardiographic findings.

11.2.

DIAGNOSIS AND TREATMENT OF POSTPERICARDIOTOMY SYNDROME

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Introduction: Postpericardiotomy syndrome (PPS) is a clinical syndrome that occurs in autoimmune inflammatory reaction within the pericardium and pleura, and manifests itself with the pericardial and pleural effusion within 1 to 6 weeks after cardiac surgery. We present our experience of diagnosis and treatment of PPS in 211 patients referred for cardiac surgery at University Hospital Dubrava, Zagreb, after invasive cardiac treatment in General Hospital Slavonski Brod.

Methods: Clinical, radiographic and echocardiography data were analyzed. The key diagnostic parameters in the evaluation of patients and choice of therapy were: echocardiographic findings of pericardial effusion> 0.3 cm, the progression of pleural effusion, elevated inflammatory parameters and type of exudate effusion.RESULTS: 20 (9.4%) patients developed PPS, 15(75%) were male. Median onset time was 2 weeks, and avarage CRP level was 50.3. Among 20 patients 13 (65%) were febrile. Considering the type of surgery, CABG was performed in 7 patients, CABG+valvuloplasty in 4 patients, surgical treatment of acute aortic dissection in 4 patients and only valvuloplasty in 5 patients. Patients were treated with methilprednisolone

(18) and indomethacin (2) depending on the quantity of pericardial and pleural effusion. We raeched full recovery in all patients. CONCLUSION: PPS is a late complication of cardiac surgery. The first signs of the disease usually occur soon after surgical discharge. Routine clinical follow up in early postoperative period is crucial for timely diagnosis which leads to successful treatment.

11.3.

EUROSCORE II: NOVI POGLED NA OPERACIJSKI RIZIK

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Cilj rada: EuroSCORE (ES) je od svoje objave 1999. g postao opće prihvaćen alat za procjenu operacijskog rizika kardiokirurških bolesnika, ali i nužno mjerilo za nadzor medicinskog rezultata u kardijalnoj kirurgiji. U veljači 2012. objavljen je EuroSCORE II (ES2) s djelomično promijenjenim varijablama i značajnom prilagodbom njihovog doprinosa ukupnom riziku. Ovim radom analiziramo uočene razlike između dvaju alata za procjenu operacijskog rizika.

Materijal i metode: Od 1.1.2012. do 20.8.2012. učinjeno je 284 kardiokirurških operacija. Kod svih bolesnika određen je operacijski rizik ES i ES2 strogo poštujući postojeće definicije. Iz analize su isključene transplantacije srca i operacije ugradnje mehaničke potpore cirkulaciji.

Rezultati: Prosječni logistički ES za cijelu ispitivanu skupinu iznosio je 6.67±7.71%, a ES2 3.50± 5.16% ($p<0.001$). Prosječna redukcija rizika iznosila je 41%. Daljnja analiza pokazuje veću redukciju rizika u slijedećim podskupinama: bolesnici stariji od 70g (51%), bolesnici s kroničnom opstruktivnom bolesti pluća (51%) i OPCAB (49%). Manja redukcija rizika opažena je u slijedećim podskupinama: bolesnici s niskim rizikom prema ES (redukcija od 9%), CABG (20%), bolesnici s otežanom pokretljivošću (17%), žene (25%) i reoperacije (29%). Posebice je značajna redukcija rizika kod bolesnika s izoliranom aortnom stenozom: u skupini od 38 bolesnika kojima je kirurški zamijenjen zalistak prosječni ES iznosio je 4.59%, a prosječni ES2 1.74% (prosječna redukcija rizika 60%), dok u skupini od 6 bolesnika kojima je zalistak zamijenjen transkaterskim postupkom prosječni ES iznosi 11.01%, a ES2 2.65% (prosječna redukcija rizika od 77%).

Zaključak: Procjena operacijskog rizika pomoću EuroSCORE II odražava opće smanjenje smrtnosti nakon kardiokirurških zahvata tijekom zadnjeg desetljeća i time mijenja sliku o riziku operacije kod pojedinih bolesnika. Navedeno je posebice važno kod izbora terapijskog postupka kod visokorizičnih bolesnika s aortnom stenozom.

11.4.

ULOGA INTEGRIRANOG »HEART – TEAM-A« PRI TRANSKATETERSKOJ UGRADNJI AORTNOG ZALISKA – DVOGODIŠNJE ISKUSTVO

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Uvod: Cilj rada je prikazati ulogu integriranog »heart-teama« u dijagnostici i lijecenju visoko rizicnih bolesnika sa aortnom stenozom metodom transkateterske ugradnje aortne valvule (TAVI).

Metode: Izmedju ozujka 2011 i lipnja 2012 godine obrađeno je 25 visokorizicnih bolesnika sa aortnom stenozom. Osamnaest ih je nakon obrade procijenjeno podobnim za TAVI. Od preostalih bolesnika, kod 3 je indiciran klasicni zahvat (2 prihvatljiv kirurski rizik, 1 visezilna koronarna bolest), 2 je odustalo od

ikakvog zahvata, a 2 je preminulo. Svi su zahvati izvedeni transfemoralnim pristupom, u opcoj anesteziji, u hibridnoj operacijskoj dvorani. U 13 bolesnika koristena je Medtronic CoreValve®, a u 5 Edwards Sapien XT®. Kod 16 bolesnika (89%) procedura je bila perkutana uz korištenje Prostar® uredjaja.

Rezultati: Prosječna dob bolesnika je 79,8 godina; sa ocekivanim mortalitetom po EuroSCORE-u od 17,8±11,8% uz STS score 22,6±11,6%. Troje pacijenata je imalo ranije kardiokirurske zahvate. Kod 3 pacijenta je po procjeni konzilija prijeoperacijski učinjen PCI. Proceduralni uspjeh TAVI bio je 94% (17/18 pacijenata). Kod 2 bolesnika ucinjeni su direktni savi arterije femoralis nakon neuspjesne primjene uredjaja za zatvaranje arterije. Trideset-dnevno prezivljenje nakon implantacije iznosi 100%, dok je jedan bolesnik umro 4 mjeseca nakon implantacije zbog pneumonije. U prvih 30 dana jedan je bolesnik imao CVI a jedan plucnu emboliju, dok je kod 2 bolesnika je zbog totalnog AV bloka bila potrebna ugradnja trajnog elektrostimulatora. Kod svih je zabiljezeno znacajno poboljsanje funkcionalnog statusa (medijan NYHA preoperativno 3, u pracenju 1 stupanj).

Zaključak: Transkateterska implantacija aortnog zaliska vrijedna je terapijska opcija u visokorizicnih bolesnika sa aortnom stenozom. Djelovanje integriranog »heart teama« kljucan je dio procesa selekcije bolesnika kao i izvodjenja samog zahvata koji omogucava dobre periproceduralne, kao i kasne rezultate.

11.5.

BLEEDING RISK ASSESSMENT USING WHOLE BLOOD IMPEDANCE AGGREGOMETRY AND ROTATIONAL THROMBOELASTOMETRY IN PATIENTS FOLLOWING CARDIAC SURGERY

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Introduction: Excessive bleeding after cardiopulmonary bypass (CPB) is risk factor for adverse outcomes after elective cardiac surgery (ECS). Differentiating between patients who bleed due to surgical issues and those whose excessive chest tube output (CTO) is due to coagulopathy, remains challenging. The study sough to evaluate prediction of excessive bleeding after ECS with use of two bedside suitable devices for platelet function and viscoelastic blood clot properties assessment.

Methods: We enrolled 148 patients (105 male and 43 female) undergoing ECS in a prospective observational study. Patients were characterized as bleeders if their 24 hour CTO exceeded the 75th percentile of distribution. Multiple electrode aggregometry (MEA, with ASPI, ADP and the TRAP test) and rotational thromboelastometry (TEM, with ExTEM, HepTEM and FibTEM test), were performed at three time points: preoperatively (T1), during CPB (T2), and after protamine administration (T3). The primary endpoint was CTO and the secondary endpoint was administration of blood products, 30-day and 1 year mortality.

Results: The best predictors of increased bleeding tendency were the tests performed after protamine administration (T3). At T3, patients characterized as bleeders had significantly lower MEA ASPI (median, 14 vs. 27 AUC, p=0.004) and ADP test values (median, 22 vs. 41 AUC, p=0.002) as well as TEM values expressed in maximum clot firmness after 30 min (MCF 30) for ExTEM (53 vs. 56 mm, p=0.005), HepTEM (48 vs. 52 mm, p=0.003) and FibTEM (8 vs. 11 mm, p<0.001) test. 24 hour CTO inversely correlated with both the MEA (ASPI test: r=–0.236, p=0.004; ADP test: r=–0.299, p<0.001), and TEM MCF 30 (ExTEM: r=–0.295, p<0.001; HepTEM: –0.329, p<0.001; InTEM: r=–0.323, p<0.001) test values.

Conclusion: Our study showed that MEA and TEM are useful methods for prediction of excessive bleeding after ECS. Timely and targeted hemostatic interventions according to MEA and TEM results should be considered.

11.6.

BLEEDING RISK ASSESSMENT USING MULTIPLE ELECTRODE AGGREGOMETRY IN PATIENTS FOLLOWING CORONARY ARTERY BYPASS SURGERY

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Objectives: Individual variability in the response to antiplatelet therapy (APT), frequently administered preoperatively, has been established by various platelet function assays and could reflect bleeding tendency after coronary artery bypass surgery (CABG).

Methods: We enrolled 211 patients (155 male and 56 female) undergoing isolated CABG in a prospective observational study. Patients were divided into 4 groups with respect to their preoperative APT management. MEA, using the ASPI and the ADP test, was performed prior to surgery. The primary endpoint was chest tube output (CTO) and the secondary endpoint was perioperative packed red blood cell concentrate (PRBC) administration. Patients were characterized as bleeders if their 24 hour CTO exceeded the 75th percentile of distribution.

Results: 24 hour CTO value of 11.33 mL/kg presented 75th percentile of distribution, thus cut-off value for »bleeder category«. The proportion of patients characterized as bleeders was significantly different among the groups in regard to preoperative APT ($p=0.039$). Significant differences in both ASPI ($p<0.001$) and ADP ($p=0.038$) tests were observed between different preoperative APT groups. Significant correlations between the ASPI test ($r=–0.170$, $p=0.014$) and ADP test ($r=–0.206$, $p=0.003$) with 24 hour CTO were found. The receiver operating curve revealed an ASPI test value of < 20 area under curve (AUC) units (AUC 0.603, $p=0.023$) and an ADP test <73 AUC (AUC 0.611, $p=0.009$) as a »bleeder« determinant. The proportion of patients transfused with PRBC did not significantly differ among the groups in regard to preoperative APT ($p=0.636$). Comparison of the ASPI test values between patients with respect to PRBC administration revealed lower values in the ASPI test in a group of patients transfused with PRBC (mean, 27.88 vs. 40.32 AUC, $p=0.002$)

Conclusions: Our study showed that MEA is a useful method of predicting CABG patients with excessive postoperative bleeding.

11.7.

LONG TERM IMPACT OF ADVERSE ATRIAL TISSUE REMODELING ON ITS MECHANICAL TRANSPORT FOLLOWING ATRIAL FIBRILLATION SURGERY

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Aim: The objective of this study is to determine the correlation between adverse atrial tissue remodeling and atrial transport function following radiofrequency ablation (RFA) surgery for permanent atrial fibrillation (AF).

Materials and methods: We recruited 15 consecutive permanent AF cardiac surgery patients in the study. Left atrial (LA) myocardium biopsy was obtained for histological analysis during surgery. The samples were stained with Mallory's trichrome to quantify for fibrosis. Immunohistochemical staining using the anti-Bak antibody was used to quantify for apoptosis. Tissue Doppler imaging of the LA lateral wall was performed immediately after the procedure and at a mean follow up of 23±10.7 months. Tissue velocity imaging (TVI), transmitral flow velocities (MVE, MVA) and strain rate imaging (SRI), were analyzed.

Results: One patient died of a non-cardiac cause two months post intervention. Holter ECG monitoring revealed 85.7% of patients in sinus rhythm (SR) at follow up. Increase in TVI A, MVA and MVE was noted at follow up (1.2±1.1 vs 2.9±1.5, 0.6±0.2 vs 0.8±0.3, 1.3±0.4 vs 1.5±0.3 P<0.05). Increase in SRI was not significant. There was a positive correlation between TVI A and SRI A with MVA (r=0.71, r=0.56 P<0.05). Fibrosis and apoptosis had a negative correlation with TVI A (r=–0.57, r=–0.55 P<0.05) and MVA (r=–0.54, r=–0.59 P<0.05). Apoptosis had a negative correlation with SRI A (r=–0.54, P<0.05). Fibrosis had a negative correlation with TVI S (r=–0.61, P=0.05).

Conclusion: After RFA surgery conversion to SR is not synonymous with normal atrial contraction as described by reduced wall motion velocities and low velocity of atrial transport. Our results imply that long term postinterventional SR maintenance improves coordinated atrial activation with enhancement of contraction over time. Fibrosis which is a hallmark of adverse atrial tissue remodeling, proved to be a negative precursor of impaired atrial contractile and reservoir function.

11.8.

UTJECAJ ŠEĆERNE BOLESTI TIP II I SLABE PRIJEOPERATIVNE GLUKOREGULACIJE NA NEUROKOGNITIVNU FUNKCIJU NAKON KARDIOKIRURŠKE OPERACIJE

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Cilj: Prema našoj hipotezi utjecaj šećerne bolesti i slabija glukoregulacija dovode do progresije aortoskleroze što za poslijedicu ima veću embolizacije kao rezultat kirurške manipulacije sa aortom tijekom kardiokiurškog posupka sto će se klinički očitovati izraženijim neurokognitivnim oštećenjem.

Metode: U ovoj prospektivnoj opservacijskoj studiji sudjelovala su 62 bolesnika koja su podvrgnuta elektivnom aortokoronarnom premoštenju. Uz pomoć Transkranijskog Dopplera (TCD) vršila se evaluacija mikroembolijskih događaja (HITS). Dvije grupe, bolesnici sa i bez šećerne bolesti nisu se razlikovali po dobi (60 +/– 7 godina versus 65 +/– 8 godina, bez statističke značajnosti [NS]) ili prema EuroSCORU (2.9 +/– 1.9 versus 2.1 +/– 1.5, p=NS). Neurokognitivna evaluacija učinjena je prije operativnog zahvata, te sedmog dana i 4.mjeseca poslije operacije. Koristili smo test audio verbalnog učenja, Color trail test A, Grooved pegboard, te mini mental status.

Rezultati: Između ispitanika sa šećernom bolešću (definiranom kao dijabetes tip II u anamnezi ili trenutni HbA1c >=6,5%; N=20) i onih bez šećerne bolesti (N=41) nisu postojale značajne razlike u broju HITS-ova (Mann-Whitney test; p=0,39). U usporedbama po neurokognitivnim testovima, značajne razlike između osoba sa i bez šećerne bolesti postojale su preoperativno u testu pažnje (p=0,007), testu motorike desno (p=0,004) i testu motorike lijevo (p=0,044), postoperativno nakon 7 dana u testu pažnje (p=0,020) i motorike desno (p=0,018), a postoperativno nakon 4 mjeseca u testu pažnje (p=0,021), testu motorike desno (p=0,006) i testu motorike lijevo (p=0,043). Više vrijednosti u svim parametrima imali su bolesnici sa šećernom bolešću.

Zaključak: Bolesnici sa šećernom bolešću imaju lošiju neurokognitivnu funkciju prilikom prijeoperativnog testiranja, ali i statistički signifikantno oštećenu pažnju i motoričku funkciju kako u ranom tako i u kasnom poslijeperacijskom periodu.

11.9.

REDUCTION OF MICROEMBOLI SIGNALS WITH SINGLE CLAMP STRATEGY IN CORONARY ARTERY BAYPASS GRAFTING SURGERY

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Aim: In the present study, transcranial Doppler (TCD) imaging was used to quantify the embolic load of patients undergoing CABG in relation to different aortic clamping strategies. This was complemented by a comprehensive neurocognitive evaluation early postoperatively and again at late follow-up. The data thus obtained were compared to individual preoperative neurocognitive performances for each patient.

Methods: 59 patients undergoing elective CABG were prospectively evaluated. Two groups of patients were formed, based upon the aortic clamping strategy utilized to achieve myocardial revascularization. The single aortic clamp group (SC) was performed using a single period of aortic clamping, in the multiple aortic clamp group (MC) had their aorta side-clamped for the construction of proximal anastomoses. The groups were comparable in relation to age and operative risk (age 65.9 vs 66.8 years, EuroSCORE 2.9 vs 2.2 $P>0.05$ for both).

Results: The preoperative neurocognitive results were comparable between the groups ($P>0.05$ for all comparisons. SC patients had a lower incidence of embolization signals (270 vs. 465, $P<0.0001$). The majority of POD 7 neurocognitive evaluations were significantly depressed in comparison to preoperative results in both groups ($P<0.05$). The magnitude of this cognitive depression, however, was significantly greater in the MC group ($P<0.05$ for multiple comparisons). Preoperative levels of neurocognition were restored at 4 month F-U in the SC group in all tests except the Rey AVLT. A trend towards improvements in neurocognitive performances at F-U vs POD7 was also observed in the MC group. In contrast to the SC group, however, residual attention, motor skill and memory deficits were documented with all of the tests utilized to quantify neurocognitive outcomes.

Conclusions: The embolic burden associated with single aortic clamping for myocardial revascularization is lower than that seen with the conventional multiple clamping strategy.

11.10.

DEFINITION OF ACETYLSALICYLIC ACID RESISTANCE USING WHOLE BLOOD IMPEDANCE AGGREGOMETRY: IMPACT ON ANTIPLATELET THERAPY MANAGEMENT AFTER CORONARY ARTERY SURGERY

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Background and Objectives: A beneficial effect of acetylsalicylic acid (ASA) on vein graft patency has been described, but some patients experience adverse cardiac events despite appropriate ASA treatment. Study aim was to define ASA resistance using Multiple electrode aggregometry (MEA) preoperatively in group of patients undergoing coronary artery bypass grafting (CABG).

Design and Setting: Prospective observational trial at University Hospital Center

Patients and methods: Prospective study enrolled 131 patients scheduled for CABG, and divided them into 4 groups with respect to preoperative antiplatelet therapy (APT). Group 1 received 100 mg ASA

per day, Group 2 100 mg ASA + 75 mg clopidogrel per day, Group 3 75 mg clopidogrel per day, and Group 4 did not receive any APT. MEA with ASPI test (sensitive to ASA) and ADP test (sensitive to clopidogrel) was performed prior to surgery. In Group 1, patients were characterized as ASA resistant if their ASPI test value exceeded the 75th percentile distribution.

Results: Study enrolled 131 patients. Significant differences both in the ASPI ($p<0.001$) and the ADP test ($p=0.038$) were observed between patients in different APT groups. In Group (1) ASPI test value of 30 AUC presented 75th percentile of distribution, thus indicating ASA resistance. Group 2 patients had slightly lower ADP test values, but no significant difference occurred (mean 60.05 vs. 63.32 AUC, $p=0.469$). In Group 1 and 2, significant correlation between the ADP test and both, platelet count ($r=0.347$, $p<0.001$) and fibrinogen level ($r=0.364$, $p<0.001$) was described.

Conclusion: Association between low response to ASA and post-CABG major adverse ischemic events risk increase has been described thus indicating need for ASA resistant patients detection. In patients with preoperative ASPI test exceeding 30 AUC postoperative, ASA dose adjustment or clopidogrel addition according to MEA results should be considered.

11.11.

ASSESSMENT OF PLATELET FUNCTION BY WHOLE BLOOD IMPEDANCE AGGREGOMETRY IN CORONARY ARTERY BYPASS GRAFTING PATIENTS ON ACETYLSALICYLIC ACID TREATMENT MAY ADVISE TO SWITCH ON DUAL ANTIPLATELET THERAPY

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Introduction: Residual platelet reactivity (RPR) following coronary artery bypass grafting (CABG) might be related to thrombotic complications and major ischemic cardiac events. The aim of this study was to evaluate the perioperative changes in platelet reactivity, monitored pre- and postoperatively.

Methods: 99 patients undergoing elective CABG were enrolled in the study, of those, 41/99 (41.4%) patients were found diabetic. Preoperatively, all patients received 100mg acetylsalicylic acid (ASA), and 47/99 (47.4%) of patients received additionally 75 mg clopidogrel (CLO). The blood samples were drawn day before surgery, first and fourth postoperative day. Platelet count and fibrinogen level were documented, as well as type and daily dose of antiplatelet therapy (APT), received pre- and postoperatively. MEA using ASPI and ADP test was performed day before and 4 days after surgery.

Results: Preoperatively, we detected 31/99 (31.3%) of patients with RPR (ASPI > 30 AUC). Platelet count correlated with both ASPI ($p=0.03$) and ADP (0.002) test. Fibrinogen correlated with ADP test values ($p<0.001$) and was found to have a higher level in diabetic subgroup ($p=0.01$). Comparing to preoperative results, we detected higher values of ASPI test postoperatively ($p=0.04$) with 46/99 (46.5%) of patients with RPR despite higher dose of 300 mg ASA administered. Postoperatively, diabetic patients had a higher ASPI test values ($p=0.01$), and higher proportion of patients with RPR comparing to non-diabetic subgroup (58.5% vs. 38%, $p=0.04$). Subgroup of patients with detected ASPI >30 AUC at fourth postoperative day, received additionally 75 mg CLO per day, in terms of platelet inhibition optimization.

Conclusion: MEA can recognize patients with RPR during the both the pre- and post- CABG period. Postoperatively administered 300 mg ASA, did not sufficiently inhibit platelet aggregation in 46.5% post CABG patients. In this group of patients, dual antiplatelet therapy should be considered.