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Combination of Aspirin and Clopidogrel Exerts Superior Antithrombotic Potency Compared to Warfarin on Mechanical Heart Valves in a Rabbit Flow Chamber

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Background: Lifelong oral anticoagulation (oac) is considered to be the gold standard for the prevention of thromboembolic events after implantation of artificial heart valves. In studies on the prevention of subacute coronary stent thrombosis the combination of aspirin with ADP-antagonists such as ticlopidine or clopidogrel was found to be more effective than oac. The aim of our study is to investigate the efficacy of the combination of aspirin and clopidogrel in the prevention of thrombus formation on artificial valves in an experimental animal model compared to an anticoagulation with cumarins.

Methods: Antithrombotic potency was investigated in a rabbit-model using a perfusion chamber regarding the formation of thrombi on leaflets of Sulzer Carbomedics mechanical heart valves.

Studies were performed after oral application of clopidogrel and aspirin in group I (n = 11) at best for 4 days, after minimal 5 days treatment of warfarin in group II (n = 11) and without medication in group III (n = 5). Leaflets from mechanical heart valves were placed in a flow chamber. After tracheotomy and mechanical ventilation flow chamber was filled with blood in a circuit between art. carotis and v. jugularis. We compared the weight of the leaflets before and after the experiment. Further analysis were performed by electron microscopy.

Results: In group III (controls) flow chamber was clotted after about 15 minutes of circulation. Comparison of weight analysis between group I and II before and after perfusion showed a superiority of clopidogrel/aspirin-treatment in preventing thrombus formation on leaflets. Mean weight difference in group I (clopidogrel/aspirin) was 11,2 mg compared to mean weight difference of 17,5 mg in group II (warfarin).

Analysis by electron microscopy showed less fewer thrombus formation, i.e. deposition of platelets, fibrin and erythrocytes, on leaflets exposed to blood from rabbits in group I compared to group II.

Conclusion: Combination of clopidogrel and aspirin exerted in an experimental animal perfusion model compared to anticoagulation with warfarin superior potency in preventing thrombus formation on artificial heart valve leaflets.

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Role of Serial Troponin Testing for Diagnosis of Perioperative Myocardial Infarction After Cardiac Surgery

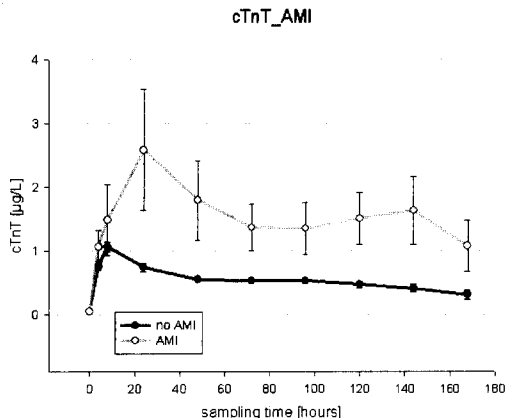
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Background: The value of serial troponin testing for diagnosis of perioperative myocardial infarction (MI) after major cardiac surgery is still unsettled.

Methods: We studied 204 patients undergoing major cardiac surgery, including CABG (132/204) and valve surgery (36/204). Cardiac troponin T (cTnT) was measured before crossclamping and serially at 4, 8, 24 hours and once daily thereafter for 7 days. Perioperative MI was defined as new evolving Q-waves on serial ECGs. ROC analysis was performed to obtain the optimal cTnT discriminator for perioperative MI at different time points.

Results: A total of 13/204 patients suffered a perioperative MI. In these patients, cTnT levels at all time-points beyond 8 hours and peak cTnT levels were higher compared to patients without perioperative MI (figure). ROC analysis yielded an optimal discriminator above 1.26 µg/L at 24 hours (AUC 0.69, sens 54%, spec 87%). In addition, time to peak was higher in patients with perioperative MI (43.4 vs 26.4h, p=0.03).

Conclusions: Serial cTnT testing may be useful in identifying patients with a perioperative myocardial infarction following major cardiac surgery.



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The Utility of the ACC/AHA Guidelines for Screening Angiography in Patients Undergoing Surgical Repair for Mitral Regurgitation

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Background: As routine screening angiography is performed for the majority of patients undergoing mitral repair at our institution, we evaluated the utility of the 1998 ACC/AHA guidelines on a review of 400 patients who underwent surgery for mitral regurgitation from 1987 to 1999.

Methods: Coronary angiography was performed and disease defined as lumen narrowing of $\geq 50\%$. Risk factors for coronary disease were: age (males > 35 or females > 51 years), family history, smoking, diabetes, and hypercholesterolemia. Evaluated ACC/AHA indications were: history of angina / MI and presence of ≥ 1 risk factor. Etiology was determined by histopathology of operative valve specimens. Sensitivity (Sn), specificity (Sp) and likelihood ratio positive (LR+) for coronary disease on angiography were calculated for each risk.

Results: Of 400 patients, angiographic details were unavailable in 12 (3%), and 29 (7.5%) had no angiography due to emergent status (24 with and 5 without defined indications). Angiography was performed in 359 (92.5%) patients with a mean age of 65 (± 10) years consisting of 234 (65.2%) males. The etiologies for mitral disease were degenerative (82.7%), rheumatic (7.0%), ischemic (5.6%) and endocarditis (4.7%).

Prevalence of coronary disease and proportion of concomitant bypass surgery was 28.1% and 22.3% respectively.

Proportion of patients fulfilling either indication for angiography was 99.4%, Sn 1.00, Sp 0.01, LR+ 1.01, with age criterion alone in 98.1%, Sn 1.00, Sp 0.03, LR+ 1.03. Angina was present in 30.9%, Sn 0.59, Sp 0.80, LR+ 3.01.

Of 248 patients without angina or MI, indications were: hypertension in 24.6%, Sn 0.26, Sp 0.87, LR+ 1.98; hypercholesterolemia in 43.1%, Sn 0.20, Sp 0.89, LR+ 1.85; smoking in 26.6%, Sn 0.24, Sp 0.86, LR+ 1.77; diabetes in 5.6%, Sn 0.21, Sp 0.84, LR+ 1.30 and family history in 9.6%, Sn 0.17, Sp 0.83, LR+ 1.01.

Conclusions: ACC / AHA guidelines have excellent Sn, but very low Sp. Similar result is achieved with age as the sole criterion for angiography. Angina was the best predictor of coronary disease. Almost all patients qualify for angiography, but only a minority had concomitant bypass surgery. More stringent criteria may improve the cost effectiveness of the guidelines.

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Elevated Serum Interleukin-6 Has Prognostic Significance for Postoperative Outcome in Patients Undergoing Cardiothoracic Surgery

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Inflammatory cytokines become elevated during cardiothoracic surgery procedures. Many studies have sought to characterize the differences in cytokine expression based on technical approaches, e.g. pump vs. off-pump CABG surgery. We undertook a prospective study to investigate the relationship between the inflammatory cytokines, IL-6, sIL-2R, sTNF-R (p55), and sTNF-R (p75), and clinical outcomes as prognostic predictors of post-operative management and outcome in patients (n=65) who had cardiothoracic operations. Three sequential blood samples were collected: (1) prior to induction of anesthesia, (2) completion of surgery, and (3) 24-hours after the induction of anesthesia. Pre-determined clinical outcome measures included ICU length of stay (ICULOS), total length of stay (TOTLOS), post-operative ventilation duration (VentTime), duration of vasopressor (PressorTime) and inotropic (InotropeTime) requirements, and complication rate. The pre-operative cytokine levels did not correlate with the outcome data, however IL-6 levels from time points 2 and 3 were found to have independently demonstrated statistically significant prognostic value in regard to the pre-determined outcome measures, ICULOS (p<0.01), TOTLOS (p<0.02), VentTime (p<0.01), PressorTime (p<0.01), and InotropeTime (p<0.01). sIL-2R, sTNF-R (p55), and sTNF-R (p75) had less influential prognostic significance. Operative Bypass time independently showed prognostic value for ICULOS (p<0.01), TOTLOS (p<0.01), and PressorTime (p<0.01). Elevated levels of cytokines cause Systemic Inflammatory Response Syndrome (SIRS) in patients undergoing cardiothoracic procedures, which manifest as increased ICULOS, TOTLOS, ventilatory support, inotropic and vasopressor requirements. Of the operative variables, bypass time had the greatest prognostic value. IL-6 appears to play a major role in mediating post-operative outcome and may facilitate decision-making for critically ill cardiothoracic patients.

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Use of Substernal Echocardiography in Patients on Ventricular Assist Devices: Initial Experience

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Background: Echocardiography is sometimes difficult in postop patients who may have dressings, poor windows and are difficult to reposition. Transesophageal echo carries the disadvantages of patient stress, respiratory compromise or the need to further sedate conscious patients. We have previously reported a dual lumen chest tube drain device with a sealed substernal echocardiography (SEE) lumen 36 Fr (SEE-IT® Medtronic Corporation) that allows insertion of a 10.2mm non-sterile miniplane TEE probe into a substernal position where it can be positioned and rotated for cardiac imaging intra- and postoperatively. **Methods:** At OHSU, 5 patients were studied serially for periods of up to 5 days with intermittent echo imaging performed by surgeons on their rounds used