Preoperative disturbances of glucose metabolism and mortality after coronary artery bypass grafting

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Background: Disturbances of glucose metabolism are important risk factors for coronary artery disease. The aim was to investigate the association between preoperative disturbances of glucose metabolism and long-term all-cause mortality after coronary artery bypass grafting (CABG).

Methods: Patients undergoing a first isolated CABG during 2005-2013 were included. None had a previous diabetes diagnosis and all underwent an oral glucose tolerance test (OGTT) prior to the operation. They were categorized as having normal glucose tolerance (NGT), prediabetes (impaired glucose tolerance and/or impaired fasting glucose) and newly discovered diabetes. Data was collected from nationwide healthcare registers. Cox regression was used to calculate adjusted hazard ratios (HR) with 95% confidence intervals (CI) for death in patients with prediabetes, and diabetes using NGT as reference.

Results: Totally 497 patients, aged 40-86 years were included. According to the OGTT, 170 patients (34%) had NGT, 219 patients (44%) prediabetes and 108 patients (22%) had newly discovered diabetes. Baseline characteristics were similar between the groups except for a slightly higher age among patients with newly discovered diabetes. There were 133 (27%) deaths during a mean follow-up time of 10 years. The cumulative 10-year survival was 77% (69-83%), 83% (77-87%), and 71% (61-79%) in patients with NGT, prediabetes, and newly discovered diabetes, respectively. There was no significant difference in all-cause mortality between the groups after multivariable adjustment.

Conclusion: Patients with prediabetes or newly discovered diabetes prior to CABG, had similar long-term survival compared to patients with normal glucose tolerance.

Keywords: CABG; diabetes; prediabetes; oral glucose tolerance test; prognosis

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Addition of Benzylpenicillin to Routine Prophylaxis Reduces the Incidence of Deep Sternal Wound Infection

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Introduction

Increasing evidence indicate that Propionibacterium acnes (PA) may cause deep sternal wound infections (SWI) after cardiac surgery. In Sweden, cloxacillin is recommended as the sole antibiotic prophylaxis. Cloxacillin is not optimal for prevention of PA, moreover PA are resilient to chlorhexidine. However, PA are susceptible to Benzylpenicillin. We therefore added Benzylpenicillin to our routine intraoperative prophylaxis in 2015. The aim of this study was to compare the incidence of SWI before and after addition of Benzylpenicillin

Methods

In his study, we included 3469 consecutive patients that underwent cardiac surgery at our centre from 2009 thru 2017. All patients were followed-up two months postoperatively. The rates of SWI that required surgical intervention and/or antibiotic treatment before and after 2015 were compared. Logistic multivariable analysis was used to adjust for potential confounders.

Results

The incidence of SWI that required surgical revision decreased from 4.89% to 1.78% after addition of Benzylpenicillin ($p < 0.001$). There was no reduction, however, in superficial SWIs that were only treated with antibiotics. Significant decrease was seen in SWIs caused by Coagulase negative staphylococci, either alone ($p<0.001$) or concomitant with PA ($p=0.011$). Addition of Benzylpenicillin remained independently associated with reduction in SWI in the multivariable analysis (OR=0.38, 95% CI=0.23 -0.61)

Conclusions

Addition of Benzylpenicillin to routine prophylaxis was associated with a reduction in surgically treated SWI. This indicates that PA actually play an important role in SWI. Benzylpenicillin is an inexpensive, safe and ecologically attractive prophylactic antibiotic and is now included in our routine.

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The risk of vascular dementia is increased after coronary artery bypass grafting–a population-based cohort study from the SWEDEHEART registry

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Background: Previous studies investigating the association between coronary artery bypass grafting (CABG) and risk for dementia show conflicting results. We compared the long-term risk for dementia in CABG patients to individuals in the general population, and identified independent predictors for developing dementia after CABG.

Methods: Data from the SWEDEHEART registry and three other national registries were merged to compare all patients <65 years who underwent isolated CABG in Sweden from 1992 to 2015 (n=47677) with age- and sex-matched control individuals (n=95354). Multivariable Cox regression models adjusted for age, gender, co-morbidity and education was used to calculate the risk of all-cause dementia, vascular dementia and Alzheimer's disease in CABG patients and controls. Mean follow-up time was 12.7 years, range 0-24 years)

Results: In total 10.1% of CABG patients and 8.1% of age- and gender matched control individuals developed dementia during follow-up. The adjusted risk for all-cause dementia (adjusted Hazard Ratio (HR) 1.24 (95% confidence interval 1.14-1.35), and vascular dementia (adjusted HR 1.45 (1.12-1.88) were significantly higher in CABG patients than in the general population. There was no increased risk in CABG patients for Alzheimer disease (adjusted HR 1.10 (0.87-1.3). The risk for all-cause dementia was increased both in women (HR 1.52 (1.24-1.85), and in men (HR 1.19 (1.08-1.30) undergoing CABG. Hypertension, diabetes, preoperative stroke, renal failure, heart failure, depression and short education were independent predictors for all-cause dementia in CABG patients.

Conclusions: CABG patients have an increased long-term risk to develop vascular dementia compared to the general population.

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Renal effects of dextran-based versus crystalloid-based priming solution in cardiopulmonary bypass: a randomized controlled study in adult cardiac surgery patients

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OBJECTIVES: Whether colloid-based or crystalloid-based priming solution of the heart-lung machine is better during cardiopulmonary bypass (CPB) and cardiac surgery is an unanswered question. In the present blinded randomized controlled trial, we evaluated the effects of a colloid-based vs a conventional crystalloid-based prime on tubular injury and postoperative renal function in patients undergoing cardiac surgery with CPB.

METHODS: 80 adult patients with an eGFR > 30ml/min/1.73m2 undergoing cardiac surgery with CPB were randomized to receive either a crystalloid- or colloid- (dextran 40) based CPB priming solution. The crystalloid solution was based on Ringer-Acetate plus mannitol. Plasma oncotic pressure, diuresis, degree of haemodilution, fluid balance, renal outcome and diuresis were measured at time points during and up to 24 hours after CPB. The tubular injury biomarker, N-acetyl-b-D-glucosaminidase (NAG), was measured before, during and early after CPB.

RESULTS: Patients that received the dextran 40-based priming solution had significantly higher plasma oncotic pressure during CPB than patients receiving crystalloid-based priming solution did (p<0.001). The haematocrit stayed lower in the colloid group (p=0.002) and the crystalloid group required more fluid administration (p=0.006). The urinary NAG levels were higher in the crystalloid (p=0.045) group, indicative of a higher degree of kidney damage.

CONCLUSIONS: The colloid based priming solution kept the oncotic pressure of the patient's blood closer to the preoperative levels during CPB, and reduced the need for fluid administration compared to the priming solution based on Ringer-Acetate and Mannitol. Furthermore, the colloid-based priming solution seemed to induce less kidney damage than crystalloid-based did.

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Bleeding in Patients Treated With Ticagrelor or Clopidogrel Before Coronary Artery Bypass Grafting

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Background. We evaluated perioperative bleeding after coronary artery bypass grafting (CABG) in patients preoperatively treated with ticagrelor or clopidogrel, stratified by discontinuation of these P2Y12 inhibitors.

Methods. All patients from the prospective, European Multicenter Registry on Coronary Artery Bypass Grafting (E-CABG) treated with ticagrelor or clopidogrel undergoing isolated primary CABG were eligible. The primary outcome measure was severe or massive bleeding defined according to the Universal Definition of Perioperative Bleeding, stratified by P2Y12 inhibitor discontinuation. Secondary outcome measures included four additional definitions of major bleeding. Propensity score matching was performed to adjust for differences in preoperative and perioperative covariates.

Results. Of 2,311 patients who were included, 1,293 (55.9%) received clopidogrel and 1,018 (44.1%) ticagrelor preoperatively. Mean time between discontinuation and Q1 surgery was 4.5 ± 3.2 days for clopidogrel and 4.9 ± 3.0 days for ticagrelor. In the propensity score–matched cohort, ticagrelor-treated patients had a higher incidence of major bleeding according to Universal Definition of Perioperative Bleeding when ticagrelor was discontinued 0 to 2 days compared with 3 days before surgery (16.0% vs 2.7%, p [0.003). Clopidogrel-treated patients had a higher incidence of major bleeding according to the Universal Definition of Perioperative Bleeding when clopidogrel was discontinued 0 to 3 days compared with 4 to 5 days before surgery (15.6% vs 8.3%, p [0.031).

Conclusions. In patients receiving ticagrelor 2 days before surgery and in those receiving clopidogrel 3 days before surgery, there was an increased rate of severe bleeding. Postponing nonemergent CABG for at least 3 days after discontinuation of ticagrelor and 4 days after clopidogrel should be considered.