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Self-reported symptoms of depression and postoperative delirium in patients undergoing coronary artery bypass grafting – a prospective cohort study

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Background:

Depression is a risk factor for the development of ischemic heart disease and is associated with increased morbidity and mortality in patients undergoing Coronary Artery Bypass Grafting. Delirium is an acute brain dysfunction often affecting elderly hospitalized patients. Postoperative delirium arises shortly after surgery. Depression has been associated with postoperative delirium after major surgery, but the association between preoperative depression and postoperative delirium after Coronary Artery Bypass Grafting is still sparsely studied.

Objectives:

The aim was to investigate the association between depression and postoperative delirium in patients undergoing Coronary Artery Bypass Grafting.

Research methods:

A prospective cohort study was conducted from September 2020 to May 2023.

Main outcome measures:

Symptoms of depression were self-reported using the Patient Health Questionnaire-9. Postoperative delirium was evaluated using the Nursing Delirium-Screening Scale and through medical records assessment.

Results:

Sixty patients undergoing Coronary Artery Bypass Grafting were included. A total of eight (13 %) patients had self-reported preoperative depression. The incidence of postoperative delirium was 30 %. Among patients with depression, 50 % developed postoperative delirium vs 27 % in the group of non-depressed.

Conclusions:

Postoperative delirium was more common in the group of patients with self-reported depression but the association was not statistically significant. A larger sample size is needed to possibly confirm the association between depression and delirium in this population. There is a need for better compliance to available screening tools to better detect postoperative delirium.

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Online Cognitive Behavioral Therapy Targeting Psychological Distress Following Open Heart Surgery: An uncontrolled pilot study

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The authors have chosen not to publish the abstract

Documentation and risk assessment of pressure injuries in Swedish Intensive Care Units - how can it be improved?

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The authors have chosen not to publish the abstract

Preoperative prediction models for postoperative delirium in cardiac surgery patients – a literature review

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Background: Postoperative delirium is a frequent but also potentially preventable complication in cardiac surgery patients. Therefore, preoperative recognition of high-risk patients is important. No consensus exists on which risk prediction model for delirium is suitable in a clinical setting.

Objective: To identify existing preoperative risk prediction models and discuss their suitability in the clinical practice setting.

Methods and results: A literature review of risk prediction models in both derivation and validation cohorts including adult patients admitted for elective cardiac surgery. We searched MEDLINE, CINAHL, Embase, and PsycINFO where 1787 references were identified and 10 were included for full-text analysis. The PRISMA reporting guideline and CHARMS checklist were followed. Seven unique risk prediction models and three validation studies were included in this review, comprising between 77 to 3439 participants originating from six different countries. Delirium incidence rate ranged from 4.1 % to 52 %. In total, 123 candidate prognostic variables were investigated of which 35 had a predictive value and thus, were included in the prediction models. Among the strongest predictors included in the models were type of surgery, delirium in history, alcohol use, cognitive impairment, and advanced age. Studies revealed an AUC from 0.74 to 0.83 in the derivation cohorts and from 0.61 to 0.89 in the validation cohorts. No models are currently easily manageable in the clinical setting due to the complex calculation of risk scores.

Conclusions: The included prediction models showed good discrimination performance for postoperative delirium in cardiac surgery patients. However, their applicability in a clinical setting was assessed to be poor.

A Novel Concept of Fast Track Care after Open Cardiac Surgery

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Background:

Open cardiac surgery is associated with resource demanding postoperative intensive care. We aimed to study the feasibility and safety aspects after implementation of a fast-track concept after cardiac surgery, including identification of factors for subsequent need of more advanced level of care.

Methods:

An observational retrospective study using prospectively collected data from a local cardiac surgery registry at the Karolinska University Hospital and the National SWEDEHEART registry. The fast-track concept includes immediate extubation, early mobilization and discharge to regular ward the day after surgery. The unit is staffed by nurses without ICU-training.

Results:

During 2018-2023, 2801 patients (78% men, median age 63 years) were treated at the fast-track unit with average Euroscore II of 2.0. Year 2023, 65% of all open cardiac surgery patients received postoperative care at the fast-track unit. Isolated CABG was the main procedure performed, n= 1189 (42.4%) followed by single-non CABG n= 1050 (37.5%); 2 procedures n= 386 (13.8%); and 3 procedures n= 176 (6.3%). In total, 94.6% of patients could be discharged as planned the day after surgery. Of those 5.4% (n=152) requiring higher level of care, most common transfer cause to ICU was circulatory failure and need for reoperation. The overall 30-day mortality was <0.5%.

Conclusion:

The introduction of a fast-track concept following open cardiac surgery was safe and feasible. About 95% of the patient could be discharged the day after surgery and with a 30-day mortality lower than 0.5%.

Remaining and reappearing heparin activity after low dose of protamine following CPB – clinical significance?

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Background: Remaining or reappearing heparin after cardiopulmonary bypass might depend on protamine dosing. We studied postoperative heparin activity after low dose protamine following use of an automatic titration system for dose calculation.

Materials and methods: In forty elective CABG patients, blood samples were collected at arrival to the intensive care unit (ICU) and three hours after. An automatic titration system (Hepcon®) was used to dose heparin and protamine. Heparin activity was measured by anti-factor Xa (anti-FXa), thrombin time (TT) and aPTT. Global coagulation was assessed by endogenous thrombin potential (ETP).

Results: Mean protamine/heparin ratio (P/H-ratio) was 0.54 (± 0.14) mg/100U. At arrival to the ICU 82 minutes after protaminization median anti-FXa was 0.09 (IQR 0.25) U/mL and 63% of the patients had detectable levels. P/H-ratio correlated negatively to heparin activity TT ($r = -0.48$, $p = 0.004$) and aPTT ($r = -0.50$, $p = 0.0015$). ETP correlated to P/H-ratio ($r = 0.41$, $p = 0.0012$) and negatively to anti-FXa ($r = -0.57$, $p < 0.001$) (figure 1). Three hours after arrival to the ICU median anti-FXa was 0.17 (IQR 0.15) U/mL and 98% of the patients showed detectable levels ($p < 0.001$), but without any correlation to P/H-ratio (figure 2). There was no correlation between bleeding and P/H-ratio or markers of heparin activity (figure 3).

Conclusion: At ICU arrival a majority of patients showed remaining heparin activity related to the P/H-ratio. Three hours later, more patients showed heparin activity, with levels independent of protamine dosing. This could indicate different mechanisms for remaining and reappearing heparin postoperatively. No relation between heparin activity and bleeding was found.

Figure 1

Coagulation analyses and protamine/heparin ratio at ICU arrival

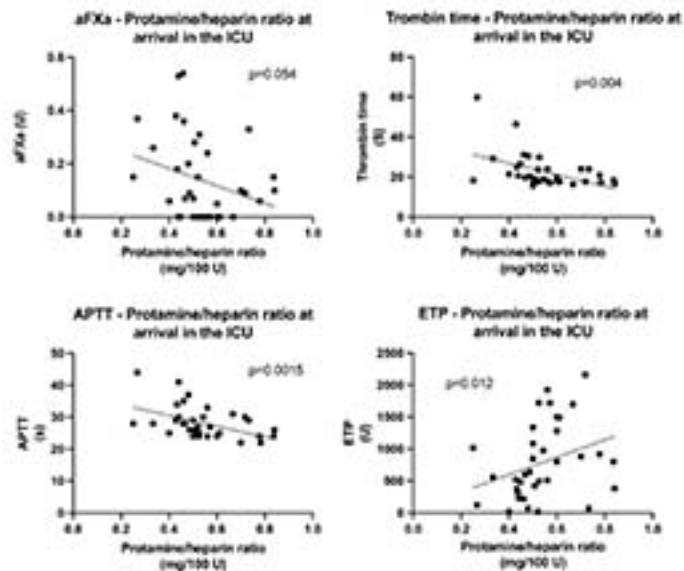


Figure 2

Anti-FXa 3 hours after arrival to the ICU - protamine/heparin ratio and heparin

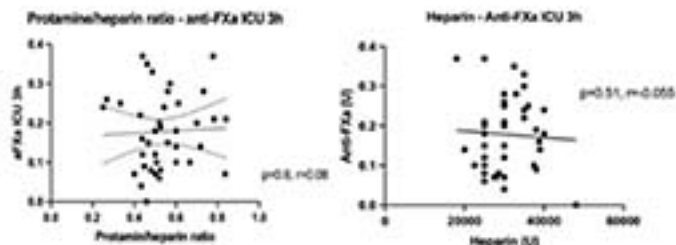
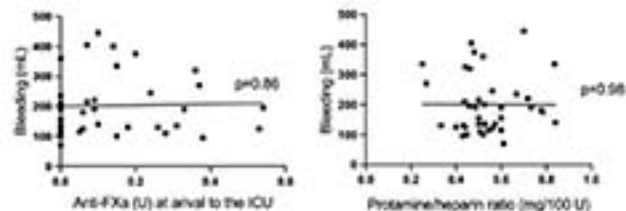


Figure 3

Bleeding during the first 3 hours in the ICU - Anti-FXa and protamine/heparin ratio



Dextran-based versus crystalloid priming solution for prevention of Acute Kidney Injury after Cardiac Surgery - a randomized controlled trial

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Background

Up to one-third of patients undergoing cardiac surgery with cardiopulmonary bypass (CPB) develop acute kidney injury (AKI). Previous studies have shown that using a CPB priming solution containing dextran 40 can improve fluid balance and reduce hemolysis. Our hypothesis was that priming with dextran can reduce postoperative AKI in high-risk patients.

Materials and methods

In this randomized, controlled, double blinded multicenter trial, adult patients with an estimated risk of postoperative AKI $\geq 50\%$ (calculated from the Leicester AKI score) were allocated to either a dextran 40-based or a crystalloid-based priming solution for the CPB circuit. The primary outcome was incidence of AKI according to the KDIGO criteria within 96 hours after surgery. Secondary outcomes were hemolysis, bleeding, fluid balance and need for renal replacement therapy.

Results

Due to slow enrolment, the study was terminated after 101 out of the planned 366 patients. Ninety-two patients were included in the final analysis, 47% in the dextran group and 53% in the crystalloid group.

The incidence of AKI was increased in the dextran group, 83% vs. 54%, $p=0.0036$; RR 1.54 (1.15-2.06). Net fluid balance ($p=0.006$) and postoperative plasma hemoglobin ($p=0.004$) were higher in the control group. There were no differences in postoperative bleeding, use of renal replacement therapy or adverse events between the groups.

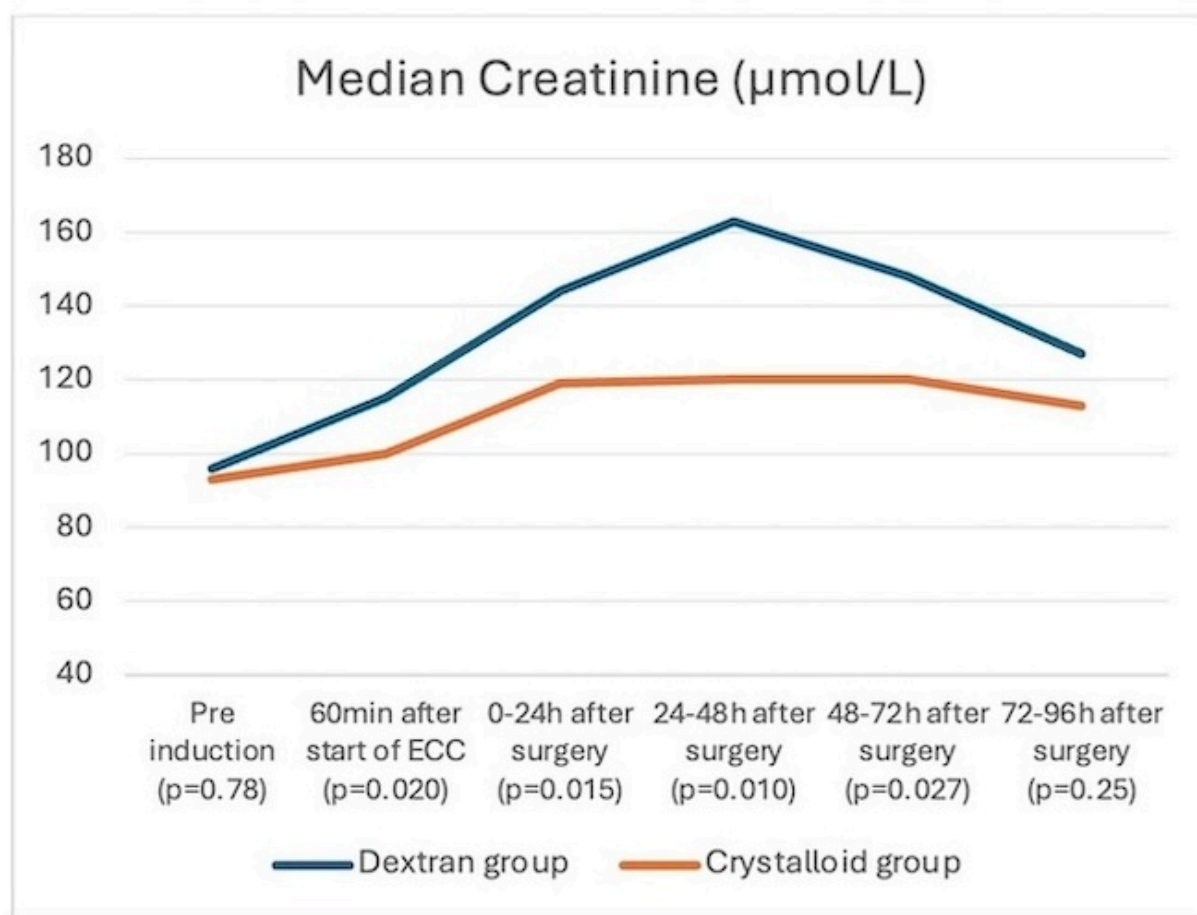
Conclusion

These results indicate an increased risk for AKI in a population with high expected incidence of postoperative kidney injury when a dextran 40-based solution is used for priming the CPB circuit.

CPB and fluid balance

	Dextran (n=43)	Crystalloid (n=49)	p
CPB duration, hours	1.8 (0.8–7.3)	1.4 (0.9–8.4)	0.09
Cross clamp time, hours	1.3 (0.6–4.5)	1.1 (0.5–4.2)	0.10
Vasopressor use during CPB, n (%)	18 (42)	16 (33)	0.39
Hemofiltration during CPB, ml	0 (0–4840)	0 (0–2600)	0.0096
Net fluid balance, L			
During surgery	1.27 (-1.71–6.41)	1.85 (-1.92–6.31)	0.0059
24 hours post surgery	1.12 (-3.68–4.37)	0.80 (-5.42–5.06)	0.35
Bleeding, ml			
During surgery	500 (100–12800)	325 (100–3070)	0.30
24 hours post surgery	750 (275–3030)	565 (225–2900)	0.14
Erythrocytes given, n (%)			
During surgery	13 (30)	8 (17)	0.14
24 hours post surgery	18 (44)	15 (31)	0.27

Values are median (range) or n (%), p-values are Mann-Whitney U tests or Fisher's exact test



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Association between depression/anxiety and new onset of atrial fibrillation in patients undergoing cardiac surgery. A nationwide population-based cohort study.

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The impact of intraoperative hemoadsorption during cardiac surgery for infective endocarditis (French Experience)

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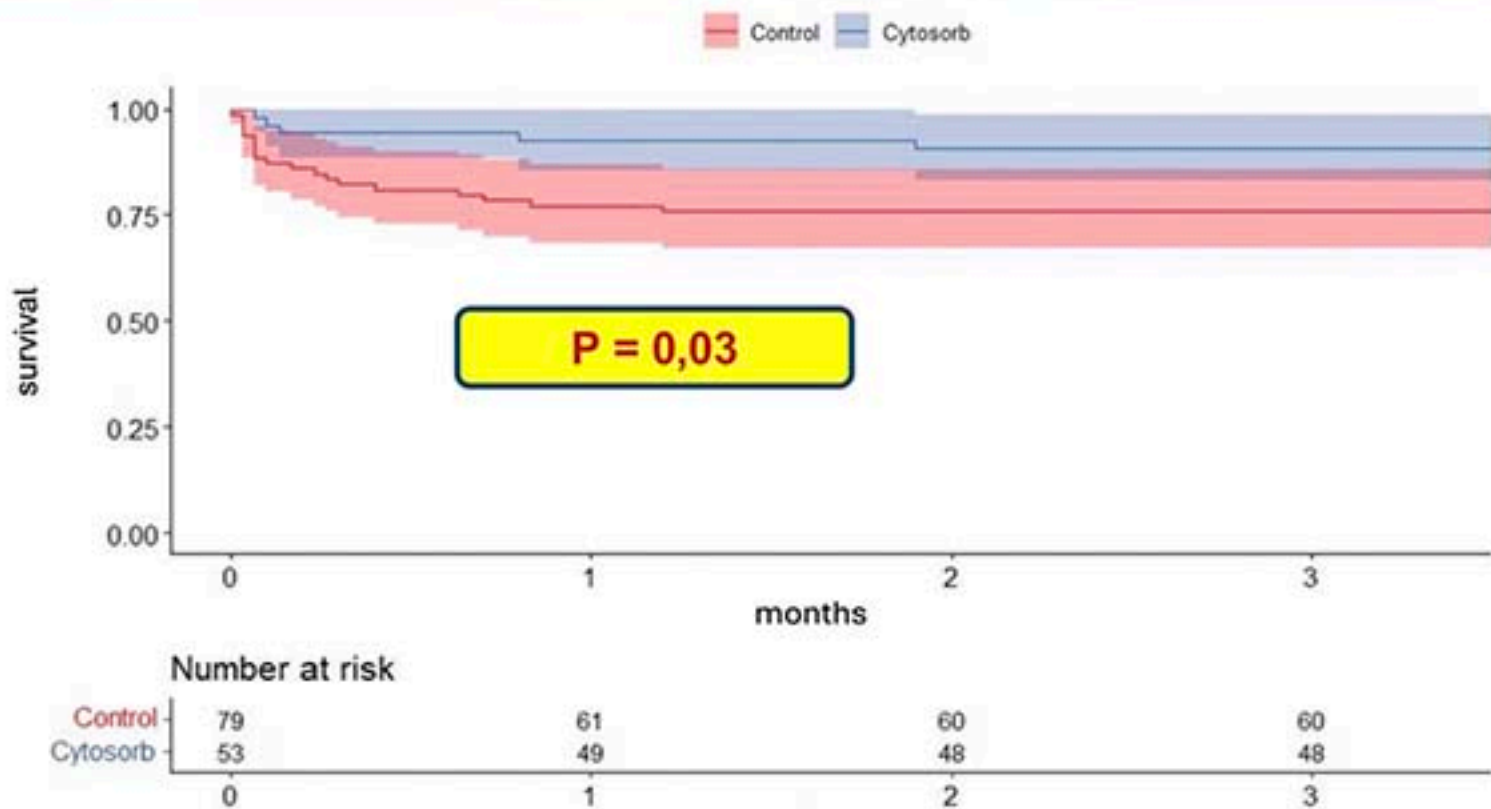
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Sepsis and systemic inflammatory response syndrome caused by infective endocarditis (IE) may translate into significantly increased postoperative morbidity and mortality after cardiac surgery. We sought to evaluate the impact of intraoperative hemoadsorption therapy , on the incidence of postoperative vasoplegia and postoperative mortality at 30 and 90 days.

From 01/2020 to 12/2023, 149 patients underwent cardiac surgery for IE. Patients treated with intraoperative hemoadsorption therapy (HA-group) were compared to patients not treated with this novel therapy (control group). The endpoints were the incidence of vasoplegic syndrome within the first 7 postoperative days and overall mortality at 30 and 90 days.

A total, of 132 patients were able to be included in the final analysis with complete follow-up (n=53 in the HA-group and n=79 in the control group). No significant differences in baseline demographics or intraoperative characteristics were observed regarding (age, gender, cardiopulmonary bypass (CBP)-time or aortic cross clamp -ACC-time). The average intensive care length of stay was shorter in the HA-group (6±3 days vs. 11 ±5 days in the control group). Postoperative vasoplegic syndrome was more frequent in the control group (53% vs. 27%, p=0.03). Overall mortality was significantly reduced in the HA-group at 30-days (7.5% vs. 21.5%, p=0.02) and at 90-days (11.3% vs. 25.3%, p=0.03).

Intraoperative hemoadsorption therapy has the potential to attenuate postoperative vasoplegia and reduced postoperative mortality after cardiac surgery for IE which has been shown in the present analysis. Future larger trials are needed to confirm the current findings.



Postoperative Mortality at 30 and 90 days.

Effects of increased cardiopulmonary bypass pump flow on renal filtration, perfusion, oxygenation and tubular injury in cardiac surgery - a randomized controlled trial

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Background: Cardiac surgery with cardiopulmonary bypass (CPB) is associated with impaired renal oxygenation and acute kidney injury. We aimed to investigate whether a higher than our standard blood flow during CPB could ameliorate renal hypoxia and attenuate tubular injury.

Methods: After ethical approval and informed consent, we randomized Thirty-six adult patients undergoing cardiac surgery were randomized to high flow (2.9 L/min/m², n=19) or standard flow (2.4 L/min/m², n=17) during CPB. Systemic hemodynamics and renal variables were measured before, during and after CPB. Glomerular filtration rate and renal blood flow were measured by infusion clearance of iohexol and para-aminohippuric acid, respectively, using a renal vein catheter. Tubular injury was assessed by urinary N-acetyl- β -D-glucosaminidase.

Results: High flow increased systemic oxygen delivery (26%) and target mean arterial pressure was maintained at a lower norepinephrine dose ($p=0.048$) compared to standard flow. During CPB, glomerular filtration rate increased (10%) in the high flow group ($p=0.004$), but not in the standard flow group ($p=0.044$ between-groups). Renal extraction of para-aminohippuric acid decreased in the high flow group ($p=0.002$), which was not seen in the standard flow group. In neither of the groups was there a change in renal blood flow or oxygen consumption during CPB. The urinary excretion of N-acetyl- β -D-glucosaminidase was 62% lower in the high flow group ($p=0.049$).

Conclusions: A 20% higher than standard CPB flow during cardiac surgery improved renal function and reduced tubular injury with no change in renal perfusion or oxygenation.