CONCLUSION: In this cohort study of AKI progression within 7 days of ICU admission, eight novel urinary biomarkers improved the prediction of AKI progression after multivariate adjustment. Similarly, ROC analysis found that several biomarkers had moderate accuracy for the prediction of AKI progression in the ICU.

METHOD: We compared the predictive value of plasma NGAL, hepcidin-25, and NGAL-hepcidin-25 with those of serum creatinine (Cr), and urinary output and urinary protein for primary endpoint major adverse kidney events (MAKE; acute kidney injury [AKI] stages 2 and 3, persistent AKI > 48 hrs, acute dialysis, and in-hospital mortality) and secondary-endpoint AKI in 100 cardiac surgery patients at intensive care unit (ICU) admission. We performed ROC curve, logistic regression, and reclassification analyses.

RESULTS: At ICU admission, plasma NGAL, plasma NGAL-hepcidin-25, and Cr predicted MAKE (area under the ROC curve [AUC]: 0.77 [95% confidence interval (CI) 0.60–0.94], 0.79 [0.63–0.95], 0.74 [0.51–0.97]) and AKI (0.73 [0.53–0.93], 0.89 [0.81–0.98], 0.70 [0.48–0.93]). For AKI prediction, NGAL-hepcidin-25 had a higher discriminatory power than Cr (AUC difference 0.26 [95% CI 0.00–0.53]). Urinary output and protein, plasma lactate, C-reactive protein, creatine kinase myocardial band, and brain natriuretic peptide did not predict MAKE or AKI (AUC < 0.70). Only plasma NGAL-hepcidin-25 correctly reclassified patients for MAKE or AKI (category-free net reclassification improvement: 0.82 [95% CI 0.12–1.52], 1.03 [0.29–1.77]). After adjustment to the Cleveland risk score, plasma NGAL-hepcidin-25 > 0.9 independently predicted MAKE (adjusted odds ratio 16.34 [95% CI 1.77–150.49], P = 0.014), whereas Cr did not.

CONCLUSION: NGAL-hepcidin-25 is a promising plasma marker for predicting postoperative MAKE.

FC051 Figure 1: AUC-ROCs of plasma biomarkers at ICU admission to predict postoperative MAKE or AKI

Missing values: NGAL (MAKE: n=1/9, ‘no MAKE’: N=2/91; ‘AKI’: n=2/9, ‘no AKI’: n=0/91), hepcidin-25 (MAKE: n=0/9, ‘no MAKE’: N=1/91; ‘AKI’: n=0/9, ‘no AKI’: n=1/91), NGAL-hepcidin-25 (MAKE: n=1/9, ‘no MAKE’: N=2/91; ‘AKI’: n=2/9, ‘no AKI’: n=1/91) Abbreviations: AUC-ROC, area under the receiver-operating characteristic; ICU, intensive care unit; IL, interleukin; NGAL, neutrophil gelatinase-associated lipocalin; CRP, C-reactive protein; CK, creatine kinase; CKMB, creatine kinase myocardial band; BNP, B-type natriuretic peptide.

*Indicates biomarker with inverse relationship to outcome.

FC051 PREDICTIVE VALUE OF PLASMA NGAL:HEPCIDIN-25 FOR MAJOR ADVERSE KIDNEY EVENTS AFTER CARDIAC SURGERY WITH CARDIOPULMONARY BYPASS: A PILOT STUDY

Saban Elitok¹, Anja Haase-Fielitz², Martin Ernst³, Michael Haase²,³,⁴
¹Hospital Ernst von Bergmann Potsdam, Department of Nephrology, Potsdam, Germany; ²Heart Center Brandenburg, Department of Cardiology, Bernau, Germany; ³Otto-von-Guericke University Magdeburg, Medical Faculty, Magdeburg, Germany and ⁴Diaverum, MVZ Am Neuen Garten, Potsdam, Germany

BACKGROUND AND AIMS: Neutrophil gelatinase-associated lipocalin (NGAL) and hepcidin-25 appear to be involved in catalytic iron-related kidney injury after cardiac surgery with cardiopulmonary bypass. We aimed to explore the predictive value of plasma NGAL, plasma hepcidin-25, and the plasma NGAL:hepcidin-25 ratio for major adverse kidney events after cardiac surgery.

METHOD: We compared the predictive value of plasma NGAL, hepcidin-25, and NGAL-hepcidin-25 with those of serum creatinine (Cr), and urinary output and urinary protein for primary endpoint major adverse kidney events (MAKE; acute kidney injury [AKI] stages 2 and 3, persistent AKI > 48 hrs, acute dialysis, and in-hospital mortality) and secondary-endpoint AKI in 100 cardiac surgery patients at intensive care unit (ICU) admission. We performed ROC curve, logistic regression, and reclassification analyses.

RESULTS: At ICU admission, plasma NGAL, plasma NGAL-hepcidin-25, and Cr predicted MAKE (area under the ROC curve [AUC]: 0.77 [95% confidence interval (CI) 0.60–0.94], 0.79 [0.63–0.95], 0.74 [0.51–0.97]) and AKI (0.73 [0.53–0.93], 0.89 [0.81–0.98], 0.70 [0.48–0.93]). For AKI prediction, NGAL-hepcidin-25 had a higher discriminatory power than Cr (AUC difference 0.26 [95% CI 0.00–0.53]). Urinary output and protein, plasma lactate, C-reactive protein, creatine kinase myocardial band, and brain natriuretic peptide did not predict MAKE or AKI (AUC < 0.70). Only plasma NGAL-hepcidin-25 correctly reclassified patients for MAKE or AKI (category-free net reclassification improvement: 0.82 [95% CI 0.12–1.52], 1.03 [0.29–1.77]). After adjustment to the Cleveland risk score, plasma NGAL-hepcidin-25 > 0.9 independently predicted MAKE (adjusted odds ratio 16.34 [95% CI 1.77–150.49], P = 0.014), whereas Cr did not.

CONCLUSION: NGAL-hepcidin-25 is a promising plasma marker for predicting postoperative MAKE.

FC051 Figure 1: AUC-ROCs of plasma biomarkers at ICU admission to predict postoperative MAKE or AKI

Missing values: NGAL (MAKE: n=1/9, ‘no MAKE’: N=2/91; ‘AKI’: n=2/9, ‘no AKI’: n=0/91), hepcidin-25 (MAKE: n=0/9, ‘no MAKE’: N=1/91; ‘AKI’: n=0/9, ‘no AKI’: n=1/91), NGAL-hepcidin-25 (MAKE: n=1/9, ‘no MAKE’: N=2/91; ‘AKI’: n=2/9, ‘no AKI’: n=1/91) Abbreviations: AUC-ROC, area under the receiver-operating characteristic; ICU, intensive care unit; IL, interleukin; NGAL, neutrophil gelatinase-associated lipocalin; CRP, C-reactive protein; CK, creatine kinase; CKMB, creatine kinase myocardial band; BNP, B-type natriuretic peptide.

*Indicates biomarker with inverse relationship to outcome.