Acute decrease in kidney function after acute coronary syndromes predicts future bleeding and death

A. Canbek[1], S.O. Obeid[1], F.M. Mach[2], M.R. Roffi[2], S.W. Windecker[3], C.M.M. Matter[1], C.T. Templin[1], B.S. Staehli[1], T.F.L. Luescher[4]

[1]University Hospital Zurich, Zurich, Switzerland; [2]University Hospital of Geneva, Geneva, Switzerland; [3]Bern University Hospital, Inselspital, Bern, Switzerland; [4]Royal Brompton and Harefield Hospital, London, United Kingdom

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Background: Coronary artery disease and kidney failure are conditions of substantial clinical impact. Current data shows evidence for adverse cardiovascular outcomes after percutaneous coronary intervention (PCI) with occurrence of acute renal failure.

Purpose: In the present study, we aimed to evaluate the impact of acute kidney failure on cardiovascular outcomes in patients presenting with acute coronary syndromes (ACS).

Methods: We analysed data of 787 patients who presented with ACS and underwent coronary angiography at the University Hospital Zurich between 01.01.2009 and 15.10.2012. Blood samples were obtained each prior to PCI (T1) and after 12–24h (T2). A first follow-up was performed at 30 days via phone interview. After 1 year, patients presented for a clinical visit.

Renal function was assessed by measurement of creatinine levels at T1 and T2. Subsequently, renal function was classified into 6 groups by glomerular filtration rate (GFR) estimations according to the Kidney Disease: Improving Global Outcomes (KDIGO) classification of chronic kidney injury. As an incremental value, we analysed the absolute change in creatinine levels by referring to a cut-off of $\geq$0.3 mg/dl.

Primary endpoints were defined as the occurrence of major adverse cardiac and cerebrovascular events (MACCE), bleeding events, as well as the combination of both (defined as Net Adverse Clinical Events (NACE)) at 30 days and 1 year. Bleeding events were assessed according to the Bleeding Academic Research Consortium (BARC), Global Utilization of Streptokinase and tPA for Occludes Coronary Arteries (GUSTO) an Thrombolysis In Myocardial Infarction (TIMI) classifications.

Results: 179 patients (24.7%) showed an acute decline in kidney function between T1 and T2 if assessed by decrease in GFR class. If acute kidney failure was defined as a change in creatinine levels $\geq$0.3 mg/dl, the number of patients with kidney failure was even larger (n=325, 44.9%).

MACCE occurred in 31 of all patients (4.3%) after 30 days and in 65 patients (9%) after 1 year. If MACCE was compared between patients with stable and decreasing GFR class, a significant difference to the disadvantage of those with declining kidney function was shown: after 30 days, MACCE occurred in 3.1% vs. 7.8% ($p<0.05$) and after 1 year in 7.5% vs. 13.4% ($p<0.05$), respectively. Similarly, bleeding events occurred significantly more often in patients with kidney failure both at 30 days and 1 year. At 1 year, NACE events happened significantly more frequently in patients with renal impairment (27.4%) compared to those with stable kidney function (13.6%, $p<0.05$).

Conclusion: In patients presenting with ACS, a decline in kidney function within 24 hours is associated with significantly higher rates of cardiovascular and bleeding events at 30 days and 1 year.