



# Karolinska Institutet

## Institutionen för Medicin Solna

# ACUTE KIDNEY INJURY AFTER CORONARY ARTERY BYPASS GRAFTING AND OUTCOMES

## AKADEMISK AVHANDLING

som för avläggande av medicine doktorsexamen vid  
Karolinska Institutet offentligen försvaras i Nanna Svartz  
Auditorium, Karolinska Universitetessjukhuset Solna

**Fredagen den 6 mars 2015 kl 09.00**

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**Stockholm 2015**

## ABSTRACT

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Acute kidney injury (AKI) is a rapid reduction in glomerular filtration rate (GFR) that leads to a rise in serum creatinine (SCr). Acute kidney injury is common and patients with sepsis and patients who undergo cardiac surgery are at highest risk. Acute kidney injury is a potentially life-threatening complication that affects 9–40% of patients who undergo coronary artery bypass grafting (CABG). The associations between AKI and postoperative complications, long-term myocardial infarction (MI) risk, stroke and end-stage renal disease (ESRD) are not well described. The overall aims of this thesis are to study the associations between AKI after CABG and postoperative complications, short- and long-term mortality, long-term MI risk, stroke and ESRD.

Study I investigated the association between AKI after an initial isolated CABG and postoperative complications and death within 60 days of surgery. Of 7594 patients, 1047 (14%) patients developed AKI as defined by the Acute Kidney Injury Network (AKIN) classification. Patients with AKI had increased risk for death and postoperative complications. Multivariable adjusted odds ratios (OR) with 95% confidence intervals (CI) in patients in AKIN stage 1 compared with patients without AKI were 4.36 (95% CI: 2.83–6.71) for short-term mortality; 2.34 (1.43–3.82) for stroke; and 2.88 (1.84–4.50) for mediastinitis compared with patients without AKI.

Studies II-IV investigated associations between AKI and long-term risks for mortality, MI, stroke or ESRD in a nation-wide cohort of almost 30 000 patients who underwent first elective CABG, 13% of whom developed AKI postoperatively. Associations were seen between MI, mortality and AKI, with hazard ratios (HR) for MI and death increasing with AKI severity. Adjusted HR for patients with AKI stage 1 were 2.92 (95% CI: 1.87–4.55) for ESRD; 1.35 (95% CI: 1.15–1.57) for MI; and 1.30 (95% CI: 1.17–1.44) for all-cause mortality compared with patients without AKI. Although we found no association between AKI and long-term risk of stroke, a subgroup analysis showed an increased long-term risk for postoperative stroke among patients younger than 65 years.

In conclusion, AKI after CABG was associated with increased risks for postoperative death, stroke, and mediastinitis. AKI was also strongly associated with long-term mortality, MI and ESRD after CABG, but not with long-term risk of stroke.

**Key words:** *Acute Kidney Injury, Coronary Artery Bypass Grafting, Stroke, End-stage Renal Disease, Mortality, Postoperative Complications.*