Commentary: Should I Stay or Should I Go Now?

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Declaration of interest

None.

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Central Message: Renal dysfunction may be compounded for patients undergoing urgent coronary artery bypass grafting within 0-1 days after invasive coronary angiography, even in the absence of severe pre-existing kidney disease. Efforts (hydration, maintaining adequate cardiac output, delaying surgery when safe to do so) to mitigate against this risk are appropriate for patients who undergo urgent coronary surgery, especially for patients with pre-existing CKD.

Central Picture Legend:
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Figure 1 legend: Flow chart for management of coronary angiogram and admission for inpatient CABG.
The present paper by Peine et al (1) from East Carolina University is the first focused examination of the risk of AKI in patients undergoing urgent CABG at various time intervals after coronary angiography (CA), stratified by preoperative CKD stage. Acute kidney injury after urgent coronary artery bypass surgery is a common complication that occurred in 12% of the 2,249 patients included in this single-center, observational study (1).

The primary findings were a higher rate of AKI if urgent CABG followed within day 0-1 after CA, and a declining risk from day 0-1 to day 3 with no continued decline in AKI rates after day 3 for the overall cohort or for any of the CKD subgroups. Importantly, patients with preoperative CKD stage 3b/4/5 had a rate of new postoperative dialysis of 9.4%, compared to 0.8% for the overall cohort. Patients who developed postoperative AKI had increased risk of operative mortality (adjusted RR 7.5, 95% CI 3.7-15.0).

There are many possible confounders of this observational study, since both post-CA renal management and time between CA and CABG were determined by individual cardiologists and surgeons. Traditionally, measures proposed to reduce risk of AKI after CABG performed in close proximity to CA include supplemental hydration with balanced crystalloid solution, maintenance of normal or somewhat elevated blood pressure and cardiac output, low-dose inodilator infusion (dopamine at 2.3mcg/min) to further promote renal perfusion, scrupulous avoidance of other nephrotoxic agents and use of off-pump revascularization techniques (2-4). Repeated doses of iodinated contrast agents (as for CCTA and CA) are especially to be avoided. The present study, in accordance with previous investigations (5-8), amplifies our understanding of the value of simply waiting for 2-3 days after CA before CABG.

Of course, present day medical, social, political and financial factors usually conspire to encourage the performance of urgent CABG as soon after CA as practical. The data presented in this paper
suggest that this routine approach is relatively safe in patients with normal preoperative renal function (1). However, as most clinicians are intuitively aware, patients with pre-existing renal disease are more likely to suffer significant AKI after CABG (9), a complication strongly associated with post-operative mortality (10). Peine et al (1) have demonstrated that this risk is significantly mitigated by simply waiting until day 3 after AC before performing CABG.

The rationale of this strategy aims to mitigate the “second strike” of cardiac surgery on an already vulnerable renal parenchyma recently exposed to contrast agents (11).

Thus, we feel that CABG should not be performed on the same day as CA unless there is a strong indication for emergency revascularization (5,7). It has been our longstanding practice to carefully monitor renal function the day after CA, especially for patients with baseline renal impairment, as this group experiences contrast-induced nephropathy in up to 25% of cases (12).

If indices of renal function including serum creatinine, estimated glomerular filtration rate and more recently advanced urinary biomarkers (13) indicate early AKI, CABG is postponed until creatinine levels have returned to baseline (Figure 1). While this can impose a few additional preoperative days in-hospital, anecdotally it seems to mitigate against the risk of serious postoperative renal dysfunction and dialysis. This study by Peine et al (1) provides an evidence base for this common practice and encourages increased attention to acute renal injury which can result from the performance of urgent CABG very early after coronary angiography.
References:


Coronary Angiogram and Admission for inpatient CABG

- Patient presentation (ACS vs non-ACS)
- HD stability (IV heparin, NGT, IABP)
- DAPT given?
- Baseline CKD?

1. Pt HD stable
   1. Pt HD stable
   2. DAPT given or not
   3. CKD

2. No DAPT given
   1. Pt HD stable
   2. DAPT given or not
   3. CKD

3. Normal renal function

Check iCr and eGFR post CA
Consider monitoring advanced urinary biomarker assay

- iCr & eGFR unchanged or increased < 20-30% of baseline
- iGFR increased > 20% from baseline

- CABG anytime
- Postpone CABG 48-72hs

Pt HD unstable
- ongoing ischemia despite IV heparin and GTN
- need for mechanical support (IABP, Impella, ECMO)

Consider urgent surgery despite recent CA, CKD, DAPT
Implement strategies to mitigate the risk of post-op AKI:
- MAP ≥ 85mmHg or patient age on or off-pump
- hydration with balanced crystalloid solution
- avoid nephrotoxic agents
- consider OPCAB
- short CPB and cross-clamp time if on-pump CABG
- meticulous hemostasis
- Avoid aggressive diuresis