There has been considerable advancement in catheters, wires, balloons, stents, and adjunctive strategies for procedures performed in the cardiac catheterization laboratory. Despite these improvements, angiographic procedures remain dependent on the use of water-soluble iodinated contrast that has inherent nephrotoxicity (1). In addition, coronary angiography with percutaneous coronary intervention (PCI) poses additional risks of renal atheroembolism, which may occur on a subclinical basis and contribute to acute kidney injury (AKI). In the settings of acute myocardial infarction and heart failure, there are hemodynamic, neurohormonal, and cytokine mechanisms of action, which are determinants for acute tubular injury in the absence of exposure to the catheterization procedure. With this backdrop, Inohara et al. (2) in this issue of the Journal analyzed 11,041 consecutive patients enrolled in a Japanese PCI registry with the goal of validating the U.S. National Cardiovascular Data Registry’s (NCDR) CathPCI registry prediction models for AKI and the need for renal replacement therapy (dialysis). The CathPCI registry prediction model included 11 variables for AKI and 6 for AKI requiring dialysis (AKI-D) (3). Both models were strongly influenced by 4 variables, in importance: 1) baseline renal function; 2) cardiogenic shock; 3) ST-segment elevation myocardial infarction (STEMI); and 4) heart failure. For patients without cardiogenic shock, STEMI, or heart failure, the most important predictor was baseline renal function (estimated glomerular filtration rate or chronic kidney disease [CKD] stage) followed by diabetes as shown in the first original models developed for AKI and AKI-D (4).

The Japanese population was significantly older, more male dominated, and had greater rates of STEMI presentation; however, it was similar to the U.S. population in rates of severe CKD, heart failure, and diabetes mellitus. As shown in the figures from Inohara et al. (2), the observed rate in the Japanese cohort and the expected rate calculated from the CathPCI registry prediction models fell along a line of agreement that was internally consistent for AKI and AKI-D stratified by presentation of acute coronary syndrome and non–acute coronary syndrome. The model (slope and intercept) was dominated by the tenth decile of data, which represents the highest-risk group. Additionally, given the more liberal use of dialysis in Japan, the model could benefit from recalibration according to propensity matching. In general, patients from the Tokyo metropolis experienced a slightly lower rate of AKI and AKI-D events compared to expected, which suggests that other factors not represented in the models, such as patient selection and the use of radial (Japan 25% vs. CathPCI registry <2%) artery access, may have played a role in the Japanese outcomes observed (5–8).

In summary, this paper is an excellent example of how the NCDR CathPCI registry can be used to generate meaningful tools for prediction of complications that are set up for external validation from populations outside of the United States. This sets the stage for future research into the clinical scenarios, procedure techniques, and mechanisms that contribute to major adverse cardiac and renal outcomes. Given the ever increasing proportion of
patients with more advanced CKD undergoing PCI, there is an urgent need for safer approaches for these high-risk patients, particularly those presenting with STEMI and left ventricular dysfunction.

**REFERENCES**


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