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EDITORIAL

Invasive Management for Non–ST-Segment–Elevation Myocardial Infarction and Chronic Kidney Disease: Does One Size Fit All?

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During the past 2 decades, there has been considerable advancement in the pharmacological and invasive management of patients with non–ST-segment–elevation myocardial infarction (NSTEMI). A number of pivotal randomized controlled trials have demonstrated the merits of an early invasive strategy in reducing the risk of mortality or reinfarction.[1,2] Chronic kidney disease (CKD) is prevalent among patients with NSTEMI.[3] In fact, patients with CKD present with NSTEMI rather than ST-segment–elevation myocardial infarction.[4,5] Such predilection for presentations with NSTEMI has been attributed to commonly existing supply–demand mismatch conditions, ischemic preconditioning, and collateralized circulation among patients with CKD.[3] Not only is CKD considered a risk enhancer for coronary artery disease, impaired estimated glomerular filtration rate correlates with worse outcomes.[6,7] Studies have consistently demonstrated that patients with CKD who experience acute myocardial infarction (MI) have worse short- and long-term survival compared with patients without CKD.[3,8] In particular, patients with CKD are at higher risk for certain complications after an acute MI, including acute kidney injury (AKI), bleeding, stroke, and vascular complications.[3,9]

See Article by Majmundar et al.

Multiple studies have demonstrated that patients with CKD presenting with NSTEMI are less likely to receive an invasive approach compared with those without CKD.[10] This is partly because patients with CKD have been underrepresented or excluded in pivotal trials comparing early invasive versus selective invasive strategies for NSTEMI. There are also concerns regarding the risk of worsening renal function (ie, contrast-induced nephropathy [CIN]) as well as bleeding complications.[7] An earlier meta-analysis of 5 randomized controlled trials conducted between 1989 and 2003 showed that among patients with NSTEMI and CKD, an early invasive strategy was associated with a reduction in the risk of rehospitalization and a nonsignificant reduction in the risk of mortality or MI, compared with a selective invasive strategy.[11] Data from the SWEDEHEART (Swedish Web-System for Enhancement and Development of Evidence-Based Care in Heart Disease Evaluated According to Recommended Therapies) study including 23 362 patients demonstrated a survival benefit at 1 year after an invasive approach among patients with NSTEMI and

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mild–moderate renal insufficiency; however, such benefit declined with lower renal function and there was no survival benefit among patients with stage 5 CKD or those undergoing dialysis.[12] Indeed, the lack of strong evidence supporting an early invasive strategy among patients with NSTEMI and CKD has been acknowledged by the latest American College of Cardiology/American Heart Association guidelines.[2]

The technical and pharmacological advancements in the current percutaneous coronary intervention era have allowed further practices to mitigate procedural risks among patients with CKD, namely the risks of AKI and bleeding. The introduction of newer-generation drug-eluting stents allowed shorter duration of dual antiplatelet therapies among patients at higher risk of bleeding.[2] The use of radial access significantly reduces the risk of bleeding and AKI compared with femoral access, which could be related to lower atheroembolism into the renal arteries with radial access.[13] Also, reliance on intracoronary imaging could significantly reduce the volume of contrast used during percutaneous coronary intervention procedures.[14] Moreover, accumulating data have crystallized the principal role of adequate hydration and minimizing the volume of contrast media as the main measure to reduce the risk of contrast-induced nephropathy.[2]

In this context, the study by Majmundar et al[15] in this issue of the *Journal of the American Heart Association* (*JAHA*) should be viewed. The authors conducted an observational analysis of the National Readmission Database (NRD) from years 2016 to 2018 comparing an invasive strategy versus none among patients with NSTEMI and stages 3 to 5 CKD or end-stage renal disease.[15] Their analysis included 141 052 admissions, of which 60.9% admissions underwent an invasive strategy (coronary angiography with or without percutaneous coronary intervention or coronary artery bypass grafting). Patients who did not receive invasive management were older and more likely women. After propensity score matching, an invasive strategy was associated with lower in-hospital mortality among all grades of CKD, despite higher rates of in-hospital complications among those receiving invasive management, including major bleeding and AKI requiring dialysis. Invasive management was associated with lower mortality during readmission, MI, need for revascularization, and major adverse cardiovascular events (composite of all-cause mortality, MI readmission, stroke readmission, or heart failure readmission). The findings were consistent in a sensitivity analysis using inverse probability of treatment weighting.[15]

The study by Majmundar et al represents an important contribution supporting the role of an invasive strategy among patients with NSTEMI and CKD. The national representation and large sample size are major strengths for this study. The authors conducted robust and extensive adjustment analyses to reduce allocation and selection bias in their observational analysis. Nevertheless, some limitations of the study deserve closer consideration. First, the diagnosis of NSTEMI and the CKD stages were based on administrative codes, which are subject to coding and documentation errors. Second, the NRD does not capture out-of-hospital mortality events, so the reported incidence of 6-month postdischarge mortality could have missed patients who died in an out-of-hospital setting. This precludes reliable conclusions regarding the rates of mortality beyond the index admission. Third, granular patient-level data were not available, including glomerular filtration rate values, ischemic and bleeding risk profiles, and procedural details. Finally, the analysis does not address the question of optimal timing of an invasive strategy (early versus delayed) among patients with NSTEMI and CKD.

Majmundar et al are to be applauded for their analysis, which demonstrated that an invasive strategy for select patients with NSTEMI and CKD is associated with lower in-hospital mortality. Although an invasive strategy was associated with higher incidence of in-hospital AKI requiring dialysis and blood transfusion, the number needed to harm for bleeding and AKI was much higher than the number needed to treat for observed in-hospital mortality. Based on these findings, the authors concluded that the risk/benefit assessment for all patients with NSTEMI and CKD is in favor of invasive management. Such a conclusion could stand for the general study cohort; however, in the absence of data regarding specific risk stratification (for ischemic or bleeding events) and procedural details (eg, volume of contrast, access site, and use of mechanical support), a “one-size-fits-all” approach might not hold true for patients with NSTEMI and CKD. An individualized and careful risk/benefit evaluation for patients with NSTEMI and CKD is probably the key to navigate the best clinical outcomes for both the heart and the kidneys.

ARTICLE INFORMATION

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