Published in final edited form as:

J Am Coll Surg. 2020 October ; 231(4): 497–498. doi:10.1016/j.jamcollsurg.2020.06.015.

Addressing Racial Differences in Baseline Kidney Function Estimates for Trauma Care: A Response to Lee, et al.

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Thank you to Drs. Lee, Kim, and Ryu for their letter to the editor regarding our recent study evaluating the optimal reference creatinine to utilize for acute kidney injury (AKI) diagnosis in severely injured trauma patients. [1]

Lee et al report the results of an analysis of an entirely Asian cohort of patients whereby the Trauma Modification of Diet in Renal Disease (Trauma-MDRD) performed better than the MDRD in correlating with AKI diagnosis and prognosis; this finding is in direct contrast to the results of our study. [1] As pointed out, our cohort only included 2% Asians. While our study requires external validation in other cohorts, Lee et al's analysis highlights the limitations of our current tools for estimating baseline creatinine. Developed in 1999, the MDRD equation was generated from a cohort of 1628 patients, of whom 88% were White and 12% were Black. [2] Although based more on theory than on conclusive data, adjustments for Black race, age, and sex have been justified due to their association with muscle mass and therefore with serum creatinine (i.e., with black race, younger age, and male sex resulting in a higher creatinine level). However, the MDRD is not accurate in all populations. In fact, the modified Trauma-MDRD was developed to address the fact that traumatically injured patients tend to be younger with fewer comorbidities than other critically ill patients. Thus, the Trauma-MDRD uses a higher assumed baseline glomerular filtration rate (GFR) of 121 mL/min/1.73 m² rather than 75 mL/min/1.73 m². [3]

Unfortunately, incorporation of multiple races and ethnicities into the MDRD or other predictive equations is unlikely to improve these tools. First, race and ethnicity are socially and not biologically determined. [4] Not only may self-identified or assigned race fail to represent genetic ancestry, but within-race genetic differences are actually more common than between-race differences. [5] That being said, it is unclear why GFR is higher among Blacks than non-Blacks with similar characteristics (age, sex, serum creatinine). Second, consideration of race can lead to worsened disparities in care, already present due to differences in social determinants of health. Inclusion of Black race in predictive equations

may lead to overestimation of GFR and result in inequitable healthcare such as decreased access to transplantation. On the other hand, exclusion of race could result in overdiagnosis and overtreatment of kidney disease due to underestimation of GFR. [2, 5] Thus, ensuring equitable care is not as easy as including more races or eliminating race entirely from the MDRD or Trauma-MDRD equations.

There are multiple challenges going forward in identifying the optimal strategy for selecting a reference creatinine in a trauma population. The ideal strategy would balance simplicity and parsimony with generalizability to heterogeneous patient populations. Additionally, the strategy would identify the underlying biological factors responsible for influencing kidney function rather than rely on surrogates such as race or even age and sex. Until such strategies are developed however, we are limited by the current available tools and their responsible application in our patients to guide care.

Acknowledgments

Disclosures: GH is supported by a T32 fellowship (grant no. 5T32GM008792) from NIGMS. Authors report no conflicts of interest.

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