

sensitive marker of a depletion state (2). Although inclusion in our cohort required loop diuretic use, there were limited granular data on diuretic dosing during hospitalization in our dataset. Therefore, we were unable to draw any specific mechanistic conclusions regarding the contribution of diuretics to the generation of hypochloremia.

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REFERENCES

1. Grodin JL, Simon J, Hachamovitch R, et al. Prognostic role of serum chloride levels in acute decompensated heart failure. *J Am Coll Cardiol* 2015;66:659-66.
2. Galla JH, Gifford JD, Luke RG, Rome L. Adaptations to chloride-depletion alkalosis. *Am J Physiol* 1991;261:R771-81.

REPLY: Living Up to the PROMISE

Is There an Ultimate Winner?



We thank Drs. Agarwal and Argulian for their interest in our review of coronary computed tomography angiography (CCTA) for chest pain evaluation, particularly in the context of serving as a “gate-keeper” to unnecessary invasive coronary angiography (ICA) (1,2). Based on the results of the recently published PROMISE trial, which evaluated anatomic versus functional imaging in a low- to intermediate-risk cohort with suspected coronary artery disease (CAD), Drs. Agarwal and Argulian assert stress echocardiography as a “winner” in testing strategies for the evaluation of patients with suspected CAD (3). These claims, as argued by the letter writers, are substantiated by the absence of ionizing radiation, efficiency, and generally low cost of stress echocardiography.

Although well intentioned, these assertions oversimplify a complex interplay of an array of important factors to consider, including the indication and intent of testing, the patient population being tested, the diagnostic performance of a test for any CAD and

actionable CAD, the prognostic utility of imaging test findings, and the influence of a diagnostic test finding to encourage therapy in a fashion that improves event-free survival. In our paper, we examined the evidence supporting the use of CCTA as a “gate-keeper” to unnecessary ICA in a patient population that differs greatly from that enrolled in the PROMISE trial, the study that Drs. Agarwal and Argulian cite. Instead, we discussed the “anatomic-physiologic” discordance that has been often observed for conventional stress imaging wherein apparent ischemia is present in the absence of high-grade anatomic CAD at follow-up ICA. These findings do not necessarily reflect a failure of stress imaging modalities to identify important cardiovascular findings but can represent alternative nonepicardial CAD processes that can be elicited by stress imaging tests that influence symptoms, diagnosis, and prognosis—a point fully discussed in our paper.

Germane to this point, we also discussed the recent iterations in CCTA wherein fractional flow reserve (FFR_{CT}) can be noninvasively calculated at any point in the coronary vascular bed from typically acquired CCTA. This technology now allows for determination of lesion-specific ischemia, a test finding eluded by previous-generation imaging technologies. This method for CAD evaluation is in its early stage of clinical development, and we discussed the emerging multicenter trials that will further evaluate its efficacy.

Finally, we highlighted the multitude of additional factors needed for consideration when evaluating a patient with suspected CAD being considered for ICA. Patient characteristics, test profiles, reason for testing, clinical settings, test availability, local expertise, payer coverage, functional capacity, comorbidities, and a host of other important clinic-economic considerations require consideration before declaring any one imaging method an “ultimate winner.” Drs. Agarwal and Argulian state that the available literature favors stress echocardiography as the winner thus far, but this assertion is unsubstantiated by scientific evidence. Indeed, the totality of large-scale prospective multicenter studies to date argues in favor of no single imaging modality but rather has served to educate physicians as to the benefits and limitations of each testing method, has emphasized that a binary dichotomy of “this test versus that test” as an all-or-nothing strategy is inappropriate, and has emphasized a nuanced approach to judicious use of cardiac imaging as the clinical standard, as reflected by the contemporary American College of Cardiology/

American Heart Association Guidelines and Appropriate Use Criteria.

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REFERENCES

1. Agarwal V, Argulian E. Living up to the PROMISE: is there an ultimate winner? *J Am Coll Cardiol* 2015;66:2267-8.
2. Marwick TH, Cho I, B OH, Min JK. Finding the gatekeeper to the cardiac catheterization laboratory: coronary CT angiography or stress testing? *J Am Coll Cardiol* 2015;65:2747-56.
3. Douglas PS, Hoffmann U, Patel MR, et al., PROMISE Investigators. Outcomes of anatomical versus functional testing for coronary artery disease. *N Engl J Med* 2015;372:1291-300.