Kinetic Estimated Glomerular Filtration Rate: A Bedside Tool for Detecting Early Acute Kidney Injury

1:45-2:00 pm

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Abstract	Introduction Serum creatinine (Scr) is a valid measure of renal filtration function in steady-state conditions, but not a reliable marker during acute kidney injury (AKI). Kinetic estimated glomerular filtration rate (KeGFR) is a simplified formula that is helpful in determining renal function in AKI. We report a case of a patient with oliguric AKI and demonstrate the utility of KeGFR to assess renal function and make an earlier diagnosis of AKI. Case Presentation An 83-year-old man with severe aortic stenosis and chronic heart failure with reduced ejection fraction status post intracardiac device placement presented with acute decompensated heart failure and underwent transcatheter aortic valve replacement. During the procedure, he received omnipaque contrast and had hypotension. Postoperative course was complicated by cardiogenic shock requiring 3 pressors. On postoperative day (POD) 2, he developed oliguric AKI with a SCr of 2.4 mg/dL from a baseline SCr of 0.9–1.1 mg/dl. SCr rapidly rose to a peak of 4.7 mg/dl on POD 4. However, by using KeGFR, he had AKI since POD 0 with a dropped GFR from 73 to 53 ml/min and down to a nadir near 0 ml/min between POD 2 to 4 Final Diagnosis Acute Kidney Injury, KDIGO Stage 3, acute tubular necrosis secondary to hypotension and contrast-induced nephropathy Management/Outcome KeGFR is simple, only requires monitoring SCr, and better reflects renal function during acute change in SCr such as in AKI. Our case demonstrates the utility of KeGFR especially to determine onset of AKI prior to rising SCr. This can lead to early nephrology consultation proved to improve patient outcomes. In this case, AKI was managed by maintaining adequate blood pressure, avoiding nephrotoxic agents, and managing secondary complications such as nonosmolar ADH stimulation and hyperkalemia. Renal recovery occurred by POD5, with SCr ultimately down to 1.4 by POD7.
Learning Objectives	1. Understand the limitations of serum creatinine in assessing renal function during acute kidney injury. 2. Recognize the utility of Kinetic estimated glomerular filtration rate (KeGFR) as an alternative tool in accurately evaluating renal function during acute kidney injury.
References and Resources	For an explanation of the principles behind the Kinetic GFR equation as well as a step-by-step walk through of how to apply it in several different clinical scenarios, see: Chen S. Retooling the creatinine clearance equation to estimate kinetic GFR when the plasma creatinine is changing acutely. Journal of the American Society of Nephrology : JASN. 2013;24(6):877-88.
Disclosures	All authors and coauthors have no relevant financial relationships to disclose. The author does not intend to discuss an off-label/investigative use of a commercial product/device.

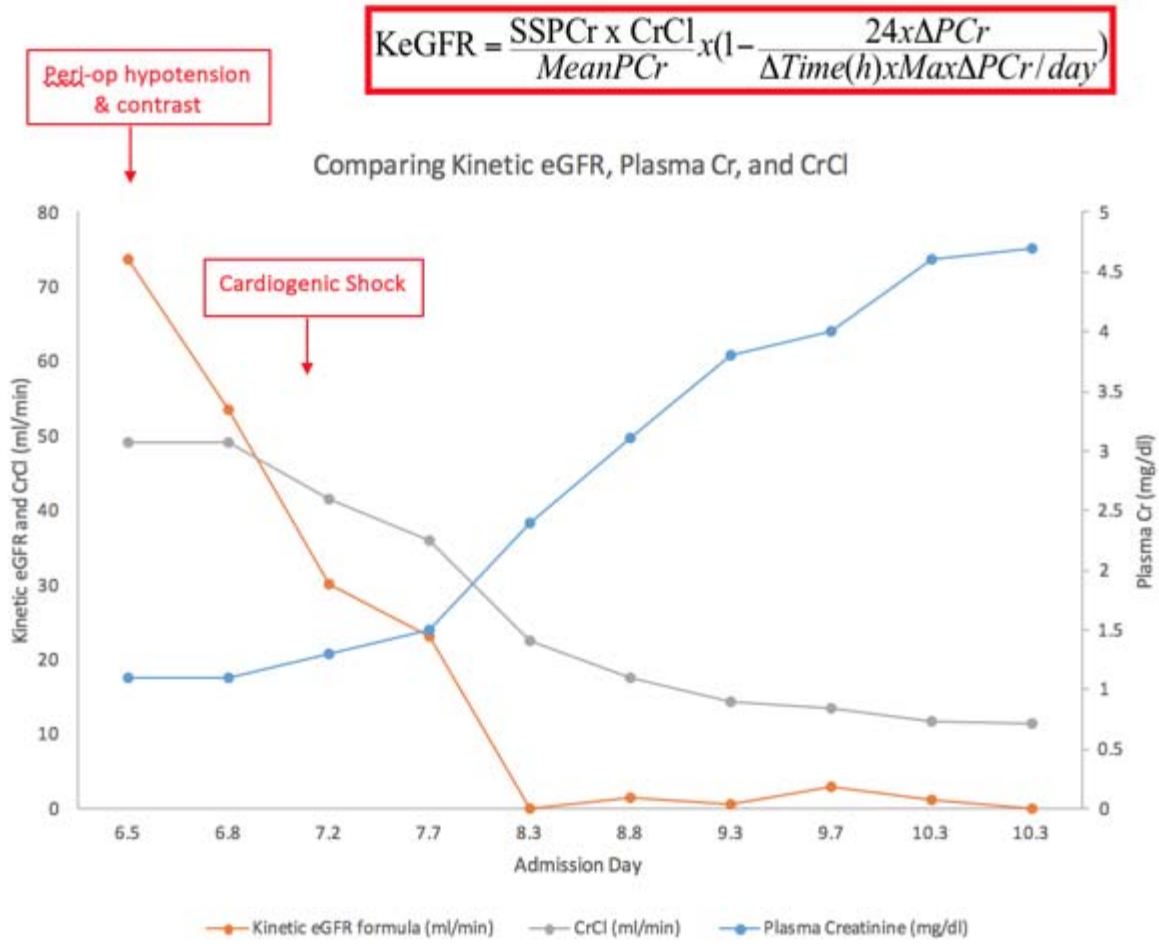

Figure 1: Clinical course of the patient during acute kidney injury by comparing methods of renal function assessment: serum creatinine, estimated glomerular filtration rate, and kinetic estimated glomerular filtration rate

Cr, creatinine; eGFR, estimated glomerular filtration rate; PCr, plasma creatinine; SSPCr, steady state plasma creatinine; CrCl, creatinine clearance using MDRD or Cockcroft-Gault equation