



## PIC QUESTION OF THE WEEK: 9/08/08

**Q:** Why would glomerular filtration rate be used rather than creatinine clearance when determining a patient's renal function?

**A:** Estimating renal function is critical in patient management and must be a consideration when determining the dosage of certain medications. The most accurate method for assessing renal function is the glomerular filtration rate (GFR). It is affected by age, gender and size. The average value in young adults ranges from 120-130 mL/min/1.73 m<sup>2</sup> and decreases with age. A consistently reduced GFR is a specific indicator of chronic kidney disease. Values below 60 mL/min/1.73 m<sup>2</sup> are associated with an increased risk of complications from kidney disease. Although GFR cannot be directly measured, it can be calculated based on the urinary excretion of inulin, iothalamate or iohexol, all of which are cleared by filtration. It is tedious to perform and rarely used in clinical practice. An alternative to the GFR is creatinine clearance (CrCl), a standard value used to estimate renal function. There are several methods for determining CrCl including a 24-hour urine collection or calculating the value using numerous equations. The customary method is based on the Cockcroft-Gault equation. This calculation takes into account a patient's age, gender, weight and serum creatinine level. It is important to note that a patient's renal function must be stable in order to use this equation. Unfortunately, using CrCl to estimate GFR is not an accurate method for assessing renal function. CrCl overestimates GFR because creatinine is not only *filtered* by the glomerulus, but also *secreted* by the proximal renal tubule. A more accurate method for determining the GFR is using the Modification of Diet in Renal Disease (MDRD) study equation. Like the Cockcroft-Gault formula, it accounts for age, gender and race, but, unlike the former equation, it also accounts for body surface area. This is important because renal function is proportional to kidney size, which in turn, is proportional to body surface area. Inclusion of body surface area in the MDRD study equation provides for a more accurate estimation of GFR than measured creatinine clearance from a 24-hour urine collection or estimated CrCl using the Cockcroft-Gault or alternative equations. Despite being more accurate, the MDRD study equation is not commonly used in practice because of its complexity, our longstanding reliance on CrCl, and the lack of dosing guidelines based on the GFR for patients with renal dysfunction.

### References:

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