Detection of Chronic Kidney Disease using estimated Glomerular Filtration Rate (eGFR) 
Information for Pharmacists

Within the next year the Nova Scotia Renal Program, a Nova Scotia Department of Health Provincial Program will make available to physicians a request test for estimated glomerular filtration rate (eGFR). The Modification of Diet in Renal Diseases Study (MDRD) eGFR differs from the Cockcroft-Gault formula for estimated creatinine clearance. In addition to this new test, the Isotope Dilution Mass Spectrometry (IDMS) assay for serum creatinine (SCr) measurement is being implemented which will provide a standard assay province-wide. Pharmacists should be aware of these changes and their implications for practice.

What is the new test?
The eGFR is a test which can report a patient’s estimated glomerular filtration rate using an equation developed from the MDRD study in patients under 70 years old with established Chronic Kidney Disease (CKD).

What is the equation?

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GFR \text{ (mL/min/1.73 m}^2) = 175 \times (\text{Scr/88.4})^{1.154} \times (\text{Age})^{-0.203} \times (0.74 \text{ if female}) \times (1.21 \text{ if African American})
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Why is it being used?
The eGFR more accurately predicts renal function in patients with CKD. This test is calculated directly by the lab and does not require patients’ weight. The readily available eGFR will improve the detection, monitoring and referral of patients with CKD, thereby aiding earlier interventions to help treat and/or prevent complications of CKD.

Will pharmacists have to calculate the eGFR with the MDRD equation?
No. The eGFR will be provided by the lab to the ordering physician. The equation is provided for information only.

Will medication doses be adjusted based on the eGFR?
No. The MDRD equation has not been validated for use in dosage adjustment of renally eliminated medications. Patients with impaired renal function should have dosage adjustments based on estimated creatinine clearance as calculated by the Cockcroft-Gault equation, which is:

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\text{Creatinine Clearance mL/min (Cl}_{\text{CR}}) = \frac{(140-\text{age}) \times \text{IBW (kg)} \times 1.2}{\text{SCR (umol/L)}} \times 0.85 \text{ if female}
\]

Ideal body weight kg (IBW)
Males = 50 kg + 2.3(height in inches – 60)
Females = 45 kg + 2.3(height in inches -60)
Will pharmacies have access to patients’ SCr and other lab data?

No, although work continues on an electronic health record. At this time lab information can only be obtained from the physician or the patient.

What is the IDMS assay?

Currently there is substantial variation across laboratories in the calibration of serum creatinine. The IDMS assay is a method which reduces interlaboratory variation in creatinine assay calibration and therefore enables more accurate estimates of glomerular filtration rate (eGFR) and standardizes these values across the province. It is important to note that with the IDMS method, creatinine values will be about 10% lower than those measured with other assays resulting in higher estimates of renal function (ClCr).

How will this affect my practice?

The availability of the eGFR will improve the detection, monitoring and referral of patients with CKD. As a result more patients will be identified with impaired renal function and these patients may present prescriptions with adjusted dosing regimens. If you have identified a patient with impaired renal function, drug therapy evaluations would include an assessment of efficacy, toxicity and proper dosing in renal impairment.

Until further data becomes available, medication dose adjustments should continue to be based on estimated creatinine clearance as calculated with the Cockcroft-Gault formula. However be aware that with the IDMS assay, renal function may be higher than estimated using previous assay methods. The eGFR, which does not incorporate specific patient weight, should be regarded as a tool for monitoring changes in renal function in CKD patients. Regardless of calculation method, measurements should still be considered estimations and patient-specific variables still need to be taken into account (e.g. extremes of body size, extremes of age, paraplegia/quadriplegia, situations with rapidly changing renal function, etc).

The Nova Scotia Renal Program has disseminated educational information to physicians in the province, in which the Cockcroft-Gault formula has been recommended for medication dosage adjustments. They have also been advised to consult their local pharmacist for guidance with dosage adjustments.

References


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