PATHOLOGISTS LANCET KENYA

Key to diagnostic excellence

eGFR: New prediction equation introduced

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NEW eGFR calculation at Lancet Kenya

We have introduced a new prediction equation called eGFR(CKD-EPI). This replaces the MDRD equation, as it is substantially more accurate than MDRD equation at levels > 60 mL/min. It will be automatically applied on all creatinine results done at Lancet Kenya countrywide.

Prediction Equation

The previously recommended eGFR(MDRD) equation had major limitations of imprecision as well as systematic underestimation (bias) of GFR at levels greater than 60 mL/min. The latter lead to limiting reportable values to > 60 mL/min.

The Lancet Group of Laboratories has introduced a new prediction equation that replaces the MDRD equation called eGFR(CKD-EPI). The latter equation is as accurate as the MDRD equation at GFR levels < 60 mL/min and substantially more accurate than MDRD equation at levels > 60 mL/min.

eGFR (CKD-EPI) is a product of a multicentre Chronic Kidney Disease-Epidemiological Collaboration. It is based on the same MDRD 4 variables i.e. serum creatinine, age, sex and race.

However, van Deventer, HE published in Clinical Chemistry (2008) that, unlike African Americans, South African blacks do not require a correction factor for their estimated eGFR. Therefore, Lancet Group do not apply a correction factor for the reported eGFR.

The correction factor for blacks, as recommended by CKD-EPI collaborators is 1.159, i.e. reported eGFR x 1.159 = corrected eGFR. (see interpretation table)

Limitations of eGFR(CKD-EPI)

1. Extremes of body size may yield inaccurate estimates, e.g. Obesity and pregnancy.
2. It is currently limited to 18 - 85 years of age.
3. Oedematous state.
4. Not fulfilling steady state conditions e.g. recent creatinine changes due to meat ingestion and acute kidney failure. eGFR is
5. Only reliable under steady state conditions, i.e. stable creatinine concentration for > 4 days.

About Creatinine

Creatinine is formed from creatine in muscle and released nto the blood stream at a fairly constant rate within an individual.

The main determinant of the amount of creatinine released into the circulation is muscle mass. The main route of creatinine excretion is glomerular filtration with renal tubular secretion and gastrointestinal losses providing minor excretory routes. The noteable variable of, which may transiently affect the serum creatinine concentration, is cooked meat.

The latter has been shown to increase pre-prandial creatinine levels from 81 umol/L to 101 umol/L 2 hours post-prandially and 99 umol/L 4 hours postprandially. Therefore, serum creatinine concentration is mainly the function of muscle mass and glomerular filtration.

An individual with a stable renal function, without meat intake, would have creatinine variability not exceeding 4% in contrast to massive between individual creatinine variations. This renders population based creatinine reference intervals insensitive in detecting renal impairment. Creatinine becomes the best tool for detecting renal changes if creatinine concentrations are compared within the same individual over time.

Creatinine Clearance

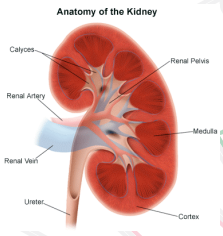
This concept is based on a theoretical volume of plasma which has been cleared completely of creatinine during its passage through the kidneys. This is associated with problems such as inaccurate urine collection and volume measurement, tubular secretion of creatinine and overestimation of creatinine clearance. The overestimation is increased in renal failure.

National Kidney Foundation; Disease Outcomes Quality Initiative stated in Ann Intern Med 2003; 139: 137 147, the following:

1. Estimates of GFR are the best overall indices of kidney function.
2. GFR should be estimated from a prediction equation.
3. Clinical laboratories should report an estimate of GFR using prediction equation, in addition to reporting serum creatinine.
4. Measurement of creatinine clearance using timed urine collections (e.g. 24 hours) does not improve the estimate of GFR.

Interpretaion of eGFR(CKD-EPI):
STAGES OF CHRONIC KIDNEY DISEASE

Stage	Description	eGFR(mL/min/1.73 m2)
Normal	Normal GFR with no evidence of kidney damage.	> 89
1	Normal or Increased GFR with evidence of kidney damage.	> 89
2	Kidney damage with mild decreased GFR	60 - 89
3	Moderately decreased GFR	30 - 59
4	Severely decreased GFR	15 - 29
5	Kidney failure	< 15



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