ESTIMATION OF GLOMERULAR FILTRATION RATE IN CHILDREN

$$eGFR = \frac{36.5 \times height\ (cm)}{SCr\ (umol/L)}$$

eGFR = estimated glomerular filtration rate (mL/min./1.73 m²)

SCr = serum creatinine (enzymatic method)

If a measured glomerular filtration rate (GFR) using exogenous filtration markers is not available, the above equation known as the "Bedside Schwartz" equation may be used to estimate GFR in children greater than 1 year of age with stable renal function.

For a more accurate eGFR calculation refer to the age- and sex- dependent CKiD U25 equation (Kidney Int 2021; 99: 948–956)

There are limitations to creatinine-based GFR estimates. This equation cannot reliably estimate GFR in the following:

- Neonates or infants < 1 year old. Interpret eGFR cautiously in children 1-2 years old, and consider normative renal clearance based on patient age.
- Patients with unstable or rapidly changing renal function
- Patients with severely impaired renal function (eGFR less than 10 mL/min/1.73 m2)
- Patients receiving dialysis (PD, HD, CRRT)
- Patients with reduced muscle mass (eg. Duchenne muscular dystrophy, malnourished children) or extremes of body size
- Use cautiously in children at Tanner stages 4/5 (71% of the patients used to formulate this equation were in Tanner stage 1/2)

Considerations for Drug Dosing in Renal Impairment:

1. Drug dosage-adjustment recommendations are typically based on other creatinine-based eGFR estimates such as Cockcroft-Gault. Extrapolate recommendations with caution.
2. When dosing drugs that require rapid therapeutic effect, (e.g. analgesics or antibiotics), consider administration of a usual first dose and adjusting subsequent dose or interval based on both patient response and renal function.
3. Consult appropriate references and a pharmacist for dosing guidance as needed.
4. Make use of appropriate therapeutic drug monitoring whenever available.

Useful Resources:

1. Drug prescribing in renal failure 5th edition. Aronoff GR et al, contents available online at : https://kdpnet.kdp.louisville.edu/drugbook/pediatric/

2. Individual drug monographs on UptoDate, Lexi-Comp or Micromedex

3. Drug dosing in hemodialysis : http://www.dialyzeihd.com/

References:

1. Schwartz GJ et al. New equations estimate GFR in children with chronic kidney disease. J Am Soc Nephrol 2009; 20(3): 629-637

2. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int Suppl. 2013; 3: 1-150

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