Louth: Antimicrobial Guidelines - Louth Hospitals: Antimicrobial Guidelines: Renal Dosing (Adults)

N.B. Estimates of GFR will not be accurate when the patient has an Acute Kidney Injury i.e. if the creatinine is rising or falling. The full clinical picture should always be taken into account.

Acute Kidney Injury

- For detailed information on antimicrobial dosing in Acute Kidney Injury, please see 'Critical Illness' reference on Medicines Complete, www.medicinescomplete.com . This is available free of charge on all HSE desktops and is also available on your smartphone via www.hselibrary.ie , please contact the HSE Library directly for an account if you do not already have one.
- A loading or initial dose of antimicrobial therapy should be administered as soon as possible in sepsis or septic shock (ideally within the first hour of presentation).
- Even in renal dysfunction, **the full dose of beta-lactams should be used for at least the first dose and potentially the first 24 to 48 hours** unless patient is frail, elderly, or has very low body-weight (Critical Illness). Contact Pharmacy for advice if needed.
- **Any dose reduction of beta-lactams in response to AKI needs to be undertaken with caution** ; much AKI seen in critical care is related to sepsis. The apparent Vd of beta-lactams can increase in sepsis and septic shock. The therapeutic consequences of underdosing antimicrobials in these patients may be severe and there is generally considered to be a wide margin of error before toxicity. Underdosing may lead to treatment failure and resistance. Due to these factors, it is common practice within critical care areas to administer standard doses for the first 24 to 48 hours.
- **For potential nephrotoxins** , e.g. gentamicin , vancomycin , check LH Guidelines as well as Critical Illness Reference. Also use clinical judgement with regard to dose. Contact Pharmacy for advice if needed.
- In patients presenting with an AKI, it is the acute changes in kidney function that must be considered and used to guide dose adjustments, rather than categories of function.
- **During AKI, serum creatinine levels lag behind the development of the injury and progress of recovery. As creatinine rises, estimates of GFR will overestimate renal function and as creatinine falls and kidney function improves, estimates of GFR will underestimate renal function (BNF).**

References:

- Critical Illness, www.medicinescomplete.com, accessed 4/3/24
- British National Formulary, www.medicinescomplete.com, accessed 4/3/24.

Chronic Kidney Disease

Calculate Creatinine Clearance

These tables apply to adult patients with **chronic kidney disease** only. They do not apply to patients on dialysis or those with acute kidney injury.

Antimicrobial
Aciclovir **IV**
Adult Renal Dose Adjustment
GFR 25 – 50 ml/min : 5 – 10mg/kg every 12 hours
GFR 10 – 25 ml/min : 5 – 10mg/kg every 24 hours
GFR < 10 ml/min : 2.5 – 5mg/kg every 24 hours
References
Health Products Regulatory Authority. Summary of Product Characteristics for each product available from www.hpra.ie , accessed Jan 2023. CRC Press. The Renal Drug Database. Available from www.renaldrugdatabase.com , accessed Jan 2023. John Hopkins ABX Guide, www.hopkinsguides.com , accessed Jan 2023. BMJ Group and Pharmaceutical Press. British National Formulary. Available from www.medicinescomplete.com , accessed Jan 2023.

Antimicrobial
Aciclovir **ORAL**
Adult Renal Dose Adjustment
GFR■ 25 – 50 ml/min : Simplex: Usual dose; Zoster: Usual dose
GFR 10 – 25 ml/min : Simplex: 200mg 4 times a day; Zoster: 800mg every 8 hours
GFR < 10 ml/min : Simplex: 200mg every 12 hours; Zoster: 800mg every 12 hours
References
Health Products Regulatory Authority. Summary of Product Characteristics for each product available from www.hpra.ie , accessed Jan 2023. CRC Press. The Renal Drug Database. Available from www.renaldrugdatabase.com , accessed Jan 2023.

Assessing Renal Function

Published information on the effects of renal impairment on drug elimination is usually stated in terms of creatinine clearance (CrCl), calculated using the Cockcroft and Gault Equation.

In some cases, renal function may be reported on the basis of estimated glomerular filtration rate (eGFR) using the Modification of Diet in Renal Disease (MDRD) formula.

The two equations are NOT interchangeable, however there is relatively good correlation between them for adult patients of average build and height, and either could be used for the majority of drugs.

- Creatinine clearance using the Cockcroft and Gault Equation should be calculated for drugs with a **narrow therapeutic index** , such as gentamicin and vancomycin, and for dose reduction of all drugs in patients **at extremes of body weight** (BMI < 18kg/m^2 or $\geq$ 40kg/m^2).
- **N.B. Estimates of GFR will not be accurate when the patient has an acute kidney injury (AKI), i.e. if the creatinine is rising or falling. The full clinical picture should always be taken into account.**
- During AKI, serum creatinine levels lag behind the development of the injury and progress of recovery. As creatinine rises, estimates of GFR will overestimate renal function and as creatinine falls and kidney function improves, estimates of GFR will underestimate renal function.

Cockcroft and Gault Equation:

K = 1.23 for males and 1.04 for females

Which weight to use for CrCl calculation?

If Body Mass Index (BMI) < 30kg/m^2 , use actual weight to calculate CrCl

If BMI $\geq$ 30kg/m^2 , use Obese Dosing Weight (ODW) to calculate CrCl

BMI = Weight(kg)/Height(m)^2

Ideal Body Weight (IBW) (kg) = R + 2.3kg for every inch over 5ft

R = 50 for males and 45.5 for females

ODW (kg) = IBW + 0.4(Actual weight – IBW)

References

Health Products Regulatory Authority. Summary of Product Characteristics for each product available from www.hpra.ie , accessed 01/05/18.

Ashley C and Dunleavy A [Editors]. The Renal Drug Database. UK: Radcliffe Publishing Limited; 2014. Available from www.renaldrugdatabase.com , accessed 9/1/2023.

John Hopkins ABX Guide, www.hopkinsguides.com , accessed 25/01/23.

BMJ Group and Pharmaceutical Press. British National Formulary. Available from www.medicinescomplete.com , accessed 30/04/18.

Beaumont Hospital Antimicrobial Guidelines, 2023. On file in OLOL Pharmacy.

McKenna C. Medicines Information Enquiry on which weight to use for creatinine clearance, 2014. On file in OLOL Pharmacy.