

## Guidelines for the use of the Cockcroft & Gault Formula to calculate Creatinine Clearance in Adult Chemotherapy Patients

The Cockcroft and Gault (C & G) formula is used to assess a patient's renal function, in the absence of an EDTA, as per guidelines in individual chemotherapy protocols.

Please note that eGFR should **not** be used to adjust doses for any medicines, including chemotherapy.

### What weight do we use in the Cockcroft & Gault formula?

Due to limitations in the e-prescribing system, Aria always calculates C&G as follows:

- uses Adjusted Body Weight (ABW) if the patient's Total Body Weight (TBW) is  $\geq$  their Lean Body Weight (LBW), as calculated below
- uses the patient's total body weight (TBW), if this is below their calculated Lean Body Weight (LBW), (i.e. if TBW – LBW is a negative number)

Therefore, for consistency within the Alliance, the above criteria should also be followed whenever C&G is calculated manually for chemotherapy patients, including when using C&G for calculating carboplatin doses.

### How do I calculate Adjusted Body Weight?

Adjusted body weight (ABW) =  $LBW + 0.4 (TBW - LBW)$

LBW (kg) for a MALE =  $50 + (0.906 \times (\text{height in cm} - 152.4))$

LBW (kg) for a FEMALE =  $45 + (0.906 \times (\text{height in cm} - 152.4))$

### How do I calculate Cockcroft & Gault?

#### C & G Formula for MALE:

Creatinine Clearance (ml/min) =  $\frac{1.23 \times (140 - \text{age in years}) \times TBW \text{ or } ABW \text{ (see above)}}{\text{Serum Creatinine } (\mu\text{mol/L})}$

#### C & G Formula for FEMALE:

Creatinine Clearance (ml/min) =  $\frac{1.04 \times (140 - \text{age in years}) \times TBW \text{ or } ABW \text{ (see above)}}{\text{Serum Creatinine } (\mu\text{mol/L})}$

### Using C&G for Carboplatin Dosing:

#### 1. Capping

There is no UK national guidance, but as of October 2010, the U.S. FDA recommends that, when renal function is estimated based on serum creatinine, a cap of 125 ml/min should be used for carboplatin calculations. Be very careful if you choose a higher cap.

N.B. Capping the CrCl is not necessary when the patient's renal function is measured using EDTA or 24 hour urine collection.

Reason for Update: review of when to use Adjusted Body Weight, in light of Aria limitations; addition of statement regarding C&G and carboplatin	Approved by Alliance Chemotherapy Group Chair: Dr J De Vos
Version: 5	Date: 30.12.15
Prepared by: S Taylor	Checked by: C Tucker

## 2. C&G beyond Cycle 1

For the majority of patients, an EDTA result is available for calculating the carboplatin dose from Cycle 2 onwards. However, for those patients receiving carboplatin and who have not had an EDTA or 24 hour urine, the carboplatin dose for further cycles beyond cycle 1 should only be amended if there is a 30% change in serum creatinine from baseline.

*N.B. Please be aware that Aria will try to change the carboplatin dose at every cycle in response to any change in calculated creatinine clearance, however minor. This dose change needs to be manually overridden unless the serum creatinine has changed > 30% from baseline.*

The C & G formula needs to be interpreted with caution in patients who are:

- **Obese**
  - Using Adjusted Body Weight (ABW) is a “best” attempt to correct for this.
- **Oedematous or have ascites**
  - Substitute “dry” weight (i.e. total body weight minus weight due to accumulated fluid) for total body weight when calculating Adjusted Body Weight and/or C&G
- **In Acute Renal Failure**
  - If 2 serum creatinine levels **in 24 hours** vary by more than 20µmol/L, the serum creatinine will no longer reflect the true clearance rate and the measure of renal function will be inaccurate.

References: Churchill's Clinical Pharmacy Survival Guide. Barber & Wilson, Churchill Livingstone 1999  
Basic Clinical Pharmacokinetics Michael Winter 3<sup>rd</sup> Edition, Applied Therapeutics Inc. Vancouver, 1994.  
Devine, BJ. Drug Intell Clin Pharm 1974 (7): 650 – 655  
Devaney, A et al; Pharm J 2006; 277: 403 – 404

Reason for Update: review of when to use Adjusted Body Weight, in light of Aria limitations; addition of statement regarding C&G and carboplatin	Approved by Alliance Chemotherapy Group Chair: Dr J De Vos
Version: 5	Date: 30.12.15
Prepared by: S Taylor	Checked by: C Tucker