NHS
North East London

Calculating renal function (creatinine clearance) when monitoring Direct Oral Anticoagulants (DOACs) for safe and effective dosing of patients

1. Use the Cockcroft-Gault equation to estimate creatinine clearance (CrCl) to help to reduce the risk of over and under-coagulation.
2. Clinical trials for the DOACs used actual body weight to calculate doses - Use actual bodyweight to calculate CrCl.
3. Use blood results from within the last month and bodyweight from within the last year (unless obvious significant weight loss/gain).
4. Do not use estimated glomerular filtration rate (eGFR) which may overestimate renal clearance, especially in elderly patients with low body weight/ body mass index.
5. Clinical systems do have built in CrCl calculators. For EMIS practices, the inbuilt CrCl calculator will correctly calculate CrCl using **actual bodyweight** for patients already on DOACs, however for patients who are not currently prescribed a DOAC, EMIS will use ideal bodyweight in patients with a BMI ≥ 27kg/m^2. This may lead to incorrect DOAC dosing. To avoid confusion, we recommend all practices use the MD+CALC online calculator.

An on-line calculator is available to calculate creatinine clearance.

Use MDCalc: https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation **(MDCalc can be downloaded as an app)**

- Use actual bodyweight when calculating CrCl for DOACs. This is done by omitting the height so that the BMI is not calculated.

6. Seek specialist advice via Advice & Guidance for the local anticoagulation service for:
    a. extremes of bodyweight **<50kg** or **>120kg** as drug level monitoring may be required *NB. When calculating CrCl for these patients in primary care: use adjusted BW for >120kg and actual BW for <50kg unless advised otherwise by anticoagulant clinic. To obtain adjusted CrCl based on adjusted bodyweight, include height into the MDCalc calculator.*
    b. patients on dialysis and patients with a CrCl <15ml/min (for apixaban, edoxaban and rivaroxaban) or CrCl <30 (for dabigatran) as DOACs are contraindicated
    c. heart failure patients with fluid overload
    d. patients with extensive amputations, or neurological diseases (e.g. spina bifida, multiple sclerosis) and myopathy that may result in profound muscle loss
7. Monitor renal function in line with the following recommendations:
    a. *** more frequent monitoring if clinically indicated/advised by specialist or concomitant nephrotoxic medications are prescribed***

Creatinine Clearance (CrCl) range (ml/min) and other factors to consider	How often to check renal function?
<15	**All DOACs are contraindicated,** refer to specialist (to consider warfarin)
15 – 30	3 monthly, consider referral to specialist (dabigatran contraindicated) ▲
30 – 60	6 monthly
All patients who are aged >75 years and/or frail±	4-6 months
>60	12 monthly

± EHRA/ESC guidance 2021 recommends 4 to 6 monthly renal, liver function (LFT) and haemoglobin (Hb) monitoring for elderly and frail patients ▲Note previous trends if chronic kidney disease (CKD): More frequent monitoring may be needed in people with previous variable or erratic renal function, and less frequent monitoring may be needed for those with stable results: https://cks.nice.org.uk/chronic-kidney-disease For acute kidney injury (AKI) see: https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2016/03/Guidelines-for-Medicines-optimisation-in-patients-with-AKI-final.pdf

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