North Central London
Joint Formulary Committee

# DOAC Prescribing Support for NCL
# AF and VTE

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## Document control

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## Document management

| | |
|---|---|
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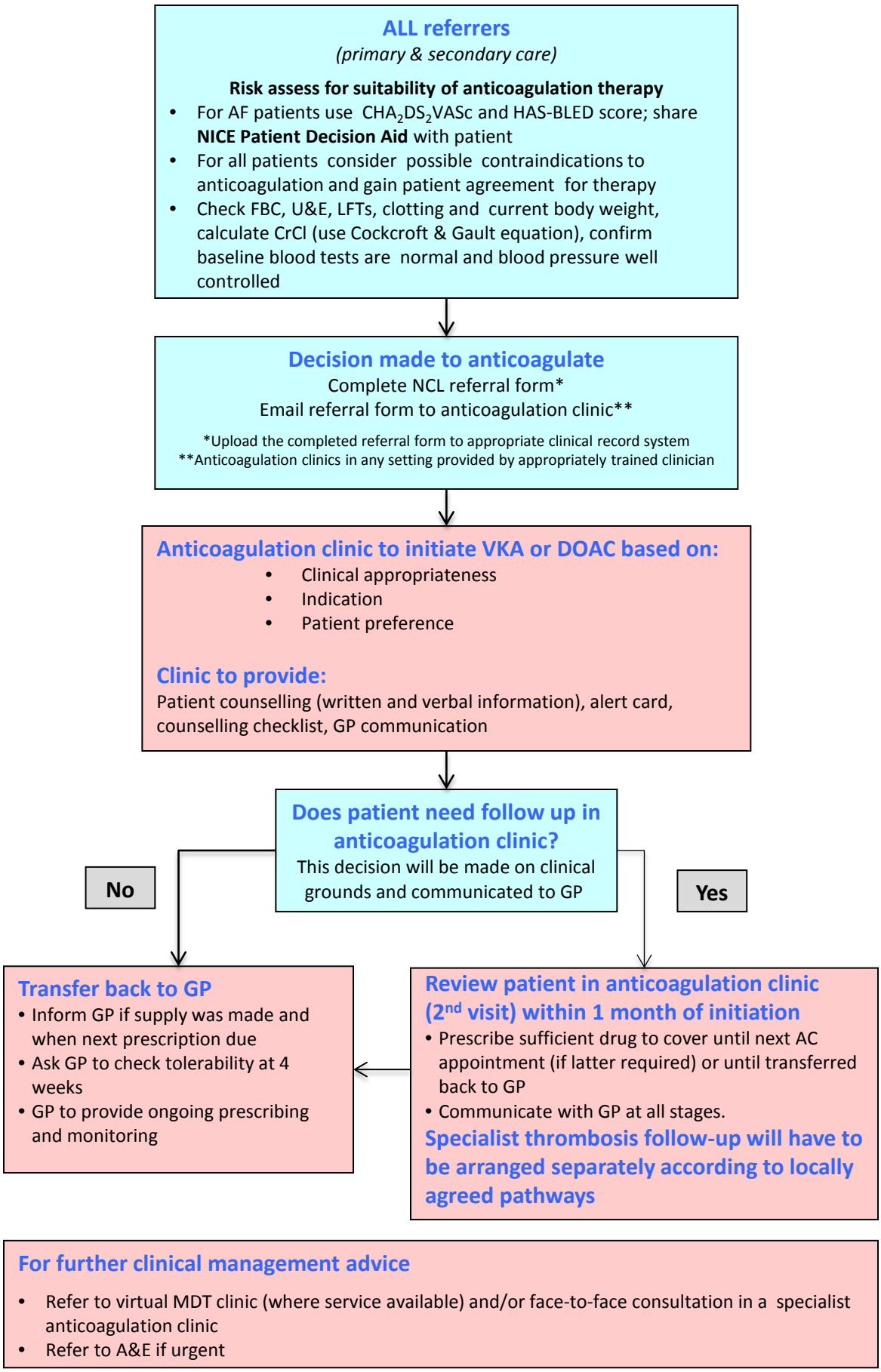
# Summary treatment pathway: Anticoagulation for non-valvular AF and VTE (adults)



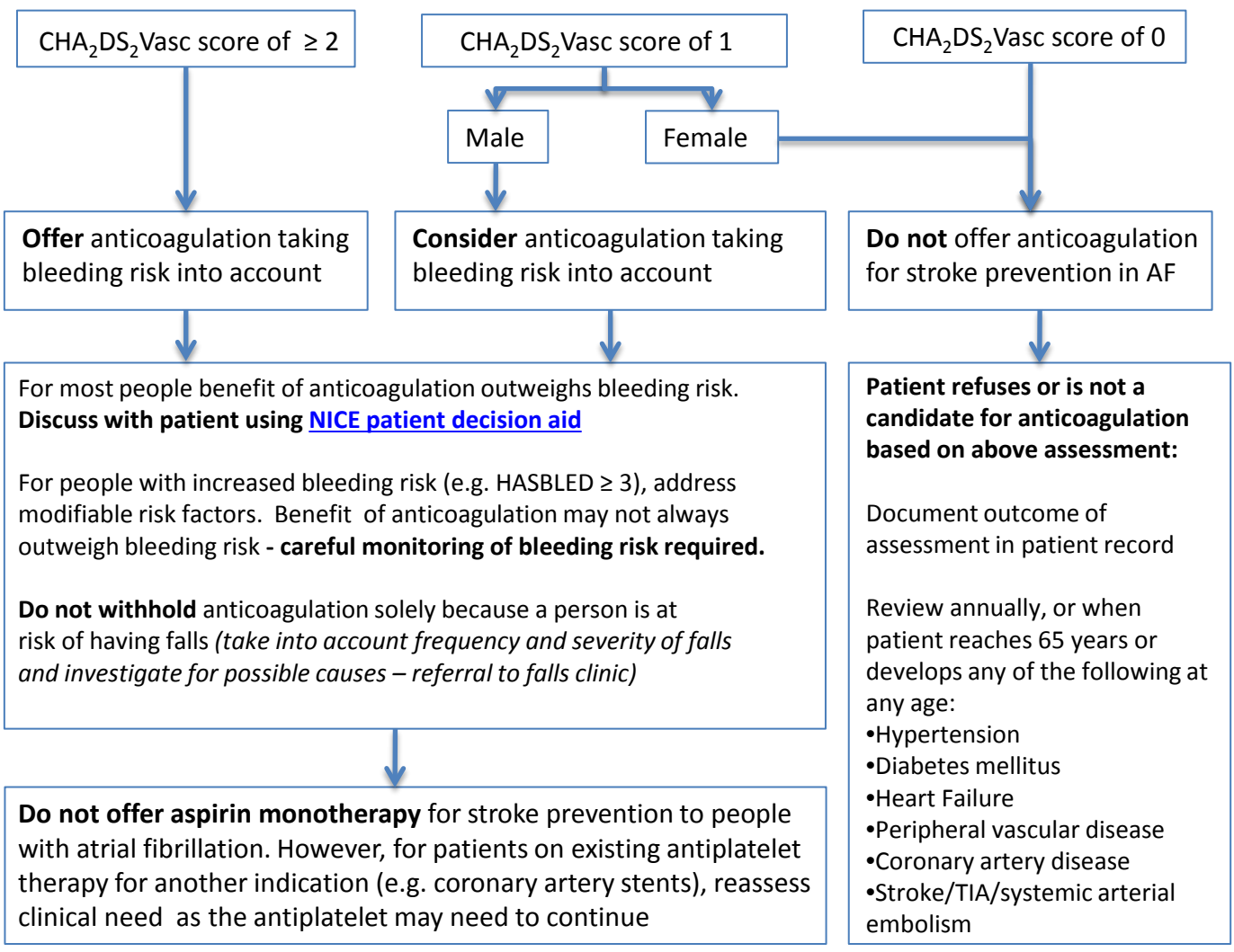
# Assessing stroke/bleeding risk for patients with non-valvular AF

| $CHA_2DS_2Vasc$ | Score | HASBLED | Score |
|---|---|---|---|
| **C**ongestive heart failure/LV dysfunct. | 1 | Hypertension (uncontrolled, > 160 mmHg systolic) | 1 |
| **H**ypertension | 1 | Chronic liver disease or Bili 2xULN with AST/ALT/ALP 3x ULN | 1 |
| **A**ge ≥ 75 | 2 | Abnormal renal function (creatinine ≥200 umol/L, renal transplant or chronic dialysis) | 1 |
| **D**iabetes mellitus | 1 | Stroke | 1 |
| **S**troke/TIA/systemic arterial embolism | 2 | History of major bleeding[1] or predisposition | 1 |
| **Vasc**ular disease (prev. MI, peripheral arterial disease, aortic plaque) | 1 | Labile INRs, time in range less than 60% | 1 |
| **A**ge 65 -74 | 1 | Elderly (age ≥ 65 or frail condition) | 1 |
| Sex (male 0, female 1) | F 1 | Drugs (concomitant antiplatelet, NSAIDs etc) or alcohol abuse (1 point each) | 1 or 2 |
| **Total score** *(maximum score 9)* | | **Total score** *(maximum score 9)* | |

| $CHA_2DS_2$-VASc score | Adjusted stroke rate (%/year) |
|---|---|
| 0 | 0% |
| 1 | 1.3% |
| 2 | 2.2% |
| 3 | 3.2% |
| 4 | 4.0% |
| 5 | 6.7% |
| 6 | 9.8% |
| 9 | 15.2% |

| HAS-BLED score | Major bleed s per 100 pt years |
|---|---|
| 0 | 1.13 |
| 1 | 1.02 |
| 2 | 1.88 |
| 3 | 3.74 |
| 4 | 8.70 |
| 5 | 12.50 |
| 6-9 | Insufficient data |

[1]Bleeding requiring hospitalisation and/or causing decrease in Hb >20 g/L and/or requiring ≥2 units blood transfusion



# Anticoagulant Selection Tool[1]

**Indication for anticoagulation**

- Valvular AF, mural thrombus, cardiomyopathy
- Mechanical heart valve
- Any indication requiring INR range higher than 2-3

**Yes**

## Warfarin

- Frequent monitoring and dose changes required
- Interaction with diet (food containing vitamin K) and some medication
- Reversible and easily monitored
- Bridging with LMWH usually required around procedures
- Higher risk of intracranial haemorrhage compared to DOACs
- Long-term safety data available

- Non-valvular AF[2]
- DC-cardioversion, ablation
- Acute DVT or PE <u>without</u> active cancer *(use LMWH in patients with VTE and cancer or VTE in pregnancy)*
- Secondary VTE prevention

**Yes**

Does the patient have:
- CrCl < 30mL/min (Cockroft & Gault),
- weight < 50 kg or > 120 kg,
- Moderate hepatic impairment (*refer pts with severe hepatic impairment to haematologist for specialist advice)*
- Is patient breastfeeding?

**Yes[3]**

Switch from warfarin to DOAC as per agreed NCL criteria

**No**

***Does patient have any of these characteristics?***

- Unstable diet
- Frequent illness or health status change <u>without</u> significant deterioration in renal function?
- Frequent medication changes or need for medications that interact with warfarin, such as antibiotics?
- Frequent medical procedures with bleeding risk?

**No**

## DOAC[4]

- Fixed dose with predictable anticoagulant effect
- Frequent monitoring not required
- No dietary interactions and fewer interactions with other medications
- Reversal agent available for Dabigatran and under development for anti-Xa inhibitors
- Importance of adherence as short half-life leads to rapid fall of drug level when doses are missed
- Easier to manage around procedures
- Lower risk of intracranial haemorrhage
- Lack of long-term safety data

**Yes**

1. Flow-chart adapted from toolkit produced by Michigan Anticoagulation Quality Improvement Initiative version 1.5/updated on 19/2/16
2. Non-valvular AF refers to AF that occurs in the absence of mechanical prosthetic heart valves and in the absence of moderate to severe mitral stenosis (usually of rheumatic origin)
3. Patients with CrCL <30mL/min were excluded from clinical trials (CrCL <25mL/min for apixaban). DOAC should not be used unless specifically advised by consultant haematologist. Patients with ALT/AST 2xULN or Bili ≥ 1.5xULN were excluded from the main clinical trials. DOACs are either contraindicated or are to be used cautiously depending on degree of liver impairment.
4. Each DOAC is only approved for certain indications and may have warnings for use in specific populations (i.e. renal impairment/hepatic failure) and with certain concurrent medications (P-gp/CYP3A4 inducers or inhibitors).

# Choice of oral anticoagulant based on patient characteristics

| Patient characteristic | Drug choice | Rationale |
|---|---|---|
| **Mechanical heart valve** | Warfarin | Increased risk of thrombosis/bleeding reported with dabigatran compared warfarin; other DOACs not studied in this setting |
| **AF with valvular disease** | Warfarin | All trials excluded patients with mechanical valves or moderate to severe (haemodynamically significant) mitral stenosis |
| **Any indication requiring higher range INR than 2-3** | Warfarin | |
| **Moderate hepatic impairment (Child-Pugh B)** | Warfarin | Patients with ALT/AST 2 x ULN (ALT 3 x ULN for rivaroxaban) or Bili ≥1.5 x ULN were excluded from the main clinical trials.<br>Use of DOACs in patients with moderate hepatic impairment is not recommended (see SPCs for more details) |
| **Severe hepatic impairment (Child-Pugh C)** | Refer to Haematologist for advice | All DOACs are contraindicated in patients with severe hepatic disease associated with coagulopathy and clinically relevant bleeding risk, including cirrhotic patients |
| **CrCl <30 mL/min** | Warfarin | Patients with CrCL <30mL/min were excluded from clinical trials (CrCL <25mL/min for apixaban). ESC guidance from 2016 suggests that warfarin should be preferred anticoagulant in this patient group |
| **Extremes of body weight <50 kg or >120 kg** | Warfarin | Limited trial data – **avoid use of DOACs (local recommendation)** unless d/w haematologist |
| **Antiphospholipid syndrome** | Haematologist to advise | Refer to haematology consultant for advice on anticoagulation management. |
| **Previous intracranial bleed** ***(Decision to anticoagulate as per neurosurgical advice)*** | Haematologist to advise | Risk of intracranial bleeding less with DOACs than Warfarin. Patients with previous intracranial bleed excluded from trials. |
| **Dyspepsia** | Warfarin<br>Apixaban<br>Rivaroxaban<br>Edoxaban | Dyspepsia in up to 10% of patients on dabigatran. |
| **History of gastrointestinal bleed or ulcer** ***(Check that underlying cause has been treated)*** | Warfarin<br>Apixaban | More GI bleeds with dabigatran (150mg), edoxaban (60mg) or rivaroxaban than with warfarin. Warfarin easier to reverse if there is a further bleed. |
| **Requirement for compliance aid such as blister pack/dosette box** | Rivaroxaban<br>Apixaban<br>Edoxaban | Dabigatran capsules must be kept in their original container. Warfarin should not be dispensed into a sealed compliance aid (due to variable dosing) |

# DOAC initiation checklist

| Checklist | Comments |
|---|---|
| **Assess bleeding risk:**<br><br>**HASBLED score - alcohol consumption should not exceed nationally recommended amount (address risk factors for bleeding where possible)**<br><br>**Check for lesions or conditions considered to be significant risk factors for major bleeding**<br><br>**Frequency and severity of falls**<br><br>**Check clotting, FBC *(last 4 weeks)*** | <u>Clinical management of patients with any of the following conditions should be discussed with a Haematologist:</u><br>• Current/recent upper or lower GI ulceration, oesophageal varices (known or suspected), malignant neoplasms at high risk of bleeding<br>• Surgery/trauma or bleed affecting head/brain, eyes or spine within last 4 weeks<br>• AV malformations, vascular aneurysms or major intraspinal / intracerebral vascular abnormalities<br>• Stroke in last 14 days/severe stroke in last 6 months (unless advised by designated stroke neurology cons)<br>• **T**hrombocytopenia <50 x $10^9$/L<br>• Congenital or acquired bleeding disorder (abnormal baseline clotting screen, haemophilia, low fibrinogen) |
| **Ensure DOAC use is licensed for required indication**<br><br>**Establish length of anticoagulation based on indication** | DOACs are currently only approved for stroke prevention in patients with non-valvular atrial fibrillation and treatment/prevention of VTE<br>DOACs are **contraindicated** in patients with mechanical heart valves and **should not be used** for:<br>•indications requiring higher intensity anticoagulation e.g. INR target greater than 2.5 (range higher than 2.0 – 3.0) if on warfarin<br>•patients with co-existing myeloproliferative disorders, nephrotic syndrome, sickle cell disease, antiphospholipid syndrome, cancer (limited clinical evidence – D/W haematologist) |
| **Check renal function** *(last 4 weeks)* **(CrCl > 30mL/min, C&G)** | DOACs rely on renal function for elimination and should be used with caution in patients with significant renal disease. DOAC dosing is adjusted according to renal function – **avoid if CrCl less than 30 mL/min** |
| **Check liver function** *(last 4 weeks)* | DOACs are contraindicated in patients with significant hepatic disease associated with coagulopathy and clinically relevant bleeding risk including cirrhotic patients with Child Pugh B and C |
| **Check blood pressure control** | Good blood pressure control should be achieved **before** initiation of anticoagulation |
| **Check body weight** | There is limited trial evidence in patients at the extremes of body weight (< 50 kg or >120 kg) – **avoid use (local recommendation)** |
| **Review medication for potential drug interactions** | While DOACs have fewer drug interactions, there are still medications that increase or decrease drug exposure. Consider addition of proton pump inhibitor if essential for patient to remain on medication that increases bleeding risk (i.e. antiplatelet agents) |
| **Consider patient's compliance with medication** | Since DOACs have a short half-life compared to warfarin and do not require monitoring, compliance may be a more important concern. Dabigatran must not be dispensed into reminder devices |
| **Pregnancy test for women of childbearing age - advise on adequate contraception** | DOACs are contraindicated in pregnancy and when breastfeeding (crosses placenta and into breast milk). |

# Switching from warfarin to DOAC

| Indications for switch from warfarin to DOACs in patients requiring long term anticoagulation | Comments |
|---|---|
| Known allergy / intolerance to warfarin or other vitamin K antagonist | e.g. alopecia with no other cause (such as iron deficiency anaemia, hypothyroidism etc) |
| Significant technical difficulties with INR monitoring and/or accessing A/C clinic that raises safety concerns | Consider alternatives such as community A/C services, domiciliary monitoring/input or self-testing |
| Patient-time in range < 65% once established on warfarin (not due to wilful non-compliance). | Non-compliance will not necessarily improve with switch to a DOAC and will be more difficult to detect. |
| INR ≥ 8.0 on 1 occasion or INR ≥ 5.0 on 2 occasions over a period of 6 months (once A/C is established), with a high likelihood of recurrence (i.e. unsafe) | |
| Awaiting DC-cardioversion or urgent AF ablation within 4 weeks | |
| Specific clinical indication as per locally designated consultant in stroke medicine / thrombosis / cardiology | |
| Patient preference (if clinically appropriate) | |

**Switching patients from warfarin or low molecular weight heparin (LMWH) to DOAC**

- Only secondary care or GP led anticoagulation clinics should switch patients to DOAC

- **If taking warfarin:**
  - Stop warfarin
  - Check INR in two days and start appropriate DOAC if INR < 2.0

- **If taking LMWH:**
  - Stop LMWH
  - If LMWH dosing is once daily, start appropriate DOAC approximately 24hours after the last dose of LMWH
  - If LMWH is twice daily, start DOAC approximately 12hours after the last dose of LMWH
  - Do not 'cross-cover' LMWH with DOAC

# DOAC dosing in non-valvular AF

| Renal function | CrCL > 50 mL/min | | | | | |
|---|---|---|---|---|---|---|
| | Age < 75y and wt > 50 kg | Age 75-79y and wt > 50 kg | Age ≥ 80y and wt > 60 kg | Age ≥ 80y and 50 - ≤ 60 kg | HASBLED ≥3 Or ↑ bleeding risk | Any age and < 50 kg or > 120 kg |
| Rivaroxaban | 20 mg od | | | | Consider 15 mg od | Do not use* |
| Apixaban | 5 mg bd | | | 2.5 mg bd | Consider 2.5mg bd | Do not use* |
| Edoxaban *Avoid if CrCL >95mL/min*** | 60 mg od<br>30 mg od if ≤ 60kg or if taking P-gp inhibitor e.g. ciclosporin, dronedarone, erythromycin, ketoconazole *(see also drug interaction table)* | | | 30 mg od | Consider 30mg OD | Do not use* |
| Dabigatran | 150 mg bd<br>110mg bd if also on verapamil OR at ↑risk of bleeding (e.g. GI risks) | 110 mg bd | 110 mg bd | | | Do not use* |

** Unless specifically advised by local haematology consultant. **↑rate of ischaemic stroke vs warfarin (AF)*

**NB: Certain drug interactions (other than those stated above / below) may also require consideration of dose reduction** (see drug interaction table)

NB: Haematologist may advise individualised doses other than those detailed within these tables

| Renal function | CrCL 30 - ≤ 50mL/min | | | | Cr CL 15 - 29 mL/min | Cr CL < 15 mL/min |
|---|---|---|---|---|---|---|
| | Age < 75y and wt > 50 kg | Age 75 - 79y and wt > 50 kg | Age ≥ 80y and wt > 50 kg | Any age and wt < 50 kg or > 120 kg | Any age / wt | Any age / wt |
| Rivaroxaban | 15 mg od | | | Do not use* | Do not use* | Contra-indicated |
| Apixaban | 5mg bd if > 60 kg<br>2.5mg bd if 50 - ≤ 60kg<br><br>(consider 2.5mg bd if HASBLED ≥3 OR at ↑risk of bleeding) | | 2.5mg bd | Do not use* | Do not use* | |
| Edoxaban | 30 mg od | | | Do not use* | Do not use* | |
| Dabigatran | 150 mg bd<br>110 mg bd if on verapamil OR at ↑risk of bleeding (e.g. HASBLED ≥3 or GI risks ) | 110 mg bd | Consider alternative drug | Do not use* | Contra-indicated | |

# DOAC dosing in VTE

| Renal function | CrCL ≥ 30 mL/min | | | |
|---|---|---|---|---|
| | Initiation | Maintenance | Secondary prevention after 6 months | wt < 50 kg or > 120 kg |
| Rivaroxaban | 15 mg bd for 21 days | 20 mg od<br>Consider 15mg od, if CrCL 30-49mL/min and the risk of bleeding outweighs risk for recurrent VTE | | Do not use* |
| Apixaban | 10 mg bd for 7 days | 5 mg bd | 2.5 mg bd | Do not use* |
| Edoxaban | Therapeutic dose LMWH for 5 days | 60mg od<br><br>30 mg od with one or more of the following:<br>• CrCL 30-50mL/min<br>• body weight ≤ 60kg<br>• concomitant P-gp inhibitor e.g. ciclosporin, dronedarone, erythromycin, ketoconazole *(see also drug interaction table)* | | Do not use* |
| Dabigatran | Therapeutic dose LMWH for 5 days | 150 mg bd<br><br>110mg bd if age ≥ 80y **or** concomitant verapamil<br><br>Consider 110 mg bd if thrombotic risk low, but bleeding risk high: e.g. age 75-80y, CrCL 30-50mL/min or at other increased risk of bleeding (e.g. GI) | | Do not use* |

* *Unless specifically advised by local haematology consultant.*

**NB: Certain drug interactions (other than those stated above) may also require consideration of dose reduction** (see drug interaction table)

NB: Haematologist may advise individualised doses other than those detailed within these tables

| Renal function | CrCL 15 - < 30mL/min | CrCL < 15 mL/min |
|---|---|---|
| Rivaroxaban | Do not use* | Contra- indicated |
| Apixaban | Do not use* | |
| Edoxaban | Do not use* | |
| Dabigatran | Contra- indicated | |

# DOAC frequency of follow-up

DOACs are predominantly eliminated by the renal route, it is therefore prudent to regularly monitor renal function and adjust dosing accordingly.
The renal function is assessed using **creatinine clearance, which must be calculated** by Cockroft Gault formula (http://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation/) eGFR is **not** a suitable alternative, especially in the frail elderly.

## Baseline blood tests

| Patient group | U/Es (calculate CrCl) | weight | FBC | LFTs | Clotting screen |
|---|---|---|---|---|---|
| All patients | ✔ | ✔ | ✔ | ✔ | ✔ |

## Frequency of follow-up blood tests

| Patient group | U/Es (calculate CrCl) | weight | FBC[2] | LFTs | Clotting screen[3] |
|---|---|---|---|---|---|
| CrCl >60 mL/min | annually[1] | annually | annually[2] | At least annually or more frequently during illness affecting liver function<br><br>Seek advice if AST/ALT >2x or bilirubin >1.5x ULN | APPT, PT and INR will **not** provide information on intensity of anticoagulation effect[3] |
| CrCl 40- 60 mL/min | 6 monthly | 6 monthly | 6 monthly[2] | | |
| **Any of the following:**<br>CrCl <40 mL/min,<br>high bleeding risk,<br>Age ≥75, wt <60 kg<br>Rapid deterioration in renal function | at least 3 monthly | at least 3 monthly | at least 3 monthly[2] | | |
| CrCl <30 mL/min | **dabigatran contraindicated**<br>**apixaban, edoxaban, rivaroxaban** - **NCL guidance is not to use**, unless advised by haematologist | | | | |
| Cr Cl <15 ml/min | **apixaban, edoxaban, rivaroxaban** - **do not use** (dabigatran contraindicated if CrCL less than 30ml/min) | | | | |

[1]if edoxaban is used for AF, review choice of agent if CrCl >95 mL/min as reduced efficacy
[2] in addition to general clinical surveillance, laboratory testing of haemoglobin could be of value to detect occult bleeding, especially in patients at higher risk of bleeding complications
[3] routine monitoring of anticoagulant effect of DOACs is **not** required. Standard coagulation parameters (APTT, PT, INR) may be affected to varying degrees by the different DOACs, but will **not** provide quantitative information on the level of anticoagulation achieved (poor correlation)

## Managing deterioration of renal function

| | |
|---|---|
| Any acute illness that MAY affect renal function | Check U/Es and calculate creatinine clearance. Reduce dose or withhold treatment if required. Consider seeking specialist advice regarding restarting treatment. |
| Significant reduction in renal function | Reduce dose as appropriate (see dosing guidance), increase frequency of routine follow-ups. Close monitoring will be required during any intercurrent illness and perioperatively. If renal function continues to worsen seek specialist advice. |
| Fall of CrCl to <30mL/min | Stop DOAC, assess for bleeding and seek specialist advice as to whether specific assays are indicated/alternative anticoagulation required (i.e. switch to warfarin). |

# DOAC follow-up checklist

| At each follow-up visit | Comments |
|---|---|
| Assess compliance | Review prescribing schedule, calculate and document average adherence<br>If patient has stopped taking DOAC, establish whether this was secondary to side-effects, accidental stoppage, temporary /permanent cessation by another clinician.<br>Re-educate on importance of strict intake schedule<br>Inform about compliance aids (e.g. dossette box, blister pack, reminder charts, smartphone applications)<br>NOTE: Dabigatran must remain in original packaging |
| Assess for thrombotic complications | History of stroke/TIA, DVT/PE in last treatment interval |
| Assess for bleeding complications | Repeat HASBLED score if ≥3. If at increased bleeding risk<br>-Correct potentially reversible risk factors<br>-Ensure more frequent reviews are in place<br>Check for any bleeding episodes<br>"nuisance bleeding' – are preventative measures possible?<br>Reinforce importance of carrying 'patient alert' card at all times |
| Assess for other side-effects | Dyspepsia common with dabigatran; consider PPI or alternative agent<br>Other side effects: Review dose? Switch to alternative agent?<br>*NB: DOACs are 'black triangle' drugs – All adverse drug events must be reported to MHRA via* https://yellowcard.mhra.gov.uk/ |
| **Assess risk versus benefit of anticoagulation and decide whether ongoing anticoagulation is still appropriate.** | |
| Ensure that current dose of DOAC is still optimal in light of age, weight and renal function, liver function etc. | **See guidance on DOAC dosing in AF/VTE**<br>**NCL guidance:** avoid use of DOACs if CrCL <30 mL/min (dabigatran contraindicated) and/or weight is <50 kg or >120kg. If edoxaban is used for AF, review choice of agent if CrCL >95mL/min as efficacy is reduced) |
| Review concurrent medication, including over the counter medication, herbal remedies | Check for possible drug interactions with new medication or medication that may increase bleeding risk or merit dose reduction |
| **Managing bleeding complications** | |
| Haemorrhage | Stop DOAC and refer patient immediately to A&E if serious bleeding occurs eg GI-bleeding, epistaxis lasting more than 1 hr |
| Serious Trauma (especially to the head) | Withhold DOAC and refer to A&E |
| Unexplained acute drop in Hb or BP | Withhold DOAC and refer for urgent investigations |
| Excessive bruising | Seek urgent specialist advice |

# Cockcroft & Gault (C&G) formula

- eGFR and calculated CrCL are NOT interchangeable, but in practice and for most adult patients of average build and height, eGFR can be used to determine dosing in place of CrCL
- Calculated CrCL rather than eGFR should be used (with caution) in the following patient populations:
    - the elderly
    - reduced muscle mass
    - poor nutritional status
    - BMI <18.5 or >30
    - eGFR ≤50mL/min

## Example of electronic CrCL (C&G) calculator

http://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation/

## Manual calculation of CrCL (mL/min) using C&G formula

$$\text{CrCL (mL/min)} = \frac{(140 - \text{age}) \times \text{weight (kg)} \times \text{constant}}{\text{serum creatinine (µmol/L)}}$$

- Constant = 1.23 (male) or 1.04 (female)
- Weight (kg) = **current weight** or **adjusted body weight** (ABW) if obese*

  *Obese defined as >20% over ideal bodyweight (IBW) (see table )
- **Adjusted body weight (ABW)** =
  Ideal body weight + 0.4 (current body weight - ideal body weight)

| HEIGHT | | IDEAL BODY WEIGHT (kg) | |
|---|---|---|---|
| feet | cm | Male | Female |
| 5ft 1in | 155 | 52.3 | 47.8 |
| 5ft 2in | 158 | 54.6 | 50.1 |
| 5ft 3in | 160 | 56.9 | 52.4 |
| 5ft 4in | 163 | 59.2 | 54.7 |
| 5ft 5in | 165 | 61.5 | 57.0 |
| 5ft 6in | 168 | 63.8 | 59.3 |
| 5ft 7in | 170 | 66.1 | 61.6 |
| 5ft 8in | 173 | 68.4 | 63.9 |
| 5ft 9in | 175 | 70.7 | 66.2 |
| 5ft 10 | 178 | 73.0 | 68.5 |
| 5ft 11 | 180 | 75.3 | 70.8 |
| 6ft | 183 | 77.6 | 73.1 |
| 6ft 1in | 185 | 79.9 | 75.4 |
| 6ft 2in | 188 | 82.2 | 77.7 |

# Management of DOAC around elective MINOR procedures

- The management of anticoagulation around elective procedures is a balance of thrombosis (venous/arterial) vs the risks of bleeding. DOACs are simpler to manage peri-procedurally than warfarin, and LMWH bridging is generally not required

- **Patients at high risk of thrombosis (e.g. VTE/CVA within the previous 3 months, antiphospholipid syndrome or antithrombin deficiency) should be discussed with the patient's haematologist**

Suggested management for **MINOR PROCEDURES** that are considered to carry **no clinically important bleeding risk and /or where adequate local haemostasis is possible**:
Examples include:

- **Dental interventions**: e.g. tooth extraction (1-3 teeth), root canal procedures, incision of abscess, implant positioning, periodontal surgery
- **Superficial surgery** e.g. abscess incision, small dermatologic excisions etc
- **Ophthalmology**: cataract or glaucoma intervention

- Procedure can usually be undertaken at trough drug level i.e. 12 hours post BD dose *(but see table for dabigatran),* or 24hrs post OD dose. (If taking evening doses of edoxaban or rivaroxaban, it may be more practical to schedule the intervention 18-24h after the last dose).

- **If estimated CrCL <30mL/min:** discuss with local haematologist *(NB: dabigatran contraindicated)*

- **If unsure as to the management of a particular patient:** discuss with local haematologist

| DOAC | Day before procedure | Day of procedure | Day 1 post* |
|---|---|---|---|
| **Apixaban BD** | Take AM and PM doses | No DOAC | Restart AM |
| **Dabigatran BD** | Take AM dose; omit PM dose | No DOAC | Restart AM |
| **Edoxaban Rivaroxaban (OD)** | If usually takes AM, take dose | No DOAC | Restart AM |
| | If usually takes PM, then take dose no later than 6pm | No DOAC *(schedule procedure ~18-24h post dose)* | Restart evening |

**Post-procedure**

- Optimise local haemostasis
- *Delay restarting DOAC if there are any concerns re bleeding; discuss with local haematologist as appropriate
- Peak drug levels (i.e. therapeutic anticoagulation) are reached 2-4 hours post oral dose

- **For patients undergoing more complex procedures with higher bleeding risks** e.g. in-patient procedures (including day surgery) or major surgery: management plans should be arranged by the pre-assessment clinic or the responsible speciality team of the trust where the procedure will be undertaken. These patients will need to be assessed in terms of thrombosis and bleeding risk and DOAC withheld as per local secondary care guidelines.

**References:**


Assessing stroke/bleeding risk for patients with non-valvular AF
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