Renal Directorate Guidelines

Royal Infirmary of Edinburgh

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**Therapeutic anticoagulation in advanced CKD**

This protocol applies to patients with a GFR < 30 ml/min or on renal replacement therapy. Options for therapeutic anticoagulation include unfractionated heparin (UFH), low-molecular weight heparin (LMWH) and Warfarin. LMWH will accumulate in advanced CKD and therefore close monitoring of anti-Xa (“LWMH assay on Trak”) is required.

**Low to Moderate Thrombosis Risk**

Dalteparin can be considered for the following indications:

* atrial fibrillation
* maintenance anticoagulation for deep vein thrombosis (DVT) or pulmonary embolism (PE)

Anti-factor Xa levels should be measured and the dose adjusted accordingly.

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| **Dalteparin** |
| **Dose calculation** | **Anti-factor Xa monitoring** |
| Dalteparin 130units/kg*(NB this dose is 2/3rds of the dose for patients with normal renal function)**Round to nearest pre-filled syringe:** *5,000units*
* *7,500units*
* *10,000units*
* *12,500units*
* *15,000units*
* *18,000units*
 | After 3rd doseThis must be taken 3-4 hours after dose administration to achieve an accurate peak levelTarget 0.5-1.0 units/ml – discuss with haematology if outwith this rangeRepeat at day 7 – 10 if treatment still ongoing |

**High Thrombosis Risk**

Examples of high-risk conditions are:

* anti-phospholipid syndrome
* anti-thrombin deficiency
* protein C/S deficiency
* metallic heart valve (mitral and aortic)

All cases should be discussed with haematology. Options will include continuous UFH, twice-daily LWMH and using tinzaparin in preference to dalteparin (as its excretion is less dependent on renal clearance).

If considering tinzparain, note that syringes are graduated and may not be suitable for use for all patients, depending on their dexterity and ability to measure and discard the excess volume to achieve the desired dose. Clear instructions are available in the product leaflet.

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| **Tinzaparin** |
| **Dose calculation** | **Anti-factor Xa monitoring** |
| Tinzaparin 175units/kg*Round to nearest 1000units. Graduated syringes are available in the following strengths:** *10,000units (red)*
* *14,000units (yellow)*
* *18,000units (blue)*
 | As for dalteparin (see above).  |

**Bleeding Risk**

Examples of anti-coagulation in individuals with high risk of bleeding include:

* post-biopsy
* post-surgery or invasive procedure
* recent hemorrhagic event

All cases should be discussed with haematology.

**Switching From UFH Infusion To LMWH**

In most cases, the desired dose of LMWH should be given at the same time the UFH infusion is stopped to allow for cross-over of both agents. There may be selected cases where this may differ, so please seek specialist advice.