# Low Molecular Weight Heparin (Tinzaparin) UHL Renal Guideline

University Hospitals of Leicester NHS
NHS Trust

**RRCV CMG**
**Renal and Transplant Service**

## 1. Introduction

This procedure describes the dosing and administration of tinzaparin as an anticoagulant for the extracorporeal circuit during routine haemodialysis.

The European Best Practice Guidelines state that "because of proven safety, equal efficacy and easy handling, the use of LMWH is to be preferred over unfractionated heparin"(1). LMWH has increased bioavailability and greater half life than unfractionated heparin which increases its predictability of action. It is convenient to use as one pre-dialysis intravenous bolus injection is sufficient for the entire haemodialysis session. Repeated doses are not required if lines are changed (2). There is conflicting data suggesting that it reduces the amount of bleeding or oozing from AVF post dialysis both during compression and in the hours following dialysis. Some data suggests it can improve the blood lipid concentrations and that it is less likely to increase potassium levels than unfractionated heparin (2).

## 2. Scope

These guidelines are applicable to patients who require haemodialysis and are directly under the care of University Hospitals of Leicester NHS Trust. Local guidance (for example for the inpatient care of kidney patients not in a Leicester hospital) may also exist and take precedence.

Clinical guidelines are 'guidelines' only. The interpretation and application of clinical guidelines will remain the responsibility of the individual practitioner. If in doubt, consult a senior colleague or expert.

## 3. Recommendations, Standards and Procedural Statements

### 3.1 CONTRAINDICATIONS

3.1.1 Tinzaparin should not be prescribed for patients who have an allergy to standard (unfractionated) heparin. Patients with heparin induced thrombocytopenia should be anti-coagulated according to the UHL Heparin Induced Thrombocytopenia guideline (C108/2007).

3.1.2 Patients previously requiring less than 1500 units of unfractionated heparin during dialysis may be dialysed without any heparin.

3.1.3 Home dialysis patients that are expected to convert to nocturnal dialysis should use unfractionated heparin. Nocturnal dialysis patients will use unfractionated heparin due to tinzaparin not being effective for more than 4 hours.

3.1.4 Use of tinzaparin pre surgery should be discussed with surgical team; consideration should be given to omitting anti-coagulant pre and post surgery or GI bleed and saline flushes used as an alternative.

3.1.5 Patients with acute kidney injury – until further local experience has accrued, LMWH should not be used in patients requiring dialysis for AKI because of the perceived bleeding risk for patients from renal biopsy site or other acute complications (e.g. lung haemorrhage, stress ulceration)

### 3.2 CONVERSION FROM UNFRACTIONATED HEPARIN

3.2.1 Patients should be converted from unfractionated heparin to tinzaparin based upon their current total dose of heparin per dialysis session.

| Total dose of unfractionated heparin | Tinzaparin dose |
|---|---|
| <1500 | Clinical decision |
| 1500 to 5000 units | 2500 units |
| 5100 to 7000 units | 3500 units |
| >7000 units | 4500 units |

3.2.2 For patients with a prescribed dialysis time of less than 3 hours (e.g. short frequent home HD), the use of tinzaparin should be discussed with doctor or nurse prescriber but some cases will still be appropriate. Care should be taken with removal of AVF needles as tinzaparin will still be active at 3hrs.

3.2.3 For patients prescribed less than 1500 units heparin per session consideration should be given to omitting anticoagulation during dialysis or continuing unfractionated heparin as smaller doses of tinzaparin are not available.

### 3.3 ADJUSTMENT OF DOSE

3.3.1 First use - observe circuit closely post dialysis, if significant clotting with no other explanation increase dose by 1000 units.

3.3.2 Once established on tinzaparin, the dose should be adjusted by 1000 units if there is significant clotting on two consecutive occasions.

3.3.3 Patients prescribed 2500 units should be reviewed regularly for repeated low grade clotting and trial of higher dose considered if this occurs.

3.3.4 Patients switching from catheter to AVF or graft should be reviewed and trial of lower dose considered.

3.3.5 If a patient has recurrent clotting on a dose of 4500 units then consideration should be given to reverting to unfractionated heparin.

### 3.4 PROCEDURE FOR ADMINISTRATION OF TINZAPARIN

3.4.1 Line machine as usual but ensure unused heparin line is clamped.

3.4.2 If the patient is unfamiliar with administration of tinzaparin, explain the procedure and reason for change (see advantages above).

3.4.3 Tinzaparin must be administered as soon as possible after connecting patient to machine.

3.4.4 Tinzaparin is considered to be prophylactic and therefore does not require a second checker according to the Leicester Medicines Code. The nurse administering tinzaparin must be competent in intravenous therapy.

3.4.5 Check patient and tinzaparin dose and expiry date against the prescription chart.

3.4.6 Administer the tinzaparin using ANTT procedure into the venous port.

3.4.7 Post dialysis, observe lines and note any clotting of lines or dialyser in patient notes.

**3.5 EARLY TERMINATION OF DIALYSIS**

3.5.1 Do not adjust dose or give second dose if patient has to interrupt dialysis for any reason (e.g. toilet break).

3.5.2 Do not give second bolus if circuit clots and dialysis lines changed. This should prompt a review of anticoagulant dose prior to next dialysis. Saline flushes may be needed for remainder of dialysis.

**3.6 MINIMAL HEPARIN**

3.6.1 If minimal heparin required then unfractionated heparin must be used.

**3.7 DOCUMENTATION**

3.7.1 Tinzaparin dose should be prescribed on prescription chart and on Proton medication screen.

3.7.2 Any incidence of clotted lines during dialysis or significant clotting observable post dialysis should be recorded in patient notes and reported to nurse prescriber or doctor for review of dose.

**3.8 REVERSAL OF TINZAPARIN USING PROTAMINE**

3.8.1 Protamine sulphate administered intravenously is partially effective in reversing LMWH and will neutralise 65-80% of the anti-factor Xa activity of Tinzaparin almost immediately.

3.8.2 Protamine sulphate should be administered slowly (5 mg per minute) as rapid I.V. infusion causes hypotension.

3.8.3 The vial should be reconstituted with 5 ml water for injection.

| Tinzaparin dose (units) | Protamine sulphate dose (mg) |
|---|---|
| 2500 | 25 |
| 3500 | 35 |
| 4500 | 45 |

***Protamine sulphate should not be given to patients allergic to fish, fish products, or known allergy to protamine.***

## 4. Education and Training

No new skills are required for this iteration of the guideline – continued awareness of the risks/benefits of using LMWH is needed amongst staff caring for people treated with haemodialysis.

## 5. Monitoring and Audit Criteria

| Key Performance Indicator | Method of Assessment | Frequency | Lead |
|---|---|---|---|
| Complications arising from use of LMWH on haemodialysis (e.g bleeding, HIT, thrombosis) | Datix reports | Annual | HD Matrons |
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## 6. Legal Liability Guideline Statement

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

## 7. Supporting Documents and Key References

European Best Practice Guidelines Expert Group on Haemodialysis. European Renal Association. Section V. Chronic intermittent haemodialysis and prevention of clotting in the extracorporeal system. Nephrol Dial Transplant 2002;17(Suppl 7):63–71.

Davenport A. Low-molecular-weight heparin for routine haemodialysis. Haemodialysis International 2008;12:S34–S37

Lim W, Cook DJ, Crowther MA. Safety and Efficacy of Low Molecular Weight Heparins for Haemodialysis in Patients with End-Stage Renal Failure: A Meta-analysis of Randomized Trials. J Am Soc Nephrol 2004;15: 3192–3206

Leicester Medicines Code

## 8. Key Words

Haemodialysis, heparin, LMWH, bleeding, clotting

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