

1. Introduction

Correction of anaemia in dialysis patients requires adequate iron stores in order to maximise the response to erythropoietin stimulating agents (ESA).

Within the East Midland Renal Network the unit based haemodialysis population receive regular maintenance IV iron (see guideline: Intravenous Iron in patients with Advanced CRF) to maintain a target serum ferritin 200 – 500mcg/L.

However, historically the home haemodialysis population who require replacement IV iron treatment have to attend ward 10 day case unit, the home training area or one of the satellite units. The patient receives 200mg over 30 minutes via an IV cannula on 3 occasions. This means that these patients are often under-treated with iron, undergo extra cannulation, and are considerably inconvenienced.

Patients will benefit from administering IV iron whilst dialysing at home by

- Receiving IV iron replacement when appropriate for the patient and not the service
- Removing the need for additional cannulation on non-fistula arm, and therefore reducing the risk of difficulty with future access.
- Optimising anaemia management and ESA efficiency.
- Reducing the impact on ward 10 day care unit.

The overriding reason that home haemodialysis patients have not historically administered IV iron at home is due to safety issue. The safety issue with current IV iron preparation – iron hydroxide III sucrose (Venofer) – is the occurrence of anaphylactoid reactions. In the past this reaction has primarily been attributed to either too rapid administration or overdose of Venofer.

Combining all the safely data a total of 12 anaphylactoid reactions have been reported out of 267941 patients since 1993. This results in an incidence of 0.0045% reactions. In all cases, the patient recovered with or without sequelae.

2. Scope

For use by registered nurses and doctors, to enable home haemodialysis patients to self administer Intravenous iron.

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 Patient training requirements

Home haemodialysis patients and their partners who administer IV iron at home must fulfil the following criteria. Both patient and carer should be:-

- assessed as competent in administering IV Iron via the haemodialysis extracorporeal circuit (see assessment criteria appendix 1)
- assessed as competent and established on home haemodialysis

- re-assessed by annual review by renal community team registered nurses who are competent in IV drug administration.

The registered nurse involved in both training and supervision needs to be competent in both haemodialysis and in administration of IV iron on haemodialysis and be in possession of ENB 998 or equivalent.

3.2 Initiation of IV iron

Patients will be identified as requiring IV iron according to the criteria below and on the first prescription will necessitate a referral to the renal community team nurse or home training nurse for patient/carer training.

The first home IV iron administration will be attended by a renal community team registered nurse.

3.3 Indications for IV Iron

- Haemoglobin (Hb) less than 110g/L and a Reticulocyte Haemoglobin (CHR) count of less than 29pg.
- The reticulocyte hb content reflects the amount of functional iron available for haemoglobin production in the bone marrow. It is an early, direct measurement of iron status and has greater sensitivity and specificity than ferritin and TSR.
- Where reticulocyte haemoglobin is unavailable or the patient has thalassaemia trait, use a combination of a serum ferritin less than 100mcg/L and transferrin saturation ratio of less than 20% to diagnose iron deficiency. Ferritin or TSR should not be used in isolation.
- Patients with Hb >110g/L without the need for erythropoietin will not require iron.

NB: Serum ferritin should ideally not be used to assess for iron deficiency except in areas where reticulocyte Hb is unavailable (see above). Ferritin is an acute phase reactant and therefore has poor correlation with iron status in the face of infection or chronic inflammation. It will still be used to monitor for iron overload in haemodialysis patients on maintenance iron.

3.4 Dosing of intravenous iron

3.4.1 Replacement therapy

If IV iron required by above criteria, patients will receive 10 doses of 100mg of intravenous iron sucrose on each of 10 consecutive dialysis sessions as prescribed by consultant nephrologist, renal SpR or nurse prescriber.

3.4.2 Maintenance therapy

All patients will receive 100mg of IV iron sucrose fortnightly unless their serum ferritin rises to above 800mcg/L with a normal C reactive protein. Patients with a serum ferritin >800mcg/L will not receive any further maintenance IV iron sucrose until their serum ferritin falls below 500mcg/L, or their TSR is <20% on two consecutive months blood results. The patient will then be prescribed 100mg of IV iron sucrose per fortnight.

3.5 Contraindications to intravenous iron

- Patients with an allergy/reaction to IV iron

- Patients who on the day the iron is due do not have any resource to contact emergency services (ie phone not working)
- Patients suffering either an acute or chronic infection

3.6 Criteria for self-administration of intravenous iron

- 3.6.1 Patient and partner have successfully completed competency based HHD training program.
- 3.6.2 Patient and partner willing to give IV iron at home
- 3.6.3 IV iron prescribed by consultant nephrologist, renal SpR or independent nurse prescriber.
- 3.6.4 Patient and partner have successfully completed competency based administration of IV iron training program.

3.7 Administration

3.7.1 Patient preparation to undertake the training

- Current prescription by consultant nephrologist, renal SpR or nurse prescriber.
- Supply of IV iron will be by either home delivery or at a clinic visit from renal pharmacy
- Informed consent and patient leaflet is given to the patient/carer and documented in notes
- Omitted IV iron should be documented on the patients dialysis chart
- Renal community team is informed

3.7.1 Equipment

- 100mg ampoule of iron sucrose hydroxide
- 30ml luer lock syringe
- 1 green (21g) needle
- 10ml ampoule of 0.9% sodium chloride
- Non-sterile gloves
- Sharps box

3.7.2 Procedure

The procedure must be performed using a non touch technique

- Pre iron blood pressure (BP) will be taken and recorded on the patient's dialysis chart
- If the patient's systolic blood pressure is below 100mmHg, then IV iron should be withheld unless specifically agreed among medical, nursing staff and patient
- If the BP is low, then ultrafiltration can be switched off for 10-15 minutes, the blood pressure will be rechecked and, if satisfactory, then the iron can be administered
- Wash hands with liquid soap and water, dry hands and put on gloves
- Check all packaging for any damage and check the expiry dates prior to opening. If anything is damaged or if passed expiry date do not use.
- Place green needle on syringe and draw up 100mg (5ml) of iron sucrose and dilute with 5ml of 0.9% sodium chloride (total syringe volume 10ml)

- Ensure any air in syringe is expelled, by tapping syringe gently and expelling the air
- Remove needle and dispose of needle and glass ampoule into sharps bin
- Ensure clamp on bubble trap is closed
- Remove bung and put safely to oneside
- Connect syringe to giving port on top of bubble trap
- Open clamp on giving port whilst maintaining gentle pressure on syringe to ensure plunger not pushed out by pressure in the bubble trap
- Administer iron through bubble trap continuously over 5 minutes
- Close clamp, remove syringe and replace bung on giving port on top of bubble trap
- Measure post iron blood pressure and record on the dialysis chart.

3.8 Complications

The incidences of adverse reactions to 100mg of IV iron sucrose are very small. This is also a small dose of IV iron. In the unlikely event of an adverse reaction (headache, light-headedness, nausea, back pain, abdominal pain, suddenly feeling unwell), STOP administration of the iron immediately and contact your renal community nurse or the haemodialysis unit.

* If the patient suddenly develops difficulty in breathing or becomes unresponsive dial 999 for an ambulance. Discontinue dialysis as per emergency procedure (see appendix 2). Lay the patient flat with head supported on their side until emergency help arrives.

In 2014 MHRA issued new recommendations for the administration of IV iron which required that it be given by staff trained in managing anaphylaxis reactions and with resuscitation facilities available. The renal community reviewed this and identified that the iron product (Venofer) used for home patients had a low incidence of reaction and as a result it was agreed in UHL that it would continue to be available for self administration at home but patients should be made aware of the risk of reactions and that they should be supplied with an adrenaline auto-injector and trained in its use and this should be documented in their notes.

4. Education and Training

All home haemodialysis patients will require training on the self-administration of intravenous iron

5. Monitoring and Audit Criteria

Key Performance Indicator	Method of Assessment	Frequency	Lead
Iron status in home haemodialysis population	Audit of compliance with guideline	annual	Home HD leads
Adverse reactions to IV iron in home haemodialysis population	Datix incidents	annual	Home HD leads

6. Legal Liability Guideline Statement

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

7. Supporting Documents and Key References

- Summary of safety information Venofer 1998 pp 3-13(Appendix 1)

- MacDougall IC et al: Beneficial Effects of Adopting Intravenous Iron Policy in a haemodialysis unit. Am J Kid Dis 1999;34:S40-S46
- European Best Practice Guidelines for the Management of Anaemia in Patients with Chronic Renal Failure. Target Guideline 6 Assessing and optimising iron stores pp 10-11 iron stores pp 10-11
- NICE Guidance on Anaemia Management in People with Chronic Kidney Disease 2015 (<http://guidance.nice.org.uk/CG114>)

8. Key Words

Anaemia, intravenous iron, self-administration, home haemodialysis

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APPENDIX 1

TRAINING PROGRAMME FOR THE SELF-ADMINISTRATION OF INTRAVENOUS IRON BY HOME HAEMODIALYSIS PATIENTS

The nurse involved in both training and supervision needs to be competent in both haemodialysis and for administration of IV iron on haemodialysis, and in possession of ENB 998 or equivalent.

1. AIM

The aim of this training programme is to ensure that home haemodialysis patients and carers administering IV iron at home have a thorough knowledge and understanding of:-

- the principles and procedure relating to the administration of IV iron
- the potential side effects and how to deal with them.

2. OBJECTIVES FOR NURSE

- To provide evidence based education with regard to the relevance and benefits of anaemia physiology and iron management.
- To provide evidence based education with regard to the potential problems that may occur with the administration of IV iron
- To demonstrate competency in the practical skill of iron administration
- To demonstrate the correct disposal of equipment
- To provide supervised practice and experience in the administration of IV iron whilst on haemodialysis
- To assess each carer's practical and theoretical ability to administer IV iron during a haemodialysis treatment

3. OBJECTIVES FOR PATIENT/CARER

- To understand the relevance and benefits of iron management and anaemia physiology
- To gain an evidence based understanding for the use of iron
- To understand the method of administration
- To demonstrate competency in the practical skill of iron administration
- To understand the potential problems that may occur
- To demonstrate the correct disposal of equipment

4. TRAINING PROGRAMME

Formal competence assessment is mandatory prior to administering IV iron unsupervised

To complete the competence assessment for administering IV iron you will need to complete the following:-

Part One: Underpinning knowledge

Receive guidance and instruction by a registered nurse.

Part Two: Supervised practice

Having successfully completed Part One, you will be required to undergo practice under supervision. The duration of this will be a minimum of 2 observed and supervised practices. When both you and the supervising nurse are confident about the procedure then you will proceed to Part Three

Part Three: Practical assessment

Your assessor will observe you formally to assess your ability to administer IV iron safely at home
Assessor Profile- Registered Nurse competent in both haemodialysis and for administration of IV iron on haemodialysis, and in possession of ENB 998 or equivalent.

On successful completion of all three parts of the assessment you may proceed to administer IV iron at home unsupervised during haemodialysis session

**LEICESTER GENERAL HOSPITAL
DEPARTMENT OF NEPHROLOGY
SELF ADMINISTRATION OF IV IRON TO HHD PATIENTS
COMPETENCY CHECK LIST**

PART 1: UNDERPINNING KNOWLEDGE

Element	Satisfactory	Initial of Assessor
The rationale for the need for IV iron is understood		
Describes indications and contraindications		
Describes signs and symptoms of an adverse reaction and how to manage such an event		
Describe potential risks associated with the procedure		
<u>Able to explain the purpose and use of adrenaline auto-injector</u>		

PART 2: SUPERVISED PRACTICE

The assessor will directly supervise and observe two episodes of IV iron administration checking the following elements

Element	1 st episode		2 nd episode	
	date	sign	date	sign
Correct equipment required for procedure identified and prepared				
Procedure is carried out safely and proficiently				
Equipment is disposed of correctly and safely				

Date of 1st Assessment:

Name of Nurse assessing

Signature of Nurse assessing

Signature of HHD patient

Signature of HHD carer

Date of 2nd Assessment:

Name of Nurse assessing

Signature of Nurse assessing

Signature of HHD patient

Signature of HHD carer

PART 3: PRACTICAL ASSESSMENT

Having successfully completed parts 1 and 2, the first administration of IV iron at home will be supervised by a home care nurse. All parties will sign off to confirm this was completed successfully.

Date of assessment:

Signature of Nurse assessing

Signature of HHD patient

Signature of HHD carer

Name of Nurse assessing

APPENDIX 2

EMERGENCY DISCONTINUING OF DIALYSIS

1. Open saline line.
2. Clamp arterial line
3. Adjust arterial gates as necessary
4. Reduce blood pump speed to 150ml/min.
5. When saline reaches bubble trap machine will alarm 'dialysis end' and automatically stop the pump.
6. Close clamps on venous line and venous needle.
7. Close clamp on arterial needle (arterial line already clamped)
8. Disconnect lines from needles.
9. Push machine to one side and leave it till later.
10. Deal with issue at hand