IRON INFUSIONS - PRE-DIALYSIS, PERITONEAL DIALYSIS AND HAEMODIALYSIS PATIENTS - SCH

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- This Guideline is intended for Intravenous Infusion of Iron in the form of iron polymaltose (Containing 100 mg iron in 2mL) for pre-dialysis, peritoneal dialysis and haemodialysis patients at SCH.
- Intravenous iron may be used to prevent iron deficiency and maintain adequate iron stores to sustain target haemoglobin level with, or without erythropoiesis stimulating agent therapy.
- Note: recommended target haemoglobin is the lower level of the normal range and reflects ranges for children with CKD maintained on erythropoiesis stimulating agent therapy.
- Target serum ferritin 100 to 500 microgram/litre, transferrin saturation 20-30%.
- Iron polymaltose is the only parenteral iron product suitable for total iron replacement.
- Due to the risk of anaphylaxis premedication is given and adrenaline and facilities for CPR must be available.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
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Team Leader:	Clinical Nurse Consultant Renal	**Area/Dept:** Nephrology SCH

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CHANGE SUMMARY

- Reference to hypochromic erythrocytes deleted, as not measured at SEALS
- Target ferritin and transferrin saturations have been adjusted to align with new guidelines.
- Contraindications, presentation and calculation for maintenance infusion rate sections added.
- Target haemoglobin levels changed to align more closely with CARI and KDIGO guidelines.

READ ACKNOWLEDGEMENT

- All medical, nursing and pharmacy staff involved in the prescribing, dispensing and administration of iron polymaltose intravenous infusion.

TABLE OF CONTENTS

Introduction

Intravenous iron may be used to prevent iron deficiency and maintain adequate iron stores to sustain target haemoglobin level with, or without erythropoiesis stimulating agent therapy. (Target dependent on the child's age – see below)

Iron deficiency is the most frequent cause of suboptimal response to erythropoiesis stimulating agent therapy.

Iron polymaltose is the only parenteral iron product suitable for total iron replacement.

Contraindications

Iron polymaltose (Ferrosig® or Ferrum H®) should not be given to patients presenting with any of the following conditions:

- Hypersensitivity to iron (iii) hydroxide polymaltose complex
- Iron overload
- Chronic polyarthritis
- Bronchial asthma
- Infectious or inflammatory renal complaints in the acute phase
- Uncontrolled hyperparathyroidism
- Decompensated hepatic cirrhosis
- Infectious hepatitis.
- 1st trimester of pregnancy

Absolute Iron Deficiency can be defined as:

- Serum ferritin <100mg/L
- Transferrin saturation (TSAT) <20 %

Target Maintenance Iron Levels

- Serum ferritin: 100 - 500 microgram/L.
- Transferrin saturation 20 – 30 %

Monitoring of Iron Levels

- Patients with chronic renal impairment should have regular 3 monthly checks - prior to commencing erythropoiesis stimulating agent therapy. (1)
- Monitor every 4 weeks from the commencement of erythropoiesis stimulating agent and when dose is increased.(2)
- Monitor every 3 months once target haemoglobin is reached. (1, 2)
- Monitor at least 1 week after doses of < 200 mg iron polymaltose, or 2 weeks after doses of > 200 mg iron polymaltose.

Prescribing Guide

Intravenous iron must be prescribed by a medical officer. Prescribers should prescribe on the IV fluid chart as: ….. mg iron (as iron polymaltose) in ….. mL 0.9% sodium chloride. The infusion rate should also be specified, ensuring that the rate is appropriate for the individual child.

All doses in this protocol are expressed as milligrams of elemental iron.

Dosing for peritoneal and pre dialysis patients: [3]

Elemental Iron dose (mg) =

body weight (kg) x (target Hb – actual Hb in g/L) x 0.24 + iron depot

Iron depot:

15 mg/kg body weight for children under 34 kg, or 500 mg for children over 34 kg.

Target Hb for children with CKD maintained on erythropoiesis stimulating agents:

6 months to 2 years = 110g/L

Over 2 years = 120g/L

Note: if ferritin levels are >500microg/L the dose of iron should be decreased[1].

Preparation:

- Doses higher than 500mg must be prepared in Sterile Pharmacy.
- Doses of 500mg or less may be prepared aseptically on the ward.
- Dose of 500mg or less are added to 100 – 500mL of 0.9% sodium chloride only. Do not use any other fluid. Do not add any other medication. Maximum concentration 5mg/mL. Minimum volume for infusion 100 mL.
- Draw up iron polymaltose using a filter needle.
- Change needle prior to loading bag; load bag using aseptic technique

Pre-medication:

- Pre-medications are usually used for the first and second doses. These should be given within 30 minutes of commencing iron polymaltose infusion.
- Hydrocortisone 2 mg/kg IV (maximum dose 100 mg)
- Paracetamol 15 mg/kg oral (maximum dose 1000 mg) do not exceed recommended daily maximum dose. Do not give if paracetamol was given in the last 4 hours.
- Promethazine 0.5 mg/kg IV (maximum dose 25 mg)

Administration

Where possible, IV iron polymaltose should be administered via veins that will not be used for future haemodialysis vascular access.

The infusion rate starts low and is gradually increased as tolerated according to the Infusion Rate table below.

Note: the maximum infusion rate of iron should not be faster than the rate that maintenance fluids would be given for the patient. The right column in the table indicates the rate at which the infusion should be capped, based on the patient's weight.

Infusion rate

Start at	15mL/hour for 30 minutes	
Then increase to	30mL/hour for 30 minutes	Do not increase the rate beyond 30mL/hr for patients weighing less than 15kg
Then increase to	60mL/hour for 30 minutes	Do not increase the rate beyond 60mL/hr for patients weighing between 15kg – 40kg
Then increase to	90mL/hour for 30 minutes	Do not increase the rate beyond 90mL/hr for patients weighing between 40kg – 75kg
Then increase to	120mL/hour for remainder of infusion	

Precautions

Due to the rare possibility of anaphylaxis it is recommended that facilities be available for cardiopulmonary resuscitation and that adrenaline, promethazine and hydrocortisone are available on the ward should they be required.

Note: Patient specific doses should be calculated and documented in the medical records by the medical team prior to the commencement of the infusion. Doses are only administered if required.

- Adrenaline 1:1000 injection (1mg/ml) (Dose: 0.01mg/kg IM to a maximum recommended dose of 1mg)
- Promethazine injection (Dose: 0.5mg/kg to a maximum of 25mg IV)
- Hydrocortisone injection (Dose: 2mg/kg to a maximum of 100mg for children < 12 years or 300 mg for children> 12 years IV)

Observations

Blood Pressure (BP), Pulse (P) and Respiration (R) rate must be attended and documented on the standard paediatric observation chart (SPOC) as follows:

- **Every 15 minutes** for **75 minutes**
- **Every 30 minutes** until the end of the infusion.

Note: If blood pressure or pulse rate change by 20% the infusion should be stopped and a **Clinical Review** call made. Specific limits for notification should be set and documented in

the medical records by the medical team prior to the commencement of the infusion. Refer to the SPOC for appropriate response depending on individuals observations.

Depending on patient's diagnosis the intervals of observations may be varied by the medical team.

Dosing for haemodialysis patients

	10-20 kg	20-35 kg	>35 kg
Protocol 1 Ferritin 0-300 microgram/L TSAT< 20%	25 mg iron weekly for 5 weeks	50 mg iron weekly for 5 weeks	100mg iron weekly for 5 weeks
Protocol 2 Ferritin 300-500 microgram/L and/or TSAT <20%	25 mg iron every second week for 3 doses	50 mg iron every second week for 3 doses	100 mg iron every second week for 3 doses
For Haemodialysis patients iron in the form of iron polymaltose is made up to 10mL. 0.9 % sodium chloride (normal saline) in a 20mL syringe and given over the last hour of dialysis via the heparin line.			

If ferritin is over 500 microgram/L consider fortnightly infusions at a lower dose and discuss with nephrologist. Check ferritin levels prior to next infusion.

Adverse Reactions to Iron Polymaltose Infusions

Note: Anaphylaxis can occur within the first several minutes of administration.

- Adrenaline and facilities for cardiopulmonary resuscitation must be available.
- Observe patient for early onset of the following symptoms (cease infusion and initiate a **Clinical Review** call):
  - Bronchospasm with dyspnoea
  - Faintness, syncope, tachycardia, hypotension, circulatory collapse
  - Flushing, sweating, chills and fever, chest and back pain

Less severe reactions:

- Observe patient for early onset of the following symptoms (cease infusion and notify doctor):
  - Nausea and vomiting (may be caused by excessive infusion rate)
  - Headache, dizziness
  - Joint and muscle pain, arthralgia, sensation of stiffness of the arms, legs or face
  - Rash, urticaria
  - Generalised lymphadenopathy

These less severe adverse reactions can be delayed by 1-2 days after treatment with iron polymaltose.

References

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