Liverpool Heart & Chest’s Anaemia Clinic
– how we set it up, how it works & our results so far

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A range of improvements have been jointly delivered to support conservative blood usage
- Pre-operatively
- Intra operatively
- Post operatively

Initial 2 year quality improvement plan with associated efficiency savings

**Year 1** - £58k CIP
**Year 2** - plan to release further £100K in 2018/9
Pre operative management of anaemia for cardiac surgery has provided significant improvements in both quality and efficiency.
Quality statement

People with iron-deficiency anaemia who are having surgery are offered iron supplementation before and after surgery.

Rationale

Preoperative anaemia is associated with increased postoperative morbidity and mortality, and with increased transfusion needs. Treating iron deficiency with iron supplements can reduce the need for blood transfusion. This avoids serious risks associated with blood transfusion, for example infection, fluid overload and incorrect blood transfusions being given. It may also reduce the length of hospital stays and the cost to the NHS. Depending on the circumstances, the cause of the iron deficiency should be investigated before or after surgery.
How did we set it up?
Identify the problem locally

- One surgeon
- Elective patients
- 6 month period
- Anaemia defined as Hb < 13g/dl
### Audit Results

<table>
<thead>
<tr>
<th></th>
<th>Anaemic</th>
<th>Not Anaemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>16</td>
<td>55</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>72.7 (55-83)</td>
<td>64.5 (44-83)</td>
</tr>
<tr>
<td>Mean pre op Hb (g/dl)</td>
<td>11.4</td>
<td>14.7</td>
</tr>
</tbody>
</table>
## Audit Results

<table>
<thead>
<tr>
<th></th>
<th>Anaemic</th>
<th>Not Anaemic</th>
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</thead>
<tbody>
<tr>
<td>Mean units transfused</td>
<td>2.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Median units transfused</td>
<td>3 (0-8)</td>
<td>0 (0-7)</td>
</tr>
<tr>
<td>% patients transfused</td>
<td>72.7%</td>
<td>31.3%</td>
</tr>
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</table>
How does it work— who, when, how
Patient Pathway

- Patient is listed to have cardiac surgery within 6 weeks: Full blood count is performed
- If Hb is below 130 g/l iron studies, TFTs and CRP are done by reflex order
- Anaemia list autopopulates, CNP and SA check and determine treatment
- CNP calls patient, SA writes to GP
- Ptn comes in for IV iron – Monofer – up to 20 mg/kg, in one visit
- Ptn comes in as planned for surgery
- Hb checked the night before
Who and where?

- Who will give the iron?
  - Perceived safety issues especially regarding anaphylaxis
- Day ward? Outpatients?
- An additional hospital visit or at a pre-existing one?
Logistical headaches

- Who will the patient be admitted under?
- Is this part of surgery or anaesthesia?
- How will the visit be captured, coded?
- Need to create EPR documents and visit
- Which tariff will we get?
Helpful things

- Reflex ordering
- Autopopulating lists
- Committed team
- Ability to do pre assessment simultaneously
- Ability to treat with >1g of IV iron in one dose
Business Case: Advantages

- Reduction in pre-operative anaemia
- Reduction in blood transfusion and wasted blood
- Potential for reduction in post-operative morbidity and mortality
- Economic benefits associated with reduced length of stay in hospital
- Use of Monofer (iron isomaltoside 1000) as IV iron, as allows total dose infusion in one visit, up to 20mg/kg – important as not sufficient time or capacity to allow multiple visits
Business Case: challenges

- Requirement for additional staffing
- Requirement for training of staff
- Not able to “stop the clock” – everything needs to be done within the existing patient pathway
- Important therefore to treat, up to 20 mg/kg, in one visit
Finances : Expenditure : How much will it cost?

- Capital Expenditure: zero
- Operating expenditure: on-going revenue costs i.e. IV cannulation consumables, cost of Iron, repeat blood tests and additional costs associated with patient contact.
- Non-Operating Expenditure: as there is zero capital cost there are zero depreciation and capital charges.
- Staffing costs – 1 additional consultant PA.
  Incorporated into pre op Nurse Practitioner role
  with slight increase in hours - £8k pa
Finances : Income : How much will you save / gain?

- **Operating Income:**
  - There is a new national tariff for HRG SA04F - Iron Deficiency Anaemia without CC = £284 per day case
  - During the trial patients have been managed as part of the OPD tariff
  - The cash flow also includes revenue saving for associated blood products – specifically red cells currently costing £122 per unit.
  - Each patient treated pre-operatively is estimated to save 2 units of red cells.

Results so far:

- 100 patients analysed
- No adverse events or safety issues reported to date
- No anaphylaxis
- No hypophosphataemia
Rise in Hb – mean 1.1g/dl

LHCH internal data
Expansion plans

- Pre operative thoracic patients
- Urgent inpatients
- Post operative anaemia

Next steps

Further audit to identify true savings in reduction of blood use and any markers for LOS and mortality/morbidity

Potential for nurse led anaemia service
Questions?
Monofer® (iron isomaltoside 1000) prescribing monitoring

▼ This medicinal product is subject to additional monitoring, and healthcare professionals are asked to report any suspected adverse reaction.

Note: Before prescribing please read full Summary of Product Characteristics.

Pharmaceutical form: Iron isomaltoside 1000 is a dark brown, non-transparent solution for injection/infusion. Presentations: Iron in the form of iron isomaltoside 1000; 100 mg/ml available in vials of 100 mg/ml, 500 mg/5 ml and 1,000 mg/10 ml. Indications: Monofer® is indicated in patients ≥18 years for treatment of iron deficiency when oral iron preparations are ineffective or cannot be used or when there is a need to deliver iron rapidly. The diagnosis must be based on laboratory tests. Administration: Each IV iron administration is associated with a risk of a hypersensitivity reaction. Thus, to minimise risk, the number of single IV iron administrations should be kept to a minimum. The cumulative iron need can be determined using either the Simplified Table or the Ganzoni formula, please consult full Summary of Product Characteristics. Monofer® may be administered as an IV bolus injection of up to 500 mg at an administration rate of up to 250 mg iron/minute up to three times a week, during a haemodialysis session directly into the venous limb of the dialyser under the same procedures as outlined for IV bolus injection, or as an up to 20 mg iron per kg body weight infusion. If the cumulative iron dose exceeds 20 mg iron per kg body weight, the dose must be split into two administrations with an interval of at least one week. It is recommended whenever possible to give 20 mg iron/kg body weight in the first administration. Dependent on clinical judgement the second administration could await follow-up laboratory tests. Doses up to 1,000 mg must be administered over >15 minutes; dose above 1,000 mg must be administered over ≥30 minutes. In case of infusion, Monofer® should be added to maximum 500 ml sterile 0.9% sodium chloride. Contraindications: Non-iron deficiency anaemia, iron overload or disturbances in utilisation of iron, hypersensitivity to any of the ingredients, decompensated liver disease, or known serious hypersensitivity to other parental iron products. Warnings/Precautions: Parenterally administered iron preparations can cause potentially fatal anaphylactic/anaphylactoid reactions. The risk is enhanced for patients with known allergies, a history of severe asthma, eczema or other atopic allergy, and in patients with immune or inflammatory conditions. Monofer® should only be administered in the presence of staff trained to manage anaphylactic reactions where full resuscitation facilities are available (including 1:1000 adrenaline solution). Each patient should be observed for at least 30 minutes following administration. If hypersensitivity reactions or signs of intolerance occur during administration, the treatment must be stopped immediately. In patients with compensated liver dysfunction, parental iron should only be administered after careful benefit/risk assessment. Careful monitoring of iron status is recommended to avoid iron overload. Parenteral iron should be used with caution in case of acute or chronic infection. Monofer® should not be used in patients with ongoing bacteraemia. Hypotensive episodes may occur if intravenous injection is administered too rapidly. Caution should be exercised to avoid paravenous leakage when administering Monofer®. Pregnancy: Monofer® should not be used during pregnancy unless clearly necessary. The treatment should be confined to second and third trimester. In rare cases, foetal bradycardia has been observed in pregnant women with hypersensitivity reactions. Undesirable effects: No very common (≥10 %) undesirable effects listed. Common undesirable effects (1 % to 10 %): nausea; injection site reactions. For information on other undesirable effects, please consult full Summary of Product Characteristics. Legal Category: POM. Package Quantities and basic Prices: 5 vials of 1 ml, £84.75; 5 vials of 5 ml, £423.75; 2 vials of 10 ml, £339.00. Marketing Authorisation Number/Holder: PL 1830/0001, Pharmacosmos A/S, Roervangsvej 30, DK-4300 Holbaek, Denmark. Date of preparation: June 2017. Further information is available on request to Pharmacosmos UK.

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard. Adverse events should also be reported to Pharmacosmos UK Ltd.

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