IronMan

Preoperative **Iron** use across Greater **Man**chester

Phase 1

Contents

1. IronMan Team

As with all the work of the trainee research networks (TRNs) this project was only made possible through the contribution of volunteering clinicians, especially trainees, around the region. We know it is essential to recognise this time and effort and we want to highlight their contribution here at the start. Thank you to everyone who was part of the IronMan team.

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2. Introduction

Perioperative anaemia is recognised as having a significant impact on patient outcomes following major surgery, with iron deficiency being the commonest cause of this (1-6). This includes an increased risk of mortality, AKI, and a need for allogeneic blood transfusion. Blood transfusion is expensive and may result in worse outcomes for patients. Indeed, this may be a contributing mechanism for the poorer outcomes that have been seen. There is therefore increasing emphasis on the importance of optimising patients' haematological status throughout the perioperative period to minimise both anaemia and related blood transfusion. Appropriate preoperative iron supplementation is one key part of this pathway. However, two interacting factors can pose challenges to the use of oral iron supplementation. Firstly, the short time window prior to surgery can limit the time available for oral iron therapy to augment heamoglobin levels. Secondly, the increased hepcidin levels associated with an inflammatory state (for instance, in malignancy) has been identified as reducing the utilisation of enteral iron (7). As such, intravenous (IV) iron has been explored as potentially being more effective in cases of a short preoperative optimisation window.

However, the PREVENTT study (8) has recently suggested a more limited benefit from preoperative IV iron therapy. Whilst haemoglobin levels appeared to increase for the operative day and later postoperative days, this did not translate into reduced transfusion rates or improved mortality. As such, this may change IV iron perioperative practices, especially given the cost and logistical challenges associated with its use and uncertainty about its benefits(9).

Anecdotally, the practice of perioperative anaemia management varies between trusts within the Northwest of England. This is especially true for IV iron. This project aims to explore the current systems in place for managing preoperative anaemia in the Northwest of England. Phase 1 of this project was designed as a snapshot of current practices across the region to provide the foundations for further assessment.

3. Goals

The primary goals of the IronMan project are to:

1. Understand the local systems in place across the North West for managing preoperative anaemia, with a focus on perioperative iron therapy.
2. Share examples of effective systems for effectively managing preoperative anaemia, with potential for subsequent service development opportunities.
3. Provide educational opportunities for participating trainees around the related aspects of perioperative care, as well as QI methodology.

4. Specific Objectives

1. Is there a local policy/strategy for identifying and managing preoperative anaemia?

2. How are patients identified?
3. How are patients assessed/triaged for anaemia treatment?
4. Is there a facility for IV iron therapy?
5. How is IV treatment delivered?
6. What are the barriers to optimising patients' haemoglobin prior to theatre?

5. Methods

The formation of the project group followed standard North West Research and Audit Group (NWRAG) procedure. Trainee site leads were recruited via open invitation to those on the NWRAG and trainee mailing lists, social media promotion and regional anaesthetic trainee email list. The lead trainee was responsible for data gathering from their trust, and encouraged to identify a consultant site lead. Questions were provided through a Google Forms link, with a paper proforma as backup. Trainee leads were given basic advice on potential sources of useful information, but the majority of the approach was left at the discretion of the local team, given the anticipated variations between hospital sites. This information was then returned to the central project team for consolidation and analysis.

The project focused purely on elective adult surgical pathways and did not aim to explore anaemia pathways in paediatric or emergency surgical populations.

6. Results

I - Background Information

We received responses from 10 of 12 potential hospital trusts across the region.

The range of surgical specialties across these hospital sites is shown in Figure 1

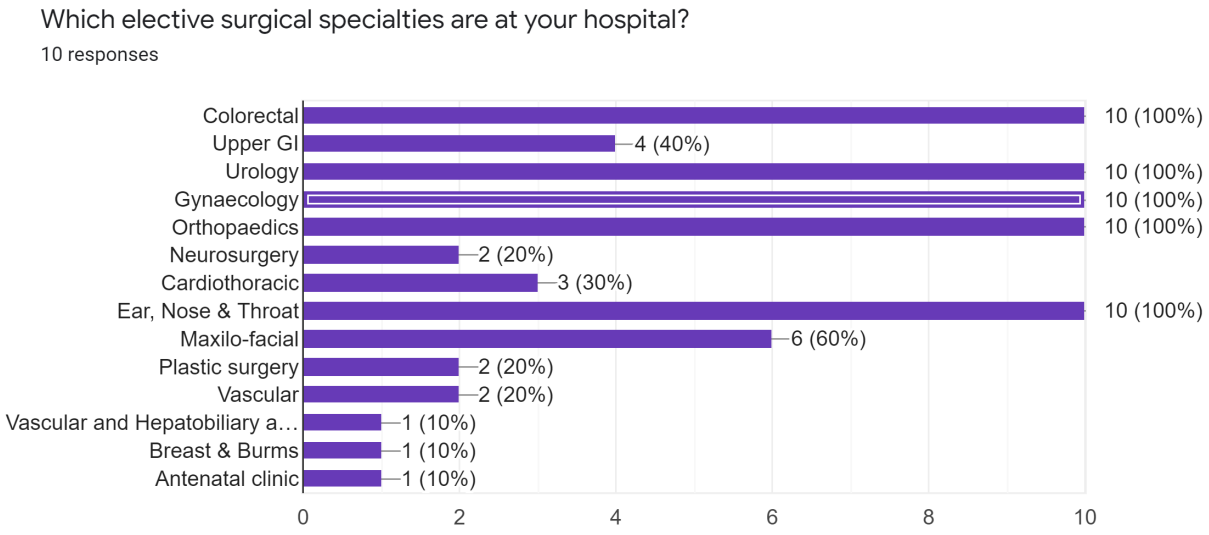

Figure 1. Distribution of surgical specialties

II - Preoperative IV Iron Policy

All 10 trusts that responded had a policy on the management of pre-operative anaemia.
9 out of 10 trusts had a policy for the use of IV iron preoperatively.

The access to IV iron across sites showed a similar distribution across the specialties, accounting for the single trust that did not provide the service (Figure 2)

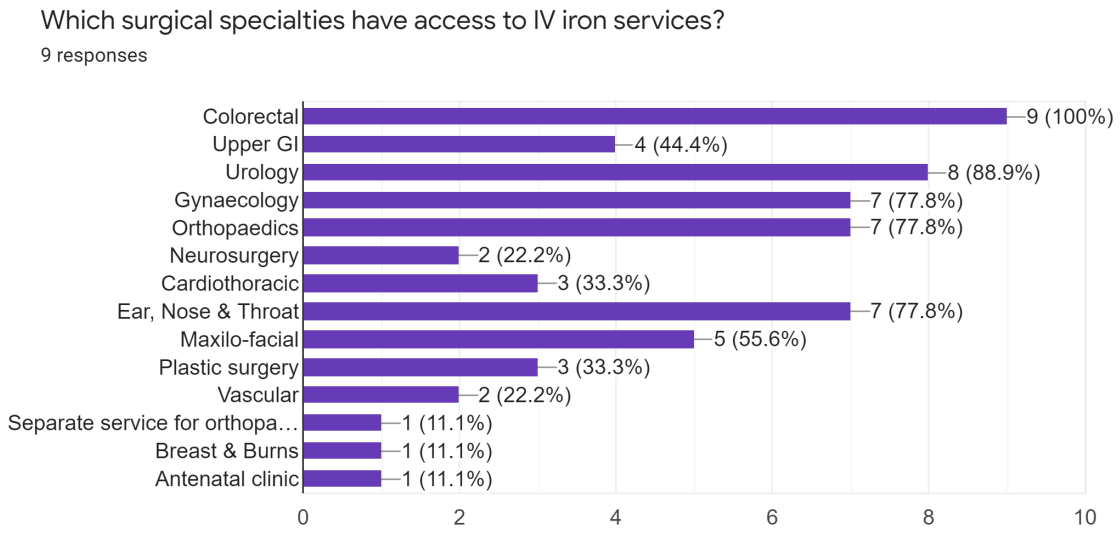

Figure 2. Availability of IV iron to surgical specialities

III - Indications for IV iron therapy

There was a range of differing indications for IV iron across sites.
Iron deficiency anaemia was the most commonly described (7 of 9 sites).
The remaining sites described *iron deficiency* or *microcytic anaemia* as indications.

Anaemia was defined as:

- <130g/L (4/7 sites)
- <109g/L
- <110g/L (women) or <125g/L (men)
- “Consultant preference”

Iron deficiency was defined as:

- Ferritin <30mcg/L (4/8 sites)
- Ferritin <30mcg/L + iron sats <20%
- Unspecified i.e. just “Iron deficiency” (3/8 sites)

Ferritin <100mcg/L and CRP >5mg/L was defined as an alternative to ferritin <30mcg/L at one site.

Additional requirements were stipulated in a number of protocols:

- Timeframe to surgery
    - 3 months

    - “Urgent”
    - Under 8 weeks (or if oral failed)
    - “Too short for oral iron to be effective”
- Relationship to oral iron therapy
    - Previous trial of oral iron (2 sites)
    - 4 week trial of oral iron (if over 8 weeks from surgery)
- On cancer pathway
- Over 18 years old

IV - Administration

The majority of IV iron therapy is delivered in a day unit environment (7 of 9 sites).
One site delivered the therapy through an IV community service.
Other sites where therapy was delivered included:

- Antenatal clinic
- Haematology department

The majority of therapy was delivered by departmental nursing staff (6 of 8 sites)
Advanced nurse practitioners delivered therapy at the remaining 2 sites.

V - Prescription

The therapy is prescribed by different clinicians at different sites:

- Advanced nurse practitioner (3 sites)
- Surgical consultant (2 sites)
- Anaesthetist in pre-op (2 sites)
- Ward doctor (as alternative to anaesthetist at 1 site)
- Pharmacist (1 site)

It was unknown who prescribed the therapy at one site.

VI - Funding

The source of funding was also highly variable across sites, and sometimes unclear:

- Surgical department (3 sites)
- CCG (2 sites)
- Anaesthetic department (1 site)
- Medical department (1 site)

Preparation

- Ferinject (7 sites)
- Monfer (2 sites - with Ferinject available as alternative at 1 site)

VII - Postoperative IV Iron

Only 1 site had a clear policy for the postoperative provision of IV iron therapy. At one other site the policy was unknown and the remaining sites had no policy.

At this site the therapy was delivered on the post-operative ward or in the community by the nursing staff. It was prescribed by the ward doctors.

7. Analysis

The broad coverage of the project, including the vast majority of acute hospital trusts in the region, allows insight into current practices.

Firstly, the wide variation in definitions employed at different sites is striking, with differing definitions for both anaemia and iron-deficiency blended with different indications for starting IV iron therapy. Although the option for clinician decision in initiating therapy may have advantages, the variation in defining some key terms is less beneficial. Such definitions and treatment thresholds vary in some of the published research and it would be interesting to note the decision making behind the choice. This would seem particularly relevant in translating the research outcomes into clinical practice.

The logistics of providing iron therapy are also insightful. The utilisation of a day unit environment seems to have the clearest preference for most hospital sites. However, it is interesting to note the alternative approaches, most specifically the utilisation of a community IV team at one site. The advantages and challenges of such a strategy would be valuable to explore further. The “ownership” of the process is also an interesting logistical challenge, with the varying approaches clearly being outlined in these results with the range of different funders and prescribers. As would be expected, the multidimensional nature of the patient’s perioperative journey means that there are a large number of specialties that participate in their care. Whilst this could potentially cause an absolvement of responsibility for the cost of such a general intervention, it is interesting to see that different outcomes have been able to be negotiated in the varying pathways. This would also be a fascinating area for further inquiry. Finally, it would seem that Ferinject is the formulation that has proven to be the most popular across the region. Again, the reasons for this would be worth exploring in future work.

One of the main limitations of this study is the potential heterogeneity of pathways within larger trusts. Certain specialties, for instance cardiac surgery or obstetrics, seem likely to have different approaches than other elective specialties. In addition, it is also possible that different geographical sites within the same trust may employ notably different approaches in some of these perioperative pathways. Further description of such differences may be helpful in future analysis, although the current granularity within this study still provides valuable insights in regards to the study design.

8. Concluding Remarks

The first phase of the IronMan project has been able to offer insights on the management of perioperative anaemia across the region. Areas of similarity and difference have been identified and described in some details. Ultimately, these results provide an excellent foundation for further work in this area. Many of these will be tackled by phase 2 of the IronMan project which will draw heavily on these results in its design. We also encourage the utilisation of these results at local sites across the region to continue to develop and improve perioperative medicine.

For any further information on the project, please contact the project team through the NWRAG websites (www.nwrag.co.uk).

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