

# Perioperative Anaemia Management in Severn (PAMS) Project – A Quality Improvement Initiative

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## Introduction

Care of patients with perioperative anaemia is a national priority<sup>1</sup>, as anaemic patients are not just more likely to need transfusion, but are at higher risk of perioperative complications and death<sup>2</sup>. National guidelines state that all patients with iron deficiency anaemia should be offered iron supplementation before and after surgery, and elective non-urgent surgery should be delayed to allow optimisation<sup>3</sup>. Adequate treatment of perioperative anaemia can reduce the need for transfusion (along with its associated risks) and reduce hospital length of stay consequently lessening healthcare expenditure<sup>4</sup>. As a haemoglobin (Hb) of <13g/dL has been shown to adversely affect patient outcomes<sup>5</sup>, the 2017 International Consensus statement recommends targeting this Hb level in both men and women perioperatively<sup>6</sup>. Patient blood management has also been identified as a holistic element of care in reducing the incidence of perioperative anaemia<sup>7</sup>.

The Perioperative Anaemia Management in Severn (PAMS) project aimed to:

- Establish the proportion of patients with preoperative anaemia in the Severn region
- Identify differences in transfusion rates, length of hospital stay and complications between anaemic patients and non-anaemic patients
- Appreciate differences in the management of preoperative anaemia throughout the region, and identify any impact on patient outcomes
- Identify any variance in practice that would be amenable to a Quality Improvement process
- Empower local health care providers to initiate change in their local institutions

## Methods

Data was retrospectively reviewed for all patients enrolled in the Perioperative Quality Improvement Programme (PQIP) in the Severn Region over a 2 year period across 3 trusts; 2 tertiary centres and 1 district general hospital (DGH). All patients with a Hb < 13g/dL were identified and data on patient demographics, preoperative parameters, intraoperative parameters, Day 7 postoperative morbidity survey and discharge information were reviewed.

In addition, original data was collected from each trust on local guidelines for preoperative anaemia management, along with measures employed locally to reduce intraoperative blood loss including cell salvage availability and routine use of tranexamic acid.



## Results

A total of 511 patients were reviewed from three trusts, with 165 (32%) patients being identified as anaemic prior to a variety of surgical interventions (Figure 1). Average age, ratio of M:F and ASA were comparable between sites.

### Incidence and intraoperative management

The incidence of preoperative anaemia was high and varied between trusts (range 28.6% - 41.2%), with surgical speciality significantly contributing to prevalence (lower GI 41.8%, upper GI 31.6%, Spinal 28.7%, Trauma and Orthopedics 16.7% and Head and Neck 14.2%). The median Hb however were similar between trusts (12g/dL (IQR 1.6) vs. 12g/dL (1.5) vs. 11.85g/dL (1.6)). The majority (51%) had mild anaemia (12-12.9g/dL, but one patient had a Hb of less than 7g/dL preoperatively).

Rates of moderate blood loss (>500mls) were higher amongst anaemic patients (12.4% vs. 7.4%) but transfusion rates were low across all trusts (4.3% vs. 1% vs. 0%). All sites had access to intravenous iron and cell salvage, with prophylactic tranexamic acid use varying depending on type of surgery (present in protocols for specific specialities including joint replacements and cardiac surgery).

### Postoperative Outcomes and location of care

Post operative complications were generally more prevalent in anaemic than non-anaemic patients: pulmonary (3% vs. 0.8%), cardiac (1.8% vs. 0%), wound infections (1.8% vs. 1.7%), with similar incidence found across all 3 sites. However, length of stay was not affected when patients were grouped by surgical speciality: Colorectal 4.5 days vs. 4 days, Upper GI 5 vs. 5.

Unplanned postoperative critical care admissions were not markedly different between anaemic and non-anaemic patients, although patients at the DGH were significantly more likely to be admitted unplanned than either of the tertiary centres. Documentation of preoperative risk was generally poor, even in those patients undergoing major surgery.

### Management of preoperative anaemia

All patients are assessed for anaemia at preoperative assessment clinic, whilst management of anaemia varied between trusts (table 1). Anaemia was screened for using either point of care (POC) testing or full blood count; prevalence of anaemia was lower at the hospitals using point of care testing. One trust used the diagnostic criteria of 13g/dL for both sexes, whereas the other trusts still used different values for men and women. Criteria for IV iron varied between trusts; it was automatically offered if there were less than four weeks until surgery in 2 hospitals, with the third requiring consideration by a Consultant Anaesthetist.

## Conclusion

A high proportion of patients presenting for elective surgery across the South West are anaemic, although slightly fewer than the national average of 41%, and there are some regional differences in the assessment and management of these patients. The increased rate of complications and transfusion in anaemic patients, although not significant in this data, is in keeping with the literature.

The challenges of optimising Hb in particular cohorts of patients is well described (such as patients undergoing cancer operations who cannot be delayed or who are bleeding), and so the emphasis should be on multifaceted management that is reviewed at every stage of the patients care pathway to ensure treatment options are not disregarded.

Regional variance in preoperative management has highlighted the importance of early intervention, with the suggestion that screening with POC testing can facilitate earlier treatment of iron deficiency anaemia and reduce its incidence. This, along with continued use of different treatment criteria for male and female patients, is a point to be emphasised in local quality improvement work to follow on from the initial phase of this study. In addition the provision of IV iron preoperatively, and potentially postoperatively, should be standardised, integrated into care pathways, and be available to all who meet the appropriate criteria. This will also be a focus for improvement of services moving forwards.

TABLE 1: PREOPERATIVE ANAEMIA MANGEMENT PATHWAYS

	Hospital 1	Hospital 2	Hospital 3
Screening method	FBC and haematinics	POC testing and formal bloods	POC testing and formal bloods
Treatment threshold (g/dL)	12 in women 13 in men	13 in all	12 in women 13 in men
When is oral iron started	After results of FBC (normally via GP)	In clinic or GP from POC results Discontinued if not iron deficient a	In clinic or GP from POC results Discontinued if not iron deficient
Is IV iron available	If surgery < 4 weeks	Consultant decision	If surgery < 4 weeks
Criteria for IV iron	Ferritin<30mcg/L Ferritin 30-100mcg/L and blood loss>500mls	Ferritin<100mcg/L Ferritin 30-100mcg/L and CRP>5	Ferritin<30mcg/L Ferritin 30-100mcg/L and Tsats<20%

### References

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FIGURE 1: PROPORTION OF PATIENTS UNDERGOING SURGERY BY SURGICAL SPECIALTY

