# Optimising Preoperative Anaemia Management for Cardiac Surgery

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#### Introduction:

- Preoperative anaemia has been independently associated with adverse outcome and red cell transfusion in cardiac surgery [1].
- Consensus guidance [2] and NICE quality standard 138 [3] requires investigation of anaemia and correction of iron deficiency prior to surgery.

# Audit of current practice:

- 108 elective patients were reviewed at UHSFT (Jul–Aug 2016)
- Prevalence of anaemia was 30%
- Anaemia was defined as Hb < 130 g.l<sup>-1</sup> for men, and < 120 g.l<sup>-1</sup>

## Preoperative Anaemia Clinic:

• A pilot preoperative anaemia service was set up in May 2017. Patients were screened in the surgical OPD using a HemoCue<sup>®</sup> near patient device. Haematinics were then tested and followed up for treatment indications.

- The identified causes of anaemia in the first 25 patients were:
  AID 64% (16), FID 8% (2), 12% Haematological (3), 12% ACD
- 8% (2) and CKD (stage 4 or worse) featured in 8% (2) of cases.

## **Results:**

- We then compared AID/FID patients (n = 15) treated on the pathway to baseline audit anaemic patients
- Mean age was 73 yrs (SD 8) vs 69 yrs (SD 10.7), Mean

for women according to WHO criteria.

• 32 anaemic and 76 non-anaemic patients were compared for transfusion and hospital outcomes (See Table 1)

 Data was collected from validated surgical databases and UHS laboratory IT systems

• The median preoperative time from OPD appointment to surgery was 76 days (IQR 41-126). In this time, mean Hb for anaemic patients fell from 120 g.I-1 (SD 14.8) at admission to 116 g.I-1 (SD 9.2) prior to surgery. Average Hb for non-anaemics was 142g.I-1 (SD 12.8).

Table 1: Preoperative Anaemia Outcomes (Elective patients):			
Demographic differences *	Group 1	Group 2	Significance
	(Anaemic)	(Normal <u>Hb</u> )	(p values) <sup>/</sup>
	n = 32	n = 76	
Median LOS CICU/HDU	5.0 [3-6.3] 1-31	3.0 [2-5]1-29	0.06
Median Hospital LOS	11 [7.7-15.7]5-32	8.0 [7-11.8]4-36	0.04
Mortality	9% (3)	0% (0)	N/A
Chest re-opening (any cause)	6% (2)	2.6% (2)	N/A
CNS Complications	6% (2)	1.3% (1)	N/A
Renal Complications	12.5% (4)	0% (0)	N/A
Infective Complications	12.5% (4)	2.6% (2)	N/A
Arrythmia	12.5% (4)	13% (10)	N/A
Transfusion	100% (32)	28% (21)	N/A

 $^{st}$  Mean (sd) for continuous data. All other data () denotes numbers of participants

⁺ Mean (s̪d, Range)

<sup>f</sup> = p values for independent samples T-test (continuous variables) and Fishers exact test (categorical variables).

• Mean Euroscore for anaemic patients was 6.7 (SD 2.9) vs 5.9 (SD 2.7) for non-anaemics (p=0.17).

• Among anaemic patients, there were 17 diabetics (53%), 26 hypertensives (81%), 6 patients (19%) with pulmonary disease (2 current smokers), 2 previous TIA (6%), 4 LMS disease (9%) and no patients with LV < 30%

Median bypass times were 93 min (IQR 77-123) and 104 min (IQR 82-127) respectively.
Median cross clamp times were 64 min (IQR 49-80) and 72 (IQR 56-95) respectively.

<u>Euroscore was 6.0 (SD 2.3) vs 6.7 (SD 2.9)</u>.

• There were 6 diabetics (40%), 10 hypertensives (67%), 3/15 (20%) had pulmonary disease (2 current smokers), 2 previous TIA (13%), 2 LMS disease and no patients with LV < 30%

• Median cross clamp times were 53 min (IQR 43-65) and CPB times 80 min (IQR 68-90)

• Average Hb was 111g.I-1. Four patients were treated with IV iron (MonoFer<sup>®</sup>). 3 patients had their operation undertaken at Spire Southampton.

• There were no deaths or multiorgan failures in the treated anaemic patients, 1 chest reopening, no CNS, renal, infective complications and 3 arrhythmias.

• Median hospital LOS was 9 days (IQR 6.2-13.5) vs 11 days (7.7-15.7).



#### Transfusion outcomes:

• Mean allogeneic blood use in pathway patients was 2.0 units (SD 1.8) vs 3.3 units (SD 2.3) in baseline anaemics.

• The mean total cost per pathway patient was £615 vs £862 in non-pathway patients with the mean cost of RBC dropping from £395 to £251/ patient

#### Transfusion outcomes:

• Mean allogeneic blood use in anaemic patients was 3.3 units (SD 2.3) vs 1.7 units (SD 1.8) in non-anaemics.

• There was no significant difference between groups in the use of octaplex, FFP, platelets or cryopreciptate. The mean total transfusion cost per patient was £853 in anaemic patients vs £576 for non-anaemics (£277). RBC use accounted for £233 of this was.

• There was no significant difference between discharge haemoglobin in the anaemic group (99 g.l-1, SD 0.9) and the non-anaemic group (108 g.l-1, SD 1.2).

#### References:

In pathway pts, blood product use also appears slightly lower
Mean platelets (0.7 vs 1.2 pools), mean octaplex (467 vs 531), mean cryoprecipitate (0.5 vs 0.6), mean FFP (0.5 vs 0.6 units).

• There was no significant difference between discharge haemoglobin in the anaemic group (99 g.l-1, SD 0.9) and the non-anaemic group (108 g.l-1, SD 1.2).

## Conclusions:

- A high proportion of anaemic patients have iron deficiency in cardiac surgery
- A preoperative anaemia service is feasible by screening in OPD
- Treatment may save 1.3 units RBC/ patient
- Outcomes (LOS) may be improved in IDA patients with iron therapy. We will be entering UHS patients into a current RCT from this this year. [4]

1. Hung M, Besser M, Sharples L, Nair S, Klein A. The prevalence and association with transfusion, intensive care unit stay and mortality of preoperative anaemia in a cohort of cardiac surgery patients. *Anaesthesia* 2011; **9**: 812-8.

- 2. Munoz et al. International consensus statement on the peri-operative management of anaemia and iron deficiency. Anaesthesia 2017, 72, 233-247
- 3. National Institute for Heath and Care Excellence Blood Transfusion Quality Standard 138. December 2016. nice.org.uk/guidance/qs138 (accessed Feb 2018)

4. <u>https://www.itacs.org.au/</u> (Accessed 15.02.2018)