

Tackling Increasing Blood Transfusion rates in Obstetrics at Royal Cornwall Hospital

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Background

Intraoperative cell salvage has been embedded in obstetrics at Royal Cornwall for 15 years

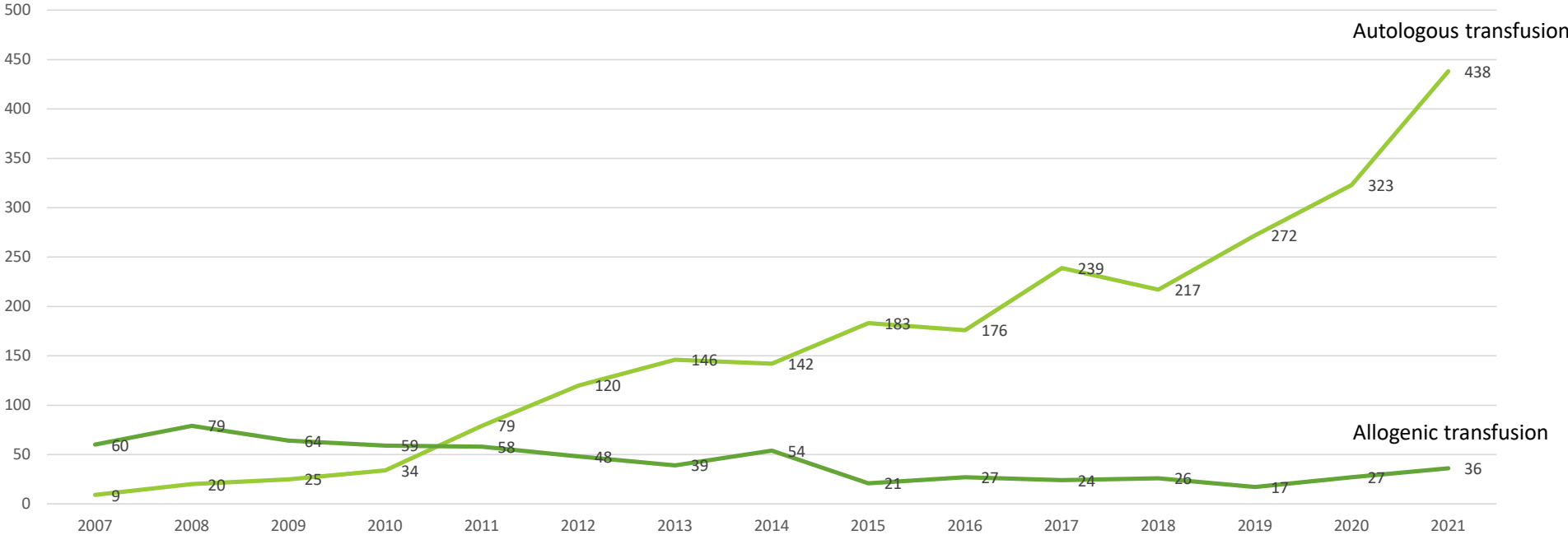
- Better oxygen delivery
- Reduced risk of viral transmission
- Reduced negative immunomodulatory effect
- Jehovah's Witnesses
- Conserves precious resource
- Able to donate blood in future!

Increasing autologous reinfusion rates

Noted increased blood product transfusion since 2019

Blood transfusions at RCHT

Autologous and Allogeneic Transfusions 2007-2021



Breakdown

36 patients received blood products

- 61 x RBC
- 12 x FFP
- 8 x cryoprecipitate
- 1 x platelets

Concurrent ICS use

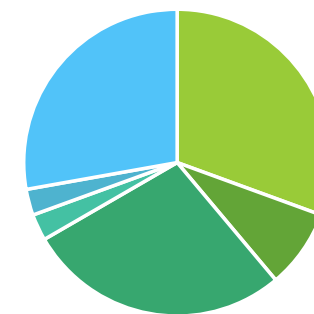
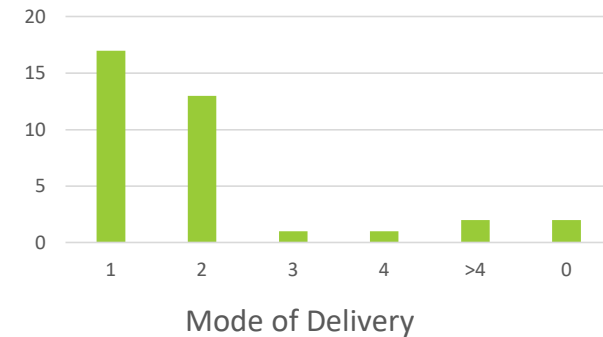
- Saved equivalent of 10 further units RBC

29% C-section – ICS reinfused in 45%

71% Vaginal delivery

Transfusion in 0.89% of deliveries

Units (RBC) Transfused



■ Forceps ■ Kiwi ■ SVD ■ ERPC ■ Miscarriage ■ Caesarian Section

Appropriate?

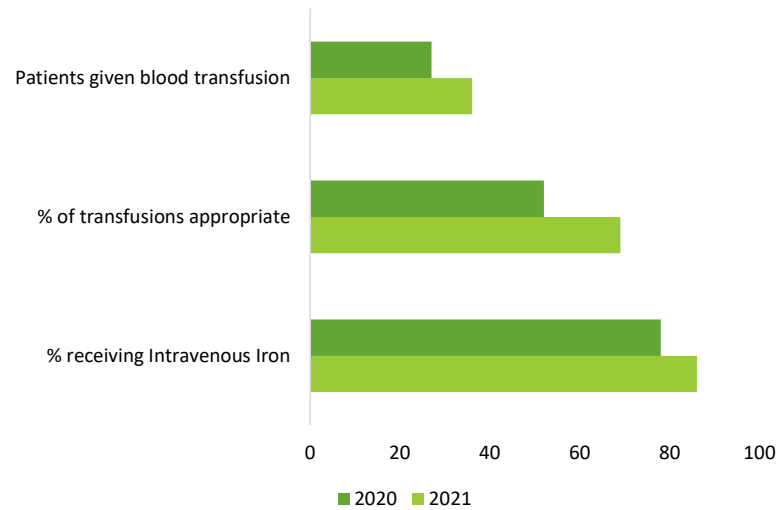
Symptomatic Anaemia/ Hb <60g/L

Massive PPH

On advice of specialist teams

Management of coagulopathy

- ROTEM use = ↓ FFP



Symptomatic Anaemia

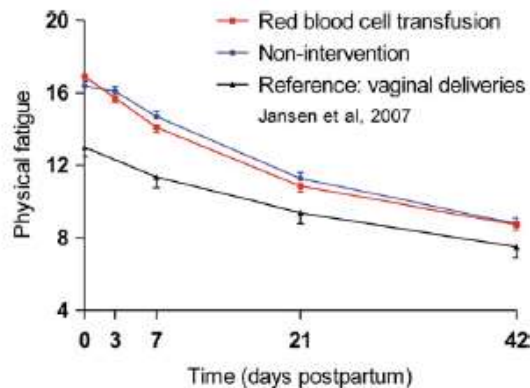


Figure 2. Physical fatigue score in randomised women ($n = 447$). Analysis of variance estimates of means, error bars represent standard errors. Reference curve obtained from the pilot study that included 141 consecutive women delivering in hospital. Seventy-one women delivered vaginally; in these women, median blood loss was 300 ml.⁹

Prick et al 2014

Post-PPH >1L

Hb 48-79g/L

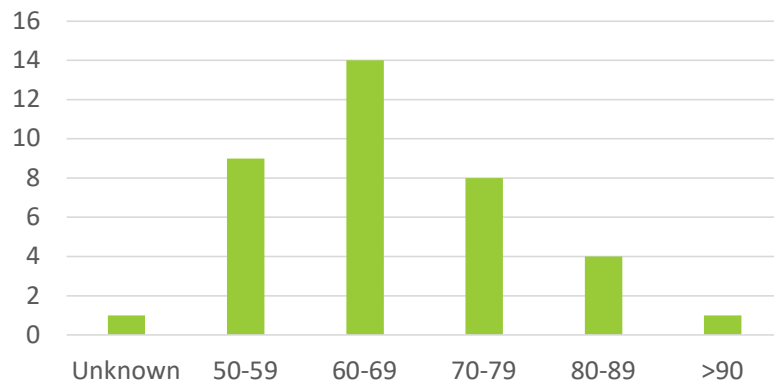
Randomised to transfusion (259) vs no transfusion (262)

Primary outcome D3 physical fatigue (higher score =worse)

Minimal difference in symptom burden post-transfusion

Symptomatic Anaemia

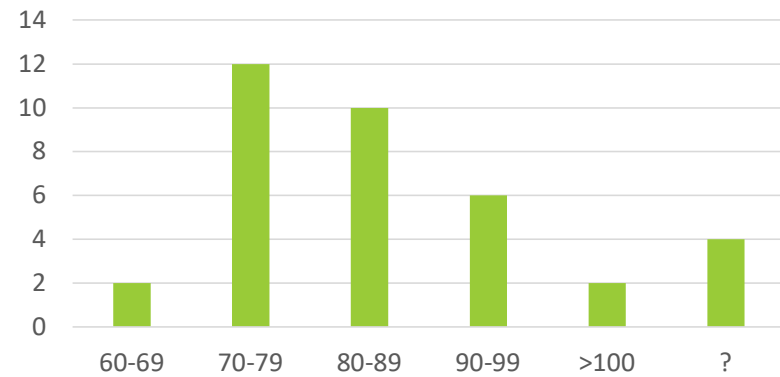
Pretransfusion Hb



Coagulopathic patient (no RBC given)



Post transfusion Hb



PPH

EBL	
2998	Patient with Fontan circulation requiring ERPC at 16 weeks. 1 unit RBC in theatre, 2 nd post op, 3 rd on cardiology ward to target Hb 90g/L
3000	Patient with retained placenta. Booked at 35 weeks. 1 RBC in theatre, 1 post natal ward
3200	Secondary PPH 11 days post natal. Retained blood clots, required 1 RBC
4000	Patient flown in from IOS with retained placenta and poor tone. 3 units given in theatre.
5000	Patient with massive PPH following uterine inversion at home – 4x RBC, 4x FFP
6000	Patient with ruptured uterus at 17 weeks – 5xRBC, 4xFFP, 1x Plt, 2x Cryo, 1200ml ICS

Special circumstances

Antenatal diagnosis colorectal cancer

- 6 units RBC to allow post-delivery commencement of Chemotherapy

Patient with Fontan circulation

- Cardiology advice Hb >90g/L

Pre-existing coagulopathy (liver disease)

- FFP given on Haematology advice

Patient with Covid 19 coagulopathy (thrombocytopenia)

- FFP + Cryoprecipitate given on haematology advice

Patient receiving 4 units RBC, 4 units FFP, transfusion started prehospitally

Antenatal Anaemia

Target Hb >110g/L

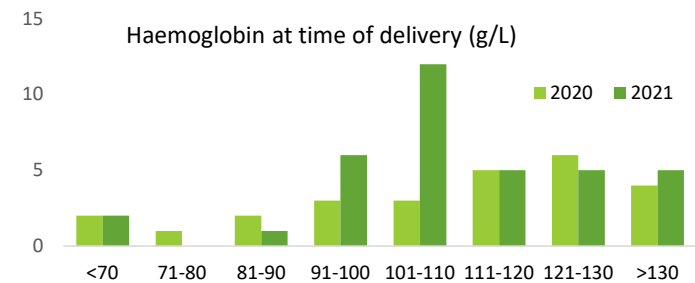
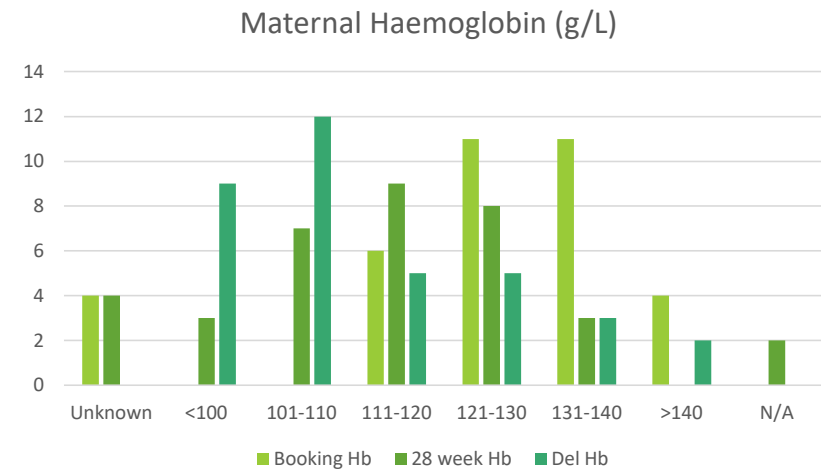
- 40% compliant

Rising proportion of anaemia at time of delivery

Increased likelihood of transfusion

- In group without transfusion requirement average Hb 110-120 at delivery

?Covid effect




Use of intravenous Iron (Ferrinject)

Increasing rates of Intravenous Iron in patients requiring blood products

Potential to expand use in antenatal patients

- Optimise delivery Hb = reduce need for blood products

Consider if short gap between pregnancies

- Inadequate time to replenish body Iron stores
 - Prevent antenatal anaemia > reduce risk of transfusion requirement
- 

Other blood products & treatments

TXA given to 58%

ROTEM introduced into practice

Reduced FFP prescription

- 12 vs 17 in 2019
- Despite higher RBC transfusions

Targeted transfusion


- Cryo vs FFP in hypofibrinogenaemia

Intraoperative cell salvage – Salvo trial

Multicentre RCT 2017

- >3000 patients
- ICS vs stored blood
- Non-significant reduction in transfusions
- Theoretical risk of maternal red cell isoimmunisation

But

- Overstated cost projection – kits used even if insufficient volume to reinfuse
 - No evidence of isoimmunisation following ICS
- 

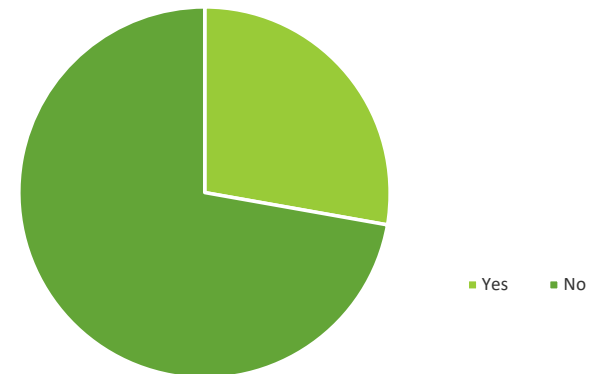
AAGBI guidelines

Association of Anaesthetists guidelines: cell salvage for peri-operative blood conservation 2018

A. A. Klein,¹ C. R. Bailey,² A. J. Charlton,³ E. Evans,⁴ M. Guckian-Fisher,⁵ R. McCrossan,⁶ A. F. Nimmo,⁷ S. Payne,⁸ K. Shreeve,⁹ J. Smith¹⁰ and F. Torella¹¹

7. Current evidence does not support the routine use of cell salvage during caesarean section. Cell salvage should be considered in the 'collect only' mode in women undergoing caesarean section who are anaemic before surgery, in women anticipated to be at high risk of haemorrhage or if unanticipated bleeding develops during surgery.

2021 Bleeding Predicted?



Intraoperative Cell Salvage – our experience

2480ml reinfused alongside RBC transfusion

- Equivalent ~ 10 units PRC

Experienced theatre team

- Reduced waste
- Only use reinfusion kit when sufficient volume

No evidence from our site of significant risk of maternal sensitisation to fetal blood from cell salvage

CASE STUDY

Obstetric cell salvage

Royal Cornwall Hospital, Truro

Since 2007, the Royal Cornwall Hospital's routine use of cell salvage in obstetric theatre has safely and economically reduced the need for allogeneic transfusion and the associated risks to patients.

Using cell salvage for all caesarean sections maintains staff competence with the cell salvage equipment and provides daily training opportunities.

The trust has found this approach to be cost effective (in contrast to some recent studies).

The trust:

- only processes blood when sufficient volume has been collected;
- uses only one suction (anticoagulation and aspiration) line;
- does not need to employ extra staff members as all its anaesthetic practitioners have completed an in-house competency-based training programme;
- does not use leucocyte depletion filters in obstetrics.

Outcomes:

- Nearly 40% of collections are sufficient to be processed.
- In 2019 obstetrics at Royal Cornwall transfused 58,264mls of blood – the equivalent of approximately 300 units of red cells.
- No recorded cases of amniotic fluid embolus.
- Observational data suggests women receiving autologous blood maintain normal coagulation profiles.
- No RhD negative mothers who have received autologous blood have needed extra anti-D.

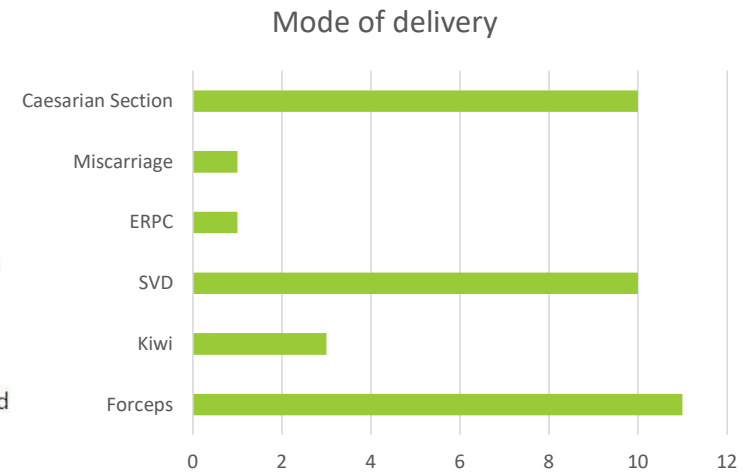
Vaginal Cell Salvage

> *Int J Obstet Anesth.* 2015 May;24(2):103-10. doi: 10.1016/j.ijoa.2014.12.001. Epub 2014 Dec 11.

Is cell salvaged vaginal blood loss suitable for re-infusion?

K M Teare ¹, I J Sullivan ², C J Ralph ³

Conclusions: Vaginal blood can be collected efficiently with little disruption to patient management. The amounts of haemolysis and washout of non-red cell blood components are consistent with results in our cell salvage quality assurance programme for caesarean section and non-obstetric surgery. Although bacteria are detectable in all the post-wash and post-filter samples, the median residual contamination is similar to that found with cell salvage in caesarean section, and if re-infused would result in a circulating bacteraemia of <1 cfu/mL; this is similar to that seen with dental procedures (0.3-4.0 cfu/mL) and is thought to be clinically insignificant.



Summary

Increasing stored blood transfusion rates

- Increasingly appropriate transfusions

Good use of intravenous Iron

- ?role for antenatal use

Symptomatic anaemia main driver for RBC transfusions

- Possibly less efficacious than anticipated
- Treatment of anaemia prior to delivery may reduce transfusion burden

Use of Thromboelastometry improving management of coagulopathy

Remember Tranexamic acid!

Majority of transfusions in vaginal/instrumented deliveries

- ?role for vaginal cell salvage

Any Questions?

Thankyou!

References

Carroll C, Young F. Intraoperative Cell Salvage. BJA Ed Online
<https://doi.org/10.1016/j.bjae.2020.11.007>

Prick et al. Transfusion policy after severe postpartum haemorrhage: a randomised non-inferiority trial. BJOG 2014; 121 (8): 1005-1014.