

# NeoNatal periOperative Transfusion Evaluation Study: NeoNOTES



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## Why

Neonatal perioperative blood product transfusion is complex and lacks consensus amongst tertiary paediatric surgical centres<sup>1-4</sup>. Blood resource management, theatre productivity & costs requires service evaluation to minimise waste and improve patient care



## How

Retrospective cohort study via clinical casenote review at Royal Manchester Children's Hospital (RMCH), UK

100 neonates undergoing surgery between October 2017 to October 2018 included

Weight, corrected gestational age (CGA), gender, diagnostic groups, operative groups and preoperative serum haemoglobin concentrations were analysed to identify risk factors associated with receiving perioperative blood product transfusion

Perioperative surgical blood product ordering practice to include human albumin solution (HAS), packed red blood cells (PRBC), platelets, fresh frozen plasma (FFP) and cryoprecipitate was assessed for each patient and as a department via online survey



## Findings

- 94% of surgical neonates were pre-operatively cross-matched (XM) for PRBC, reflecting surveyed RMCH departmental culture
- 23,250ml of donor blood was ordered, with 70 adult units & 50 paediatric units (Pedipack) prepared
- 11.4% of neonates were transfused PRBC perioperatively requiring total volumes of 30 millilitres (6, 90), median (range)
- Typically this correlates with one Pedipack unit being suffice for neonates transfused in our cohort
- £10,927 PRBC ordering surplus cost with additional £557 HAS surplus cost estimated for this cohort



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80% of transfused neonates were <28/40 CGA and/or <1kg and/or undergoing a laparotomy for re-exploration, necrotising enterocolitis or meconium ileus

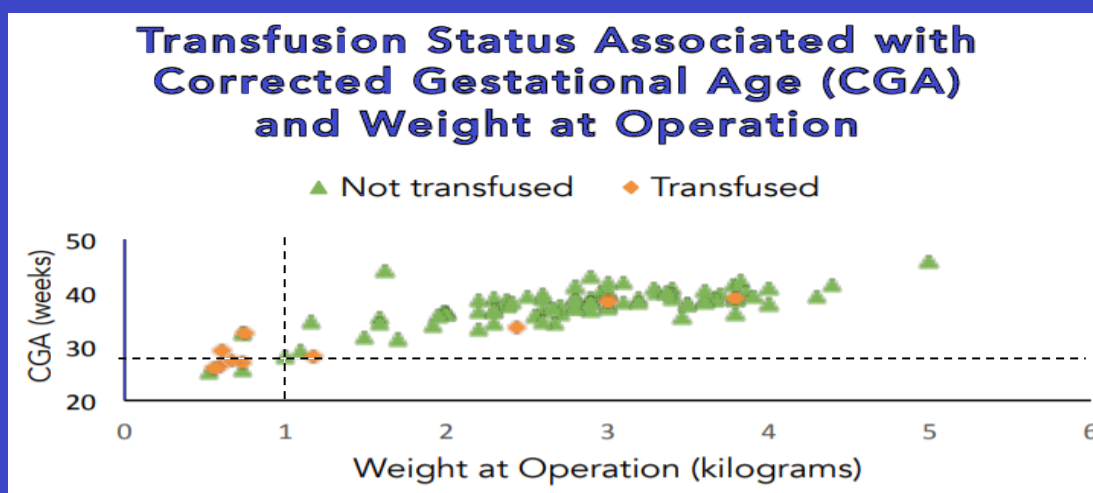


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Preterm CGA of <28 weeks and low birth weights of <1kg at time of operation were 8.57 (p<0.0001, 95% CI 3.45, 21.27) and 11.6 (p<0.0001, 95% CI 4.40, 30.54) times more at risk of receiving perioperative PRBC transfusions respectively



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Strong linear correlation exists between weight and age for our cohort ( $r=0.82$ ,  $p<0.0001$ , 95% CI 0.74, 0.87)



## Action

### 2020 RMCH Neonatal Maximum Surgical Blood Order Schedule (MSBOS)

For ALL neonates undergoing:

- > Re-look laparotomy
- > Necrotising Enterocolitis laparotomy
- > Meconium Ileus laparotomy



XM x 3 Paediatric units (Pedipack) PRBC

No HAS required

Any additional blood products to be discussed with Anaesthetist/ Surgeon

For all other procedures, if the neonate:  
Has an Hb>100g/L within the last 24 hours;  
Has not received a previous transfusion;  
Has no maternal antibodies on group and save (G&S)



NO crossmatch or G&S is required

If the neonate does NOT fulfill any of the above criteria AND there is significant risk of blood loss



Neonatal G&S is required

For neonates with an Hb<100, please discuss with the Anaesthetist and Surgeon

Education on Pedipack benefits and allocation, together with Emergency PRBC and HAS locations and stocks, accompany these guidelines on a single sided poster for display and circulation in vital clinical areas



## Review

Prospective audit of emergency surgical neonates between December 2019 and January 2020 against 2020 RMCH Neonatal MSBOS standards found 80% of perioperative blood transfusions were captured, with associated financial savings, minimised delays to theatre and reduced consequent hidden morbidity



## Recommendations

In collaboration with NHS Blood Transfusion Service, we are leading a multicentre study to guide an inter-professional Delphi process in establishing national guidelines for Neonatal MSBOS with the aim to reduce waste, standardise requests, streamline perioperative journey times for neonates and minimise the consequences of unnecessary blood product exposure to ultimately improve patient care

1. New, H et al. (2016) Guidelines on transfusion for fetuses, neonates and older children. British Journal of Haematology. 175: 784-828  
2. Wittenmeier, E et al. (2018) Red blood cell transfusion in perioperative pediatric anesthesia: a survey of current practice in Germany. Transfusion. 58: 1597-1605  
3. Stey, A et al. (2016) Variation in intraoperative and postoperative red blood cell transfusion in pediatric surgery. Transfusion. 56: 666-672  
4. Goel, R et al. (2016) Pediatric Patient Blood Management Programs: Not Just Transfusing Little Adults. Transfusion Medicine Reviews. 30(4): 235-241