

Neonatal outcomes following intrauterine transfusion for haemolytic disease of the fetus and newborn: a twenty-year service review.

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Background

Haemolytic Disease of the Fetus and Newborn (HDFN)¹⁻⁴

- Alloimmune disease
- Anaemia caused by destruction of fetal red blood cells by maternal antibodies (IgG)
- Affects ~520 pregnancies per year in the UK²
- Associated fetal and neonatal morbidity and mortality

Complications

Antenatal: fetal anaemia, fetal hydrops, preterm delivery
Neonatal: Jaundice, kernicterus, anaemia

Middle Cerebral Artery Peak Systolic Velocity (MCA-PSV) is a non-invasive indicator of fetal anaemia severity. Multiple of the median (MoM) calculated using MCA-PSV and gestational age³.

Intrauterine Transfusions (IUT)⁴

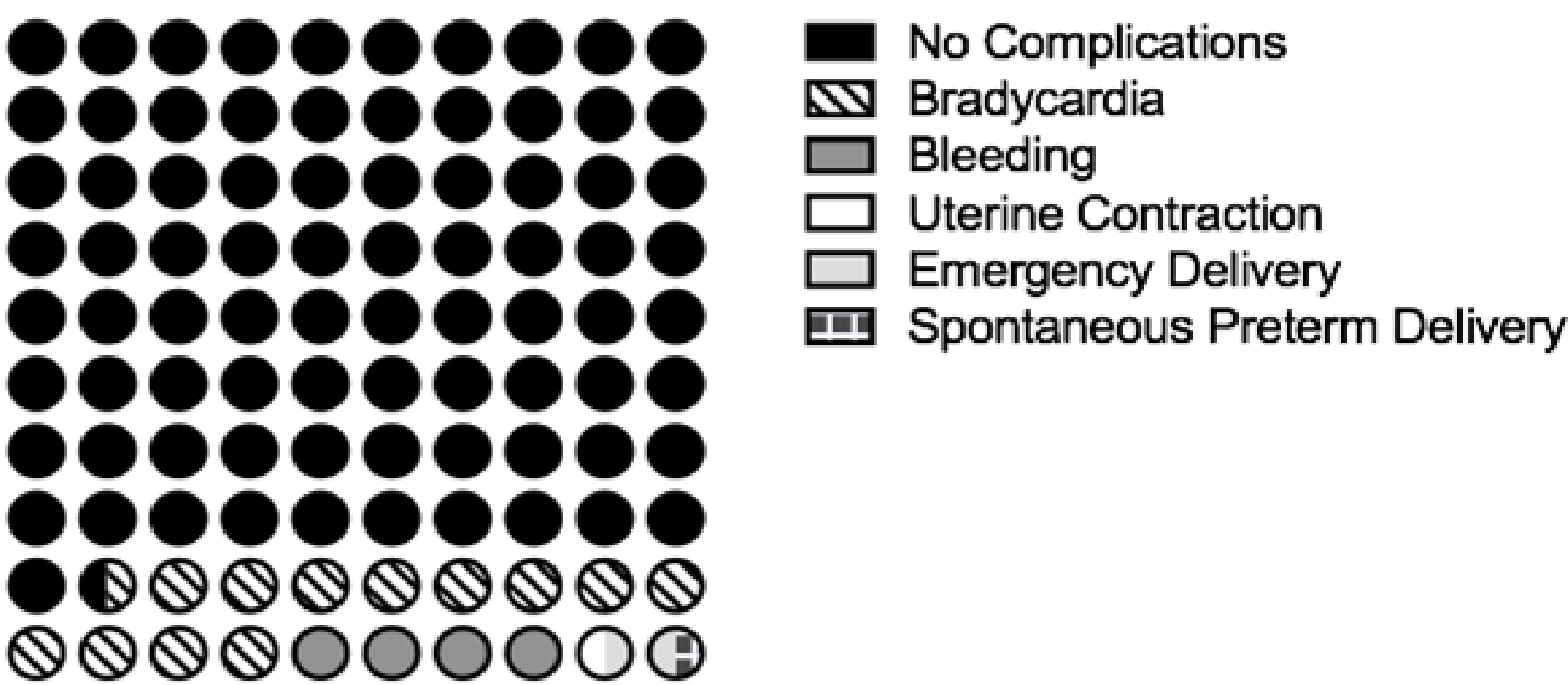
Aim: prevent, or reverse fetal hydrops, minimise preterm delivery.
Risks: fetal bradycardia, fetal haemorrhage, preterm rupture of membranes, infection, induced labour and fetal loss.

Neonatal Management

Phototherapy, red blood cell transfusion, IVIG, supportive

Antenatal Management

- 156 IUTs performed
- 28 weeks - average gestational age at time of IUT (range 18-34 weeks)
- 2 IUTs per pregnancy (median)
- 35 weeks - mean gestational age at delivery, 47% elective caesarean section
- 1 spontaneous preterm delivery at 23+4 weeks, 3 days following IUT
- Anti-D most common detected maternal antibody.



IUT Related Complication	Number (%)
No complication	127 (81.4%)
Infection	0
Ruptured membranes	0
Spontaneous preterm delivery	1
Fetal demise	0
Haemorrhage	0
Transient bradycardia	20 (12.8%)
Emergency delivery	1 (0.6%)
Bleeding <5 min	6 (3.8%)
Uterine contraction	1 (0.6%)
Total	156

Neonatal Course

- 98% (67/69) admitted to NICU
- Average length of admission:10 days
- 1 neonatal death secondary to extreme prematurity at 23+4 weeks

Readmissions

- 19 babies (29%) were readmitted
- 17 for low Hb requiring further red blood cell transfusion
 - 2 admitted with respiratory syncytial virus

Management	Number (%)
Admission to NICU	67 (98%)
Phototherapy	60 (88%)
UVC Line	47 (69%)
Exchange Transfusion	44 (65%)
Top up transfusion	14 (21%)
Respiratory support	29 (43%)
Other complication	4 (6%)

Predicting Outcomes

Predictive Factor	<i>Phototherapy</i>	
	<i>R²</i>	<i>P value</i>
Maternal Anti-D levels		
MCA-PSV before first IUT	0.266**	<0.001
MoM before first IUT	0.058	0.104
MCA-PSV before last IUT	0.177*	0.003
MoM before last IUT	0.101*	0.029

Objectives

- 1)Evaluate the morbidity and mortality amongst babies who required IUTs due to HDFN.
- 2)Evaluate the role of key investigations in the fetus at risk of HDFN and assess the relationship with neonatal outcomes.

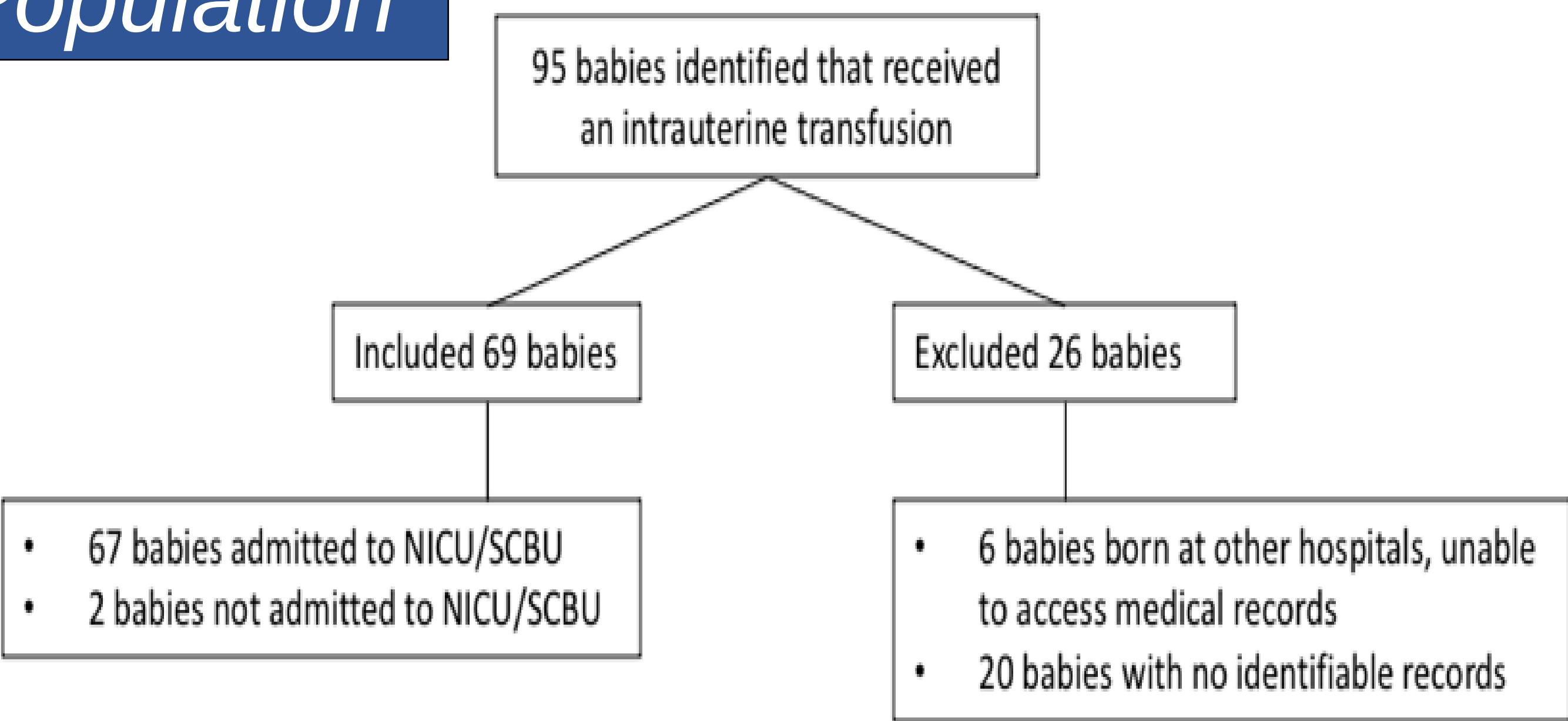
Methods

- Retrospective observational study, trust approval was granted
- Inclusion criteria: babies with confirmed HDFN and received
- IUTs for HDFN between January 2000 and August 2020.
- Data collected using maternal and neonatal electronic and archived healthcare records.

Statistical Analysis

Data were assessed for normality and Spearman's correlation analysis was performed. Linear regression analysis was performed on factors with significant correlation with phototherapy duration or length of neonatal admission. IBM SPSS version: 28.0.0.0 (190) was used.

Population



Key Points

- HDFN requiring IUT is associated with neonatal morbidity, though mortality is low following advances in fetal medicine.
- MCA-PSV may be predictive of neonatal phototherapy requirements, however more research is indicated.
- Identifying predictive factors could assist informed counselling of parents and improve planning and coordination between obstetric and neonatal teams prior to delivery.

Discussion

Antenatal Management: one neonatal loss following spontaneous vaginal delivery 3 days following IUT in this group (1.5%), in line with the national quoted risk of 2% ^{2,5}.

Neonatal Management: 98% required admission to NICU: comparable rates reported by Birchenall et al., (2013)⁶. The high readmission rate also comparable with the readmission rate of 20% reported by Birchenall et al. ⁶

Predicting neonatal outcomes: The MCA-PSV and corresponding MoM recorded prior to the last transfusion gave a significant correlation with neonatal phototherapy requirements, linear regression analysis was significant.

Confounding factors: gestational age at delivery, mode of delivery, antibody type and antibody titres.

Limitations

Small study size
Retrospective review

Future Research

Multicentre studies
Role of MCA-PSV in predicting neonatal course
Long term outcomes

References

