

The role of Transfusion Nurse in Neonatal Care.

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Topics

- Patient identification
- Specimen labelling
- Issues with neonatal transfusion
- Appropriate products
- Appropriate equipment
- Transfusion reactions
- NETS



Patient Identification

Neonates are at risk

- Multiple births
- Similar appearances
- Unable to participate in identification process
- Sequential UR numbers

(Gray, Suresh, Urspring, Edwards, Nickerson, Shiono, Plesk, Goldmann and Horbar 2006 Patient misidentification in the Neonatal Intensive Care Unit: Quantification of Risk, Pediatrics, 117).





Specimen Labelling

Common errors we see in the laboratory

- Maternal bradmas on baby samples and requests.
- Samples with incorrect baby labels
- Unlabelled specimens/requests

Reducing Errors

- Posters
- Education Campaigns

However still have trouble getting staff to appreciate that final check of the patient and the sample/request ID.

Safe specimen collection and labelling

1. Take the completed request form and the labels to the patient

Minimum information on the request form:

- Patient family name and given name
- Date of birth
- UR (if available)
- Sex of patient
- Location of patient
- Requesting clinician (name and pager)
- Clinical note
- Tests required
- Date of request

2. Identify the patient

Ask the patient (or their parent) to state their **full name and date of birth** and/or

Check the **patient identification name band**

Do the details **exactly** match those on the request form and the labels?

3. Collect the specimen(s)

Which tubes?

Specimen Collection Handbook
<http://www.nwh.org.au/specimen/>

ALERT!

Mis-labelled samples are a major risk to patient safety and will be rejected by the laboratory

4. Label the specimen(s) before leaving the patient

- Full name
- Date of birth
- UR (if available)
- Date and time of collection

Using a patient label?

- Check that details **exactly** match those on the name band and request form
- Sign label and add date and time of collection

5. Sign the declaration

"I certify that the accompanying specimen was collected from the patient stated above as ascertained by inquiry and/or examination of name band and was labelled immediately following collection."





Blood Product Administration in PICU and NNU

Safety

Transfusion safety

- Make sure the **right** patient gets the **right** blood – always adhere to the pre-transfusion check on the back of the Blood Transfusion Record
- Start blood products within **30 minutes** of issue and complete within **4 hours**
- The Blood Transfusion Record is a legal document and must be filed in the medical record on completion of transfusion

Immediate management of suspected transfusion reaction

Recognise

- Fever
- Chills
- Hypotension/hypertension
- Pain (along IV site, chest or back)
- Acute respiratory distress/stridor/whistle
- Dark urine
- Bleeding, oozing (DIC)
- Urticaria (hives)

React

- **Stop transfusion** (leave IV line in place), then
- Provide emergency patient care
- Arrange immediate medical review
- Keep IV line open with N/Saline (flush IV cannula or attach side arm)
- Repeat pre-transfusion check

Report

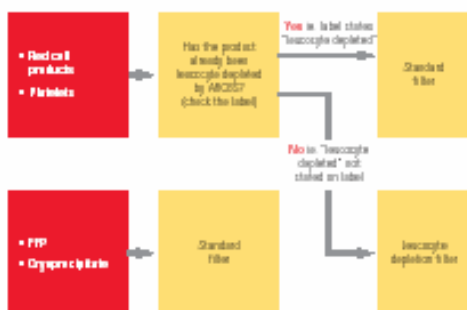
Further detail on reverse of Blood Transfusion Record and Blood Transfusion Website

Care of transfused patients

- Monitor your patient for adverse effects of transfusion, observe closely during the first 15 minutes
- As a minimum take and record vital signs (T, P, BP)
 - before starting
 - 15 minutes after commencement
 - on completion of each pack of red cells/platelets/FFP/cryoprecipitate

Blood filters

Which filter should I use?



*Not sure that the product has been leucocyte depleted? – eg hospital blood bank on 5823

About blood filters



1. Dispensing pin may be used with McGee
2. McGee
3. Double reservoir



Filter type	Standard (5) – 5823 or 5824	Leucocyte depletion 5 filter red cells
Purpose	To filter out large clots and aggregates	To filter out certain rising leucocytes (<1 x 10 ⁹ /litre) remove large clots and aggregates
Clinical indications	For administration of FFP, cryoprecipitate and leucocyte depleted red cells and platelets	Use for red cell products that have not been leucocyte depleted at ARCCS
How long may packs be stored after issue date compressed or at least 12 hours?	1 pack of red cells	1 pack of red cells
Can be used with a filter in use?	No	No
Brand name	McGee In-line blood filter Baxter universal transfusion set for blood/col. Admin pump set	Terumo Integrip 5-BC
Storage and shelf life	McGee 581500 Genuine 5823 II Tela 288613 Dispensing pin 287952	281311

Note that most platelet products are leucocyte depleted by ARCCS. Check the product label – if 'leucocyte depleted' not stated, also refer to Baxter Integrip 5-BC (leucocyte depletion filter for platelets)

Common blood products

Blood product	Volume (approx)	Is a cross match required?	Is it safe to use on long term?
Red cell products			
Red cells Leucocyte depleted	>300ml		
Red cells leucocyte depleted paediatric (in small packs 'PedPack')	25-100mls	Yes (irradiated just prior to put up from hospital blood bank)	4 from
Red cells	>100ml		
Red cells Red/lycosol treated	>100ml		
Pre-washed (acid citrate dextrose)	Variable	No	6 from
Platelet products			
Platelets leucocyte depleted	81-400ml		
Platelets product in 50ml Leucocyte depleted	>240ml	Yes (irradiated at ARCCS (ARCCS = Radiation Red Cells Blood Service))	4 from (generally in total of 4 to be approximately 1-1.4 x normal platelet count unless active bleeding)
Platelets apheresis Leucocyte depleted	100-100ml		
Platelets apheresis Leucocyte depleted Packed in 50	81-400ml		
Plasma products			
Fresh frozen plasma (FFP)	500ml, 200ml or paediatric (per 50kg)	No	8 from
Cryoprecipitate	10-40ml	No	8 from
Albumin 5	50ml, 100ml	No	Up to 24 hours (only to use only – do not re-use)
Albumin 20	10ml, 30ml	No	

Maximum infusing time is from opening blood pack until completion of infusion

Leucocyte depletion

What does it do?

Removes leucocytes to less than 10⁹ per blood component

Which products?

Cellular products (platelets and red cells) even if CMV -ve

Why do it?

- Reduces the risk of CMV transmission when CMV -ve products are not available
- Reduces frequency of recurrent febrile reactions
- Reduces alloimmunisation to HLA and leucocyte antigens

When?

Some products are leucocyte depleted by ARCCS – check the product label

Which patients?

All PICU & NNU patients

Irradiation*

What does it do?

Destroys donor lymphocyte's ability to divide (does not remove/destroy them)

Which products?

Cellular products (platelets, red cells, granulocytes)

Why do it?

Prevents Transfusion-Associated Graft Versus Host Disease (TA-GVHD)

When?

Ring blood bank to request irradiation of unit prior to collection – (allow at least 5 minutes)

Which patients?

All PICU & NNU patients

* Life-saving transfusion should not be delayed while waiting for irradiated blood products

Compatible ABO groups

Group identical blood products should be given. However, in circumstances where this is not possible, a non-identical but compatible group may be issued.

Recipient ABO group	ABO group of compatible red cells					ABO group of compatible FFP/cryoprecipitate				
	Group	O	B	A	AB	Group	O	B	A	AB
AB	*	*	*	*	*	*	*	*	*	*
A	*	*	*	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*	*	*	*
O	*	*	*	*	*	*	*	*	*	*

What about platelets?

Should ideally be compatible with the recipient's red cells.

However due to supply issues or cross grouping may be necessary – consult with Haematologist on call.

Neonatal testing – ASBT protocol

(Bullimore and How Paediatric Society of Blood Transfusion protocol for you transfusion leading to the neonatal)

What is it?

A protocol that allows issue of red cell products to suitable infants without repeated crossmatching

Which infants?

- Under 4 months of age
- Ongoing need for blood
- No NEC
- Crossmatch meets lab criteria (blood bank will inform requesting clinician if not eligible)

How to request ASBT?

- Request "ASBT protocol" with first crossmatch
- Indicate if any previous transfusion

Ordering Blood

Once on ASBT crossmatch not required, order blood by telephoning hospital blood bank (X6 5823)

Cardiac Surgery

Babies on ASBT requiring whole blood for cardiac surgery will require a crossmatch prior to surgery. The ASBT protocol can resume post-operatively

Reducing Errors

Issuing new policies and protocols will not improve patient safety in neonatal intensive care.

Greater success may result from system wide improvements that decrease inattention, miscommunication, distraction and other contributory human factors.

(Suresh, Horbor, Plesk, Gray, Edwards, Shiono, Urspring, Nickerson, Lucey, Goldman (2004) Voluntary Anonymous Reporting of Medical Errors for Neonatal Care. Pediatrics, 113)

Issues with Neonatal Transfusion

- Lack of evidence based clinical guidelines
- Guidelines
 - WCH paediatric guidelines
 - ANZSBT draft guidelines
 - BCBS guidelines (UK)

Small Volume Transfusions

Neonatal blood volumes are calculated in mls/kg.

- Neonates ranges from 400gms-3000gm+
- Try to use pedipaks
 - Default 2 pedipaks
 - <750g allocate 4 pedipaks

Red Cells





Appropriate Products

- At times it is not possible to provide a neonate with a pedipak for transfusion.
- Need to have the staff understand they can use a small amount of an adult bag.

Equipment for Transfusion

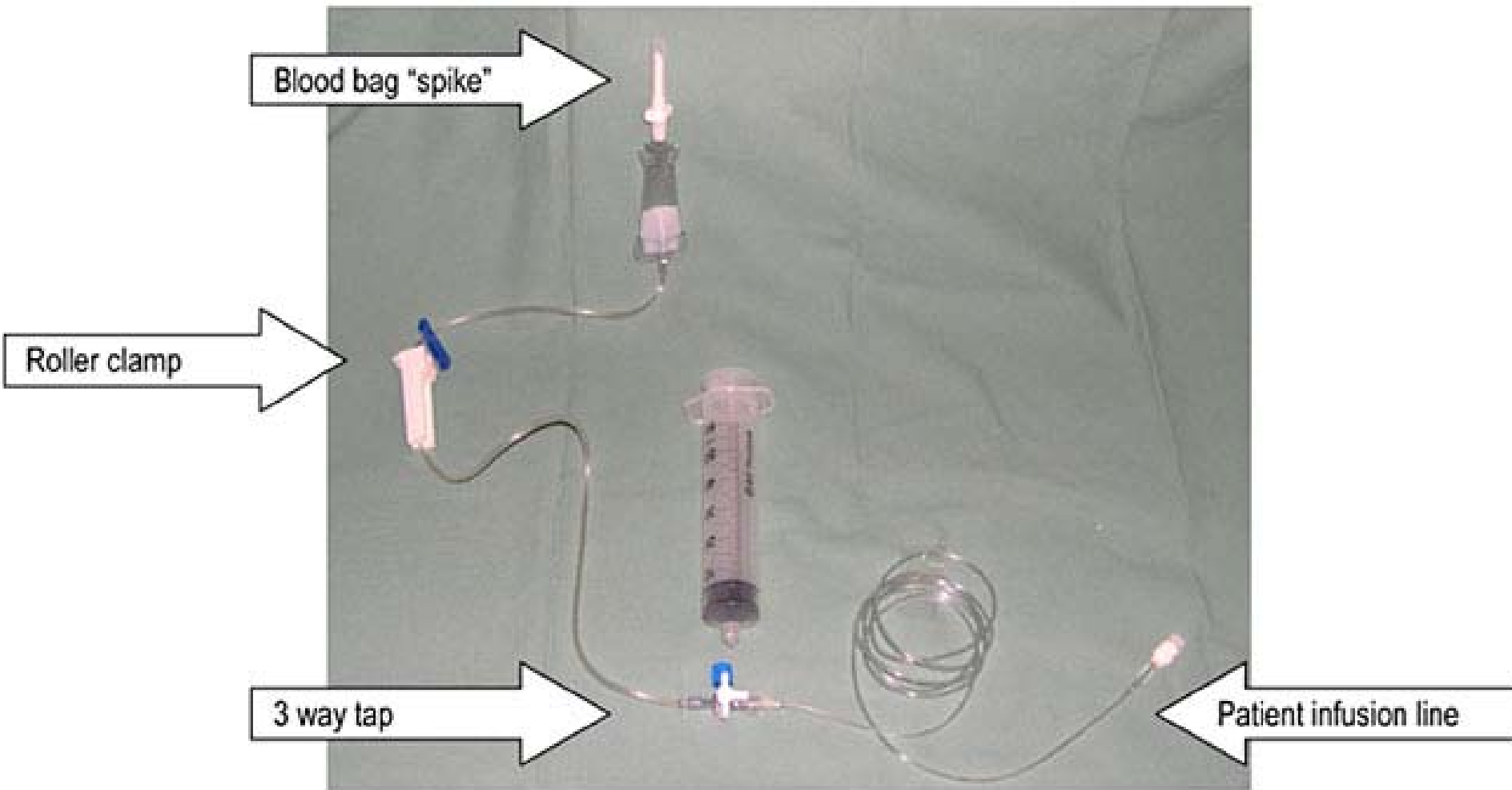
Syringe drivers used to accurately deliver small volumes

- Syringe labelling?
- Blood pack discarded prior to completing transfusion
- Procedure for decanting blood?

Issues to address

- Labelling- right blood to right patient
- Pack retention for investigation of any reaction
- Maintaining product integrity and sterility

Baxter Neonatal Transfusion Set



Baxter Transfusion Set

- A purpose built giving set to allow safe transfusion from a syringe.
- Blood bag remains inline
- Standard 170-220 micron filter inline
- Syringe attaches to 3 way tap

Warming of Blood Products

Blood products need to be warmed for all neonatal exchange transfusions

- Both sites were using water bath blood warmers → OH&S issue
- Introduced Beigler™ blood warmers



Using the Beigler Blood Warmer

- Issues as to the optimal temperature setting to ensure blood is delivered to the neonate at the optimal temperature (34-37°C).
- An experiment was undertaken to determine the correct temperature setting

Conclusions

- Blood products cannot be heated to an unsafe temperature using the Beigler warmer
- At NICU RWH Beigler blood warmer set at 41°C, using 80 cm of tubing. Achieving a temperature of 35.4°C at the patient.

(Patterson, Wilson and Hitchcock 2006)

Transfusion Reactions

There is a common belief that neonates do not experience Transfusion Reactions.

- Neonates are especially vulnerable to the potential infective and toxic effects of transfusion. They have immature immune and metabolic processes, and are still undergoing rapid neurodevelopment (SHOT 2007).

Neonatal TXRs

- Febrile and allergic reactions very uncommon
- TRALI and bacterial sepsis
- Increased risk of TACO and metabolic effects

SHOT Findings (1996-2005)

- 121 errors occur < 12 months of age (5% of adverse events reported).
- Incorrect blood component transfused
 - Failure to meet special requirements
 - Errors in laboratory
 - Wrong selection of Group O FFP and Platelets
 - Mis-calculated prescriptions
 - Failure to correctly identify patients

SHOT findings cont.

- Immune Transfusion Reactions
 - Neonatal adverse reactions may be non specific in presentation (hypoxia, acidosis). Need to have a high index of suspicion.

NETS

- NETS provide emergency transport for critically ill neonates throughout the State of Victoria (based at RWH).
- During a routine transfusion update session, discussed difficulty obtaining blood for transfusion at many small regional hospitals afterhours.

NETS

- Discussed problem with Haematologist and Transfusion Committee

Decision

- RWH blood bank to provide NETS with blood for transport.
- Needs to be requested by NETS consultant
- Can prepare Red Cells or FFP for transport

NETS

- Trialled small blood in motion backpack, did not maintain blood at safe temperature for transport period.
- Now using ARCBS shippers as these are verified for safe blood transport.

NETS

- Provides timely access to blood products for critically ill neonates that require transfusion prior to transfer to a tertiary centre.
- Improves service time for NETS, do not need to wait for blood at regional centres where there is not a 24 hour laboratory/blood bank.

Summary

Neonates are the most heavily transfused group in the tertiary care setting, with the greatest potential for longevity (Roseff, Luban and Manno 2002).

Many improvements in neonatal transfusion practice have been achieved since the position of transfusion nurse was established at RWH and RCH.