Transfusion Reactions from a laboratory perspective

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23/1/2015

A crime has occurred!

'Officer I want to report……

An unfavourable event occurring in a patient during or following the transfusion of blood or a blood component

…… could this be a transfusion reaction?'

- *Laboratory pre-transfusion testing aims to minimise/prevent the occurrence of transfusion reactions (TRs)*
- *Reduce their effects if they do occur*
- *Same testing helps investigate the causes of TRs*

TRs may be highly improbable, but they are still possible!

The Rapid Response Team

- **STOP** the transfusion
- Treat the patient and manage their symptoms

No further transfusions allowed until cause is determined, unless instructed by Haematologist Clinician

- Determine the type of reaction
- Determine the cause
- Prevent re-occurrence
- Increase monitoring where patient has previously had a TR

The Game is afoot: The hunt for the criminal begins……
where will the clues lead us?

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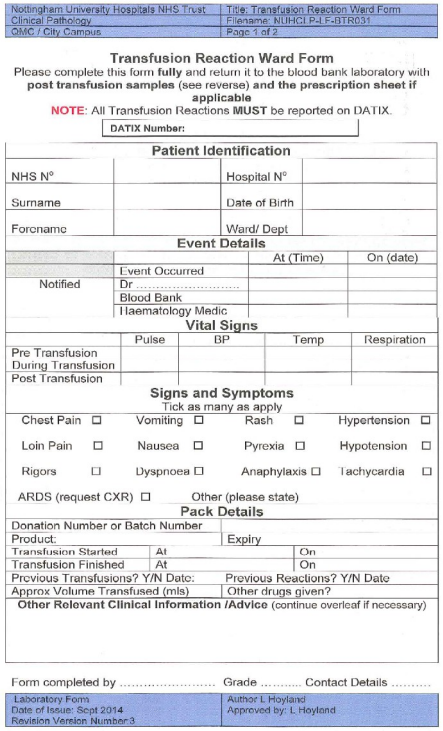
Collecting the Evidence



Nottingham University Hospitals NHS Trust	Title: Transfusion Reaction Ward Form
Clinical Pathology	Filename: NUHCLP-LF-BTR031
QMC / City Campus	Page 1 of 2

Transfusion Reaction Ward Form

Please complete this form **fully** and return it to the blood bank laboratory with **post transfusion samples** (see reverse) **and the prescription sheet if applicable**

NOTE: All Transfusion Reactions **MUST** be reported on DATIX.

DATIX Number:

Patient Identification

NHS N°		Hospital N°	
Surname		Date of Birth	
Forename		Ward/ Dept	

Event Details

		At (Time)	On (date)
	Event Occurred		
Notified	Dr		
	Blood Bank		
	Haematology Medic		

Vital Signs

	Pulse	BP	Temp	Respiration
Pre Transfusion				
During Transfusion				
Post Transfusion				

Signs and Symptoms

Tick as many as apply

Chest Pain ☐	Vomiting ☐	Rash ☐	Hypertension ☐
Loin Pain ☐	Nausea ☐	Pyrexia ☐	Hypotension ☐
Rigors ☐	Dyspnoea ☐	Anaphylaxis ☐	Tachycardia ☐

ARDS (request CXR) ☐ Other (please state)

Pack Details

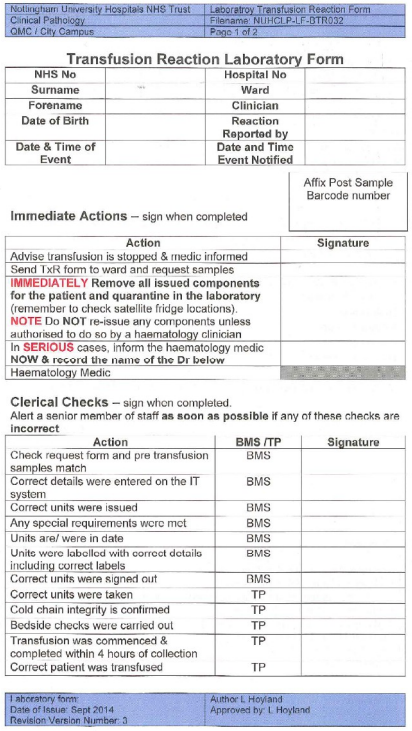
Donation Number or Batch Number		
Product:	Expiry	
Transfusion Started	At	On
Transfusion Finished	At	On
Previous Transfusions? Y/N Date:	Previous Reactions? Y/N Date	
Approx Volume Transfused (mls)	Other drugs given?	

Other Relevant Clinical Information /Advice (continue overleaf if necessary)

Form completed by ..... Grade ..... Contact Details .....

Laboratory Form	Author L Hoyland
Date of Issue: Sept 2014	Approved by: L Hoyland
Revision Version Number:3	

EXHIBIT A



Nottingham University Hospitals NHS Trust	Laboratroy Transfusion Reaction Form
Clinical Pathology	Filename: NUHCLP-LF-BTR032
QMC / City Campus	Page 1 of 2

Transfusion Reaction Laboratory Form

NHS No		Hospital No	
Surname		Ward	
Forename		Clinician	
Date of Birth		Reaction Reported by	
Date & Time of Event		Date and Time Event Notified	

Affix Post Sample Barcode number

Immediate Actions – sign when completed

Action	Signature
Advise transfusion is stopped & medic informed	
Send TxR form to ward and request samples	
IMMEDIATELY Remove all issued components for the patient and quarantine in the laboratory (remember to check satellite fridge locations). **NOTE** Do **NOT** re-issue any components unless authorised to do so by a haematology clinician	
In **SERIOUS** cases, inform the haematology medic **NOW & record the name of the Dr below**	
Haematology Medic	

Clerical Checks – sign whon completed.

Alert a senior member of staff **as soon as possible** if any of these checks are **incorrect**

Action	BMS /TP	Signature
Check request form and pre transfusion samples match	BMS	
Correct details were entered on the IT system	BMS	
Correct units were issued	BMS	
Any special requirements were met	BMS	
Units are/ were in date	BMS	
Units were labelled with correct details including correct labels	BMS	
Correct units were signed out	BMS	
Correct units were taken	TP	
Cold chain integrity is confirmed	TP	
Bedside checks were carried out	TP	
Transfusion was commenced & completed within 4 hours of collection	TP	
Correct patient was transfused	TP	

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EXHIBIT B

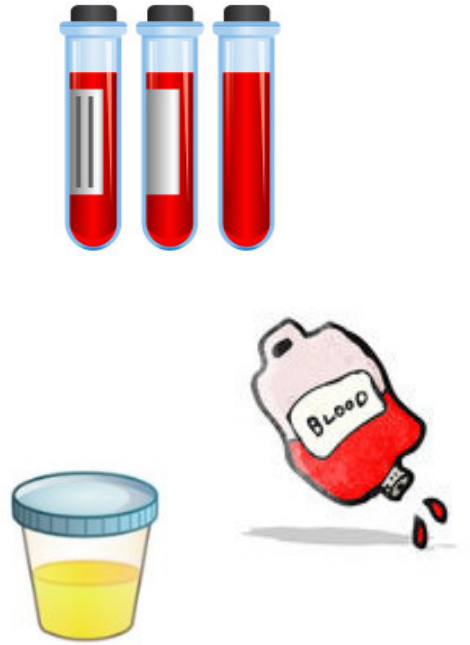

EXHIBIT C

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The Interrogation

Clinical interrogation

- Symptoms?
- Component(s) transfused?
- Drug history?

Clerical/administrative interrogation

- Correct patient details?
- Correct patient bled?

Serological interrogation

- Errors in pre-testing?
- Post-testing detects clinically significant serology?
- Signs of haemolysis?

Component quality interrogation

- Integrity of pack compromised?
- Cold chain secure?
- Component expired?
- Component contaminated?

Red Cells

Offences:

AHTR

DHTR

MO:

Intravascular/extravascular red cell destruction

Complement or IgG

White Cells

Offences:

TaGvHD

FNHTR

MO:

Viable donor WBCs attack patient cells

Platelets

Offences:

PTP

Allergic reactions

MO:

Recipient antibodies against HPA1

Bacteria/Viruses

Offences:

TTI eg. HIV, Hep A/B/C, Syphilis

Bacterial contamination

MO:

Infected donor

Unsterile packs or procedure

Cold chain failure

Circulatory System

Offences:

TACO

MO:

Volume of transfusion

Rate of transfusion

Respiratory System

Offences:

TAD

MO:

Acute respiratory distress

IgA Antibodies

Offences:

Allergic reactions

Anaphylaxis

MO:

Allergens

Acute release of cytokines

Complement activation

Leucocyte Antibodies

Offences:

TRALI

MO:

Donor HLA antibodies cause WBC destruction via complement

Clerical & Administrative Errors

Offences:

ICT

WBIT

MO:

Incomplete PPI at bedside or subsequent stages of sample processing

Witness: Blood Transfusion

RBCs implicated:

Pre and post transfusion ABO and RhD grouping
Pre and post antibody screening
Pre and post serological crossmatching (if possible)
Follow up pre and post antibody identification if required

} checking for serological compatibility

Pre and post DAT testing – Presence of IgG or complement activation - haemolysis

Platelets or FFP/Cryo implicated:

As above but no crossmatching required – checking ABO compatible

Electronic records:

Any instruction recorded for special requirements not met?

Witness: Haematology & Chemistry

Hb - Falling or not rising sufficiently? Intra or extravascular haemolysis?

Platelet count – Falling or not incrementing? Platelet destruction occurring?

Blood film – RBC fragments or spherocytes?

PT
APTT
D-Dimer

} Indices prolonged? Indicative of DIC?

LFTs / U&Es – Abnormal results? - Signs of intravascular / extravascular haemolysis?

Urine sample – Change in colour? Evidence of haemoglobinuria or haemolytic jaundice?

Witness: Microbiology

Culture unit(s)

Culture patient

Culture over 5 days

Presence of viral, protozoal or bacteria infections

Compare for a match between implicated units and patient

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Red Herrings: When is a TR not a TR?

- Underlying infections
- Panic attacks
- Drug induced symptoms
- Drug induced haemolysis

Could mislead the investigation and lead to the wrong conviction.

AND… Remember despite all efforts, the cause can often not be determined – the case my remain unsolved!

The Verdict

Once the evidence, investigations and proof have been gathered, completed and analysed, in most cases the root cause of the transfusion reaction can be identified.

The guilty party has been arrested, tried and convicted.

How to police and prevent re-offending

Policing:

Reporting systems SABRE and SHOT capture information of causes and effects of TRs.

But why should we report them?

- Legal requirement
- Data collection for National Database (Sp-ICE)
- TR event comparisons and trend analysis
- Share knowledge and experience between centres
- Results of investigations can lead to changes in process and better practice
- Ultimately improves patient safety

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How to police and prevent re-offending

Prevention:

How does the results we get help us prevent further TRs occurring?

By identifying special requirement for patients for future transfusions:

- Antigen negative
- Irradiated
- HLA / HPA matched
- IgA deficient
- Washed
- Full serological crossmatching
- Referral to NHSBT

- *Clinical management/patient's notes/flags*
- *PPI/electronic bedside labelling/zero tolerance*

The Case of the Silent Stalker

The Clues:

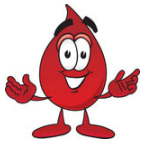
i.Hb fails to rise after 10 unit transfusion over several days

ii.No obvious symptoms other than anaemia

The investigation reveals:

- Negative pre transfusion screen, positive post transfusion screen – Anti-Jka + f(ce)
- No pre transfusion DAT, post transfusion DAT positive IgG and C3d
- No remarkable U&E results , LFTs slightly raised pre and post transfusion
- NHSBT 2009 referral sent from different hospital
- Recent transfusion history unavailable on admission
- Patient had antibody card but not aware of significance
- Of 10 units transfused 6 Jka pos and 7 f(ce) pos

The perpetrator is:



Delayed Haemolytic Transfusion Reaction

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