Root Cause Analysis of Transfusion Incidents
The Leeds Experience

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LTH Transfusion

- Blood Transfusion Department
  - 2 Leeds laboratories supplying 2 teaching hospitals and 4 other hospitals
  - 1 Bradford based lab supplying Bradford Hospitals NHS Trust
LTH Transfusion

- The Leeds labs
  - 87,000 samples per year
  - Transfusing
    - 40,000 red cell units
    - 7,000 platelets
    - 16,000 FFP and cryoprecipitate
SHOT Reporting

- Reported to SHOT since 1996
- Involved in the Near-Miss Pilot Scheme
- Participated in the Root Cause Analysis project for SHOT and the National Patients Safety Agency in 2003
Leeds SHOT Reports 2003

- 64 Incidents reported to SHOT
  - 14 IBCT
  - 6 Acute reactions
  - 2 Delayed reactions
  - 2 TRALI
  - 40 Near-miss events
Root Cause Analysis

‘Root cause analysis is a structured investigation that aims to identify the true cause of a problem, and the actions necessary to eliminate it.’

*Anderson and Fagerhaug, 2000*
Root Cause Analysis
Basic Methodology

WHAT happened
Unsafe Act

HOW it happened
Human Behaviour

WHY it happened
Contributory Factors

RCA & Feedback
Incident Investigation: The Leeds Approach

- Prior to using RCA
  - Report to SHOT
  - Gather information for SHOT questionnaire
  - Complete questionnaire
Incident Investigation: The Leeds Approach

Now using RCA

- Gather full information for incident including
  - Witness statements (staff and patient)
  - Patient’s notes
    - Nursing notes
    - ICU notes
    - Medical notes
    - Prescription charts
    - Observation charts
Incident Investigation: The Leeds Approach

- Procedures, policies and guidelines
  - Hospital
  - Laboratory
  - National

- Consult experts
  - Anaesthetists
  - Haematologists
  - NBS
  - Risk Management

- Produce a ‘time-line’ for the incident
- Produce a report
- Act on recommendations
The Report

Constituent parts

- Introduction
- Summary of incident
- Method of investigation
- Grading of incident
  - Harm to patient
  - Potential of harm to future patients
- Discussion of errors / problems
- Key learning points / recommendations
- Acknowledgements
- References
- Appendices
Root Cause Analysis

A Case Study of an
Acute Transfusion Reaction / IBCT
Acute Transfusion Reaction Incident

- Patient A, was an acute admission with LUQ abdominal pain, jaundice, query for surgery. Later the patient was diagnosed with a malignant mass around the head and neck of the pancreas.

- The patient was currently taking warfarin for AF, INR on admission >10, Hb 8.2. No evidence of bleeding.

- Four units of FFP and two units of red cells prescribed by the SpR.

- The FFP was prepared by the Blood Bank and despatched to the ward.
On commencement of the third unit of FFP the patient was observed to be having a reaction and the transfusion was discontinued.

- **Symptoms**
  - Febrile
  - Hot and itchy
  - Tachycardia
  - Breathless
  - Wheezing

- **Treatment**
  - High flow O₂
  - IV Hydrocortisone / Chlorpheniramine
  - Nebulised Salbutamol / Ipratropium Bromide
Information Gathered

- Nursing staff interviewed
- Patient interviewed
- SpR interviewed
- The patient’s clinical notes
- The patient’s nursing notes
- Leeds General Infirmary Blood Bank Computer
- Leeds General Infirmary Chemistry / Haematology computer system
- The hospital PAS (Patient Administration System) computer
- Incident report form
Errors / Problems

- **Error / Problem 1** – The patient has an acute reaction to transfusion of FFP. This appears from the patient’s notes to be of the anaphylactic type.

- **Error / Problem 2** – No tryptase tests were carried out following the reaction. The tryptase result would have helped confirm the diagnosis of anaphylaxis, although in this case the records of the patient’s symptoms give a clear indication of the type of reaction.
Errors / Problems

**Error / Problem 3 (the root cause)**

- FFP was prescribed for the patient for warfarin reversal. This does not follow national guidelines for reversal of warfarin effect.

- The recommended treatment for immediate reversal of warfarin is administration of vitamin K.

- In patients grossly overdosed with life threatening haemorrhage the recommended approach is to use concentrates of factors II, VII, IX and X (e.g. Beriplex).
Learning Points / Recommendations

- Adhering to the BCSH guidelines for reversal of warfarin would have avoided this incident from happening.

- The laboratory system for requesting tests post transfusion reaction needs to be reviewed to ensure that all the relevant samples are taken.
Follow Up

- 2 further similar incidents have been found since this one
- The Hospital Transfusion Team have issued copies of the BCSH guidelines to clinical areas and it is posted on the Trust intranet
- FFP usage is now included in PRHO and SHO induction
- The subsequent issue of the Transfusion Team Newsletter covered the use of FFP
- Currently conducting an audit of FFP usage including reason for transfusion
Have we benefited from RCA?

**Pros**
- True cause of incident identified
- Learning points identified
- Recommendations made and implemented
- Better feedback to clinical teams
- Safer practice / reduced repeat incidents

**Cons**
- Time consuming
- Requires training
- Obtaining all the patient’s notes is not easy and transfusion episodes are sometimes poorly documented
In Summary

- We have found that RCA
  - Is not necessary and is impractical for all incidents

However:
- Is very beneficial in incident investigation
- When used for small numbers of incidents can help improve transfusion practice