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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

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LTH Transfusion

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

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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

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Leeds SHOT Reports 2003

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

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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 → **HOW it happened** → **WHY it happened**

Unsafe Act

Human Behaviour

Contributory Factors

RCA & Feedback

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Incident Investigation: The Leeds Approach

- Prior to using RCA
  - Report to SHOT
  - Gather information for SHOT questionnaire
  - Complete questionnaire

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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

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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

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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**

Acute Transfusion Reaction Incident

- **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 O_2**
  - **IV Hydrocortisone / Chlorpheniramine**
  - **Nebulised Salbutamol / Ipratropium Bromide**

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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
- Guidelines for use of fresh frozen plasma. British Committee for Standards in Haematology. *Transfusion Medicine,* 1992, **2,** 57-63

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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)

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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

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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

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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