INVESTIGATION OF ACUTE TRANSFUSION REACTIONS

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Acute Transfusion Reactions

- What are they?
- How common are they?
- Who gets them (when, and from what)?
- Why is rapid recognition, investigation and treatment crucial?
- Why do we need guidelines for investigation and management and what are the key components of a protocol?
- Where do we go from here?
What are acute transfusion reactions (ATR)?

- Occur within 24 hours of transfusion
- non-haemolytic febrile transfusion reactions (NHFTR)
- hypotensive reactions
- allergic reactions (mild to life-threatening)
- haemolytic transfusion reactions
- bacterial contamination and sepsis
- Transfusion-associated circulatory overload
- Transfusion-related acute lung injury
Classifying ATR

• ATR reported to haemovigilance schemes are often difficult to fit neatly into a category; different causes have overlapping clinical features and tests may be unhelpful or delayed
• Recently proposed inflammatory category to cover spectrum of rigors, myalgia, hypotension, and shock but no allergic features
• Where do cases with transient oxygen desaturation fit in?
• we clearly need better basic research
How common are ATR?

- Variably reported as 0.2-10% of Tx
- Pruritus/urticaria 1-3%
- NHFTR 1-5% (higher if no leucodepletion)
- TRALI maybe 1 in 5,000
- Bacterial sepsis fatal in 1 in 25-80,000
- Haemolytic 1 in 12-77,000
  (fatal ABO 1 in 600,000-1,000,000)
- Anaphylaxis 1 in 20,000-170,000
- Need better population-based data
Are ATR more common in children?

- Probably:
  - 2003 SHOT Report noted excess in children (13% of ATR) (50% of these in first year of life)
  - Prospective PICU study from Quebec:
    - 2509 components in 306 patients
    - 10.8% of patients had an ATR (1.6/100 components compared to 0.25/100 in adults)
    - 15% of these events were “life-threatening”, but no fatalities
When do ATR present?

- Major ABO mismatch and bacterial transfusion reactions tend to occur very quickly - often within 15 min of start
- Only 1/3 of anaphylactoid reactions occur within first 15 min (can be 1-2 hours) - patients must remain visible and accessible to nursing staff during that time
- TRALI onset peaks around 6 hours
- TACO - during or soon after TX (but little systematic data)
Diagnosis of ATR

• Onset of new symptoms or signs during transfusion *may* be the first warnings of a life-threatening problem

• Often difficult to determine the type of reaction in early stages:
  - febrile and shocked: is it acute haemolysis or bacterial sepsis?
  - acutely breathless, cyanosed, hypotensive: is it TRALI or TACO (or severe allergic)?

• *Often badly managed if occur out of hours*
Speed of response is critical

- Most data are from study of major sepsis
- Early treatment reduces mortality and time in ICU
- In hypotensive patients, every hour delay in antibiotics increases mortality by 7.6%
Crucial to have a protocol for immediate management and investigation of ATR

Clearly define actions of:

- bedside nurse
- on-call doctor
- Transfusion Lab
- Blood Service
- on-call Haematologist
- Transfusion Practitioner

Ensure staff of appropriate seniority are involved

eg Handbook of Transfusion Medicine 4th Edn 2007
Protocols must be:

- Accessible when needed
- Clear, short and didactic
- Reflect best current practice
- Known by the staff who have to use them (who have been trained and competency assessed!)
- Maintaining awareness and competence is a major challenge, especially in low-use areas and transfusions in community
ATR Protocol

Women’s and Children’s Health Service
Perth
Western Australia
Key elements of ATR Protocol

Immediate management

• All new symptoms and signs (especially fever) must be taken seriously during Tx
• Stop transfusion, keep line open with saline
• Check vital signs and initiate resuscitation
• Check ID of blood and patient
• Notify on-call medic immediately
• Except in very mild febrile or urticarial reactions, do not continue same unit
Key elements of ATR Protocol

• Doctor must:
  - assess (and document) the situation
  - follow clinical algorithm and seek appropriate clinical specialist advice
  - contact Blood Bank (who should also have a protocol to advise necessary tests/actions)
  - return blood bag(s) & giving set
  - EDTA & clotted samples + 1st urine
  - All reactions with fever $\uparrow >1.5^\circ C$ or severe enough to stop transfusion must have blood cultures taken (SHOT)
Key elements of ATR Protocol: Laboratory aspects

• Staff must be adequately trained and have access to ATR protocol 24/7
• Must have SOPs for immediate investigation of all significant ATRs using “best practice” techniques or urgent referral to specialist lab
• Inform clinical area of samples needed for investigation
• Ensure compatible blood is available
• Liaise with Transfusion Practitioners and Haematologist
Laboratory aspects

• If *mistransfusion* identified, urgently check if another rogue unit is in the system
• If *bacterial infection* is suspected:
  - Send bag and segments for microscopy and culture (to Blood Service lab or *in house*)
    - following agreed protocols for storage, transport and testing
• If *anaphylactoid reaction* suspected arrange specimens for *mast cell tryptase* acutely (15 min to 3 hours) and at 24 hours (? utility)
Laboratory aspects

- Excellent liaison with the Blood Service is crucial:
  - support from RCI Lab in investigation of haemolytic reactions (initial or confirmatory tests) and provision of compatible blood
  - immediate contact if bacterial contamination suspected so that TM consultant can decide need for recall of other donations
  - investigation of possible TRALI and severe anaphylactoid reactions
Severe anaphylactoid reactions

• Anti-IgA Abs - need evidence-based protocol
  ➢ partial IgA deficiency 1 in 700 - very low risk
  ➢ rare severe IgA deficiency (<0.5g/l) - 1 in 200 have IgG anti-IgA but severe reactions only seen in 1 in 20,000-47,000 transfusions (routine assays don’t measure IgE anti-IgA)
  ➢ need protocol for: who to screen? what are the best tests and which blood components? (washed cells, IgA deficient donors, standard components in emergency)
Key elements of ATR Protocol: review, analyse and report

- Transfusion Practitioner has a key role in liaising between clinical staff and the lab and investigating ATRs
- All ATRs should be reported to the Hospital Transfusion Team and serious events analysed and reviewed
- Learn lessons and change systems
- Report to SHOT/MHRA
Where do we go from here?

• Recurrent SHOT Reports have stressed the need for updated, evidence-based guidelines for investigation and management of ATR
• BCSH Writing Group now set up, chaired by Dr Hazel Tinegate (Newcastle)
• Multidisciplinary (including hospital and Blood Service laboratory input)
• All suggestions welcomed!
Thanks for your attention!

“I'm sorry, dear. I wasn't listening. Could you repeat what you’ve said since we've been married?”