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Transfusion Reactions: still a risk in patient blood management.

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The Laboratory Perspective.

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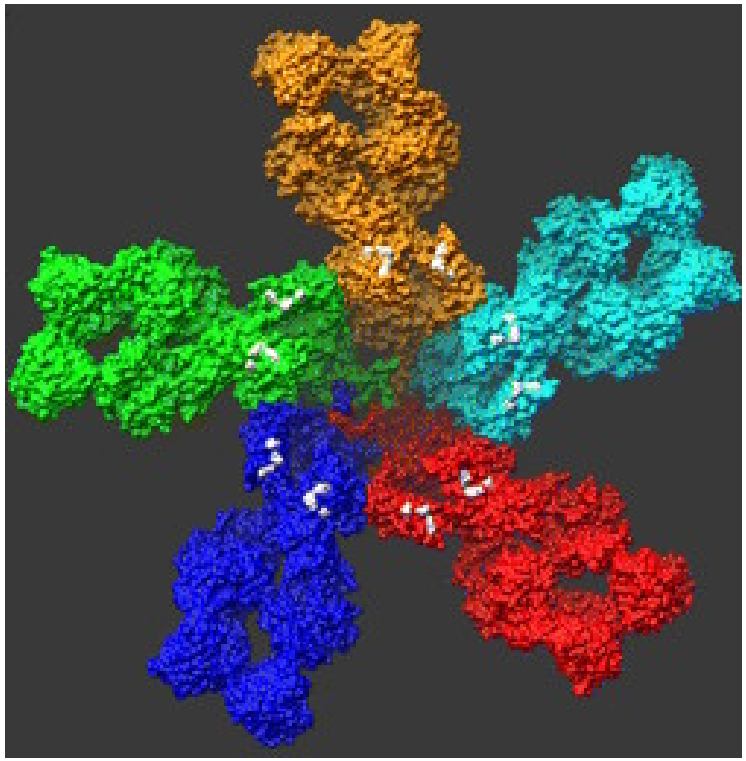

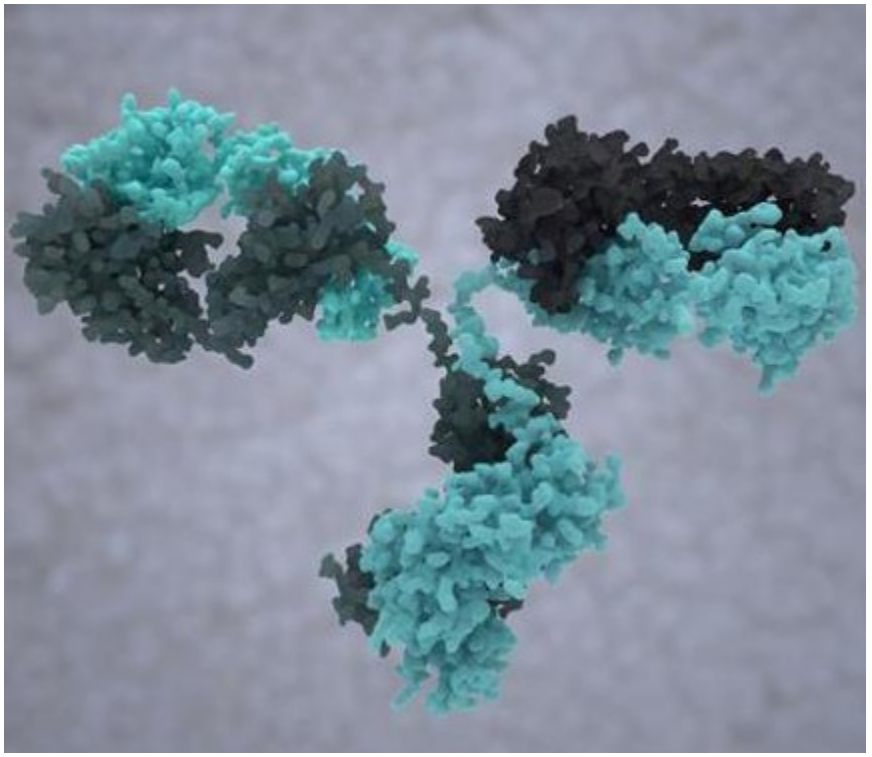

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There are many ways in which a recipient can be adversely affected by a blood transfusion.

- **Bacterial infection.**
- **Viral infection.**
- **Parasitic infection.**
- **Prion infection.**

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- **Non-haemolytic febrile reaction (NHFTR).**
- **Allergic (anaphylactic or anaphylactoid reaction).**
- **Post-transfusion purpura (PTP).**

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- **Transfusion-associated acute lung injury (TRALI).**
- **Transfusion-associated graft *versus* host disease (TA-G*v*H).**
- **Transfusion-associated circulatory overload (TACO).**

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- **Acute or Delayed haemolytic transfusion reaction (AHTR or DHTR).**

- **Hyperhaemolysis.**

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If we get it wrong, we may get a visitor!

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So, the safest transfusion is one that is ***NEVER GIVEN***.

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It must be remembered that the diagnosis of a transfusion reaction is a clinical decision based on many factors, the laboratory results being only one of these factors.

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It must also be remembered that there is a difference between a delayed haemolytic transfusion reaction (DHTR) and a delayed serological transfusion reaction (DSTR).

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A delayed haemolytic transfusion reaction is when there are clinical *sequelae* following an *in vivo* antibody/antigen interaction.

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A delayed *serological* transfusion reaction may give some of the transfusion laboratory findings of a DHTR, but the patient is not clinically compromised, and there are no clinical *sequelae*.

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In certain rare circumstances, it may be clinically beneficial to transfuse blood, knowing it to be incompatible, if it will get an otherwise healthy patient through a vital operation, even though the transfused blood may not survive normally.

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This is ***ALWAYS*** a ***MEDICAL*** decision!

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Acute Haemolytic Transfusion Reaction.

An acute haemolytic reaction usually occurs immediately upon transfusion, but can occur up to three days following transfusion.

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Delayed Haemolytic Transfusion Reaction.

A delayed haemolytic reaction usually becomes apparent after three days following transfusion, but can take up to twenty-one days to become apparent.

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Testing for an AHTR.

- **INFORM THE HAEMATOLOGY CONSULTANT!**
- **Most acute haemolytic transfusion reactions are caused by wrong blood to wrong patient incidents.**
- **Check for clerical errors *at every stage of the process*.**

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Testing for an AHTR.

- **Check that the ABO group of the recipient and the donor are compatible (they may not be identical).**
- **If a bacterial infection of the unit is *even remotely suspected* – inform the NHSBT.**
- **Perform a DAT (may be negative).**
- **Perform an elution test, *even if the DAT is negative*.**

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Testing for an AHTR.

- Re-cross-match all units with pre- and post-transfusion samples.
- Perform clotting studies and a FBC.
- Perform renal function tests.
- Examine urine for haemoglobinuria.
- Possibly test for haptoglobins and plasma LDH.

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Above all – DO NOT PANIC (but remember to document everything and report the incident to SABRE, if it does prove to be an AHTR)!

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Testing for an DHTR.

- If possible, re-cross-match all units with pre- and post-transfusion samples.
- Perform a DAT (may be negative).
- Perform an elution test, *even if the DAT is negative*.
- Perform tests on the patient's Hb, bilirubin, haptoglobins and plasma LDH.

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Testing for an DHTR.

- Perform renal function tests.
- If possible, send samples of all units, together with the patient's pre- and post-transfusion samples to the NHSBT for testing; the antigen against which the culprit antibody is directed may not be expressed on routine screening and panel cells.

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Above all – DO NOT PANIC (but remember to report the incident to SHOT/SABRE, if a DHTR is confirmed)!

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Hyperhaemolysis is a very special case of a transfusion reaction that may be either acute or delayed.

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In such a case, the post-transfusion Hb level will drop to a level below that determined before the transfusion was administered.

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It is *usually* associated with sickle cell disease, but this is not always the case.

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It is caused by hyperactive macrophages that destroy, not only the transfused red cells, but also the patient's own red cells and reticulocytes.

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Serum ferritin levels are usually high (>10 000µgL^{-1} – normal range 12 to 150 ngL^{-1} in females and 12 t0 300 ngL^{-1} in males), whilst transforming growth factor-β (TGF-β) are low (normal range 4.1+/-2.0 ngmL^{-1}).

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TGF-β deactivates macrophages and so low levels, or absence of TGF-β may lead to macrophage phagocytosis of young red blood cells.

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In such a case, unless the anaemia is, in itself, life-threateningly profound, *further transfusion is contraindicated*.

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Further transfusion will often exacerbate the situation, and may prove fatal, even if the units are cross-match compatible.

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In such a situation, when further transfusion is unavoidable, consideration should be given to IVIg and high-dose steroids (methylprednisolone).