Blood and Transplant

Automated Red Blood Cell Exchange Treatment

for the prevention of crisis and complications relating to Sickle Cell disease

Authors: Ball L; Wilson A; Anand R; Trompeter S

Automated red blood cell exchange (RBCX) therapy rapidly removes red blood cells (RBC) containing Haemoglobin S (HbS) whilst simultaneously replacing them with donor RBCs.

Automated RBCX is a treatment using an apheresis machine that removes a patient's red cells and replaces them with donor red cells thus decreasing the amount of Sickle Cell haemoglobin in the blood. This treatment is less frequently required than manual exchange or top up transfusion.

Benefits of automated RBCX:

- Accurately predicts a patient's final Haematocrit (HCT) and final HbS
- Continuously manages and maintains a patients fluid balance
- Short procedure time (average 98mins)
- Small extracorporeal volume
- Ability to use peripheral access
- Less iron overload
- Prevention/improves symptoms of crises
- Less frequently needed than manual or top up transfusion
- Treats and prevents complications of Sickle Cell Disease.

Automated RBCX is commonly used in the treatment of adult and paediatric patients suffering with Sickle Cell Disease (SCD).

Automated RBCX depletion can also be performed in certain situations. This is completed in 2 phases: a) depletion stage to reduce the HCT. b) exchanges the remaining RBCs with normal RBCs.

Clinical Guidance/Recommendations

In 2016, National Institute for Health and Care Excellence (NICE) recommended that the Spectra Optia® automated apheresis system should be used for performing automated RBCX in patients with SCD. The Spectra Optia® is fast to use, needs to be done less often than a manual red blood cell exchange and should be considered in patients who require regular transfusion.

Performing a automated RBCX using this technology would not only provide benefits when used in a patient who is iron overloaded but has the potential to save NHS England approximately £12.9m per year, (approximately £18,100 per patient per year).

Shortly after these recommendations were released, NICE also issued a 'Do Not Do' recommendation advising that top up transfusion is not generally suitable as a long-term regimen for sickle cell disease because it is iron loading.

The full NICE evaluation can be found at:
https://www.nice.org.uk/guidance/mtg28/chapter/2-the-technology

How to Access Automated Red Blood Cell Exchange Treatment

NHS Blood and Transplant (NHSBT) are major providers of apheresis services to the NHS. Apheresis Services are delivered by eight multi-disciplinary teams across England who provide regional, 24/7 services to both adults and children.

NHSBT utilise the Spectra Optia® technology to deliver automated RBCX Treatments across England. If you would like to refer a patient or discuss the use of this therapy to support your patients, please contact your local Therapeutic Apheresis Services Consultant: http://hospital.blood.co.uk/patient-services/therapeutic-apheresis-services/tas-units/

The British Journal of Haematology provides guidelines on red cell transfusion in sickle cell disease:
http://onlinelibrary.wiley.com/doi/10.1111/bjh.14346/full

http://www.b-s-h.org.uk/guidelines/guidelines/red-cell-transfusion-in-sickle-cell-disease-part-ii/

In addition, the American Society for Apheresis provides guidance and recommendations for SCD disease complications and the use of automated RBCX: http://inbcsaves.org/wp-content/uploads/2016/05/Guidelines-on-the-Use-of-Therapeutic-Apheresis_asfa.pdf

Venous Access

Automated RBCX can be performed peripherally (using 2 cannulas as a minimum) however patients with poor venous access can still receive automated RBCX. Our nurses are experienced in using a variety of alternatives e.g. Central Venous Catheters, Ports and Fistulas.

Revision date: July 2018

1718195