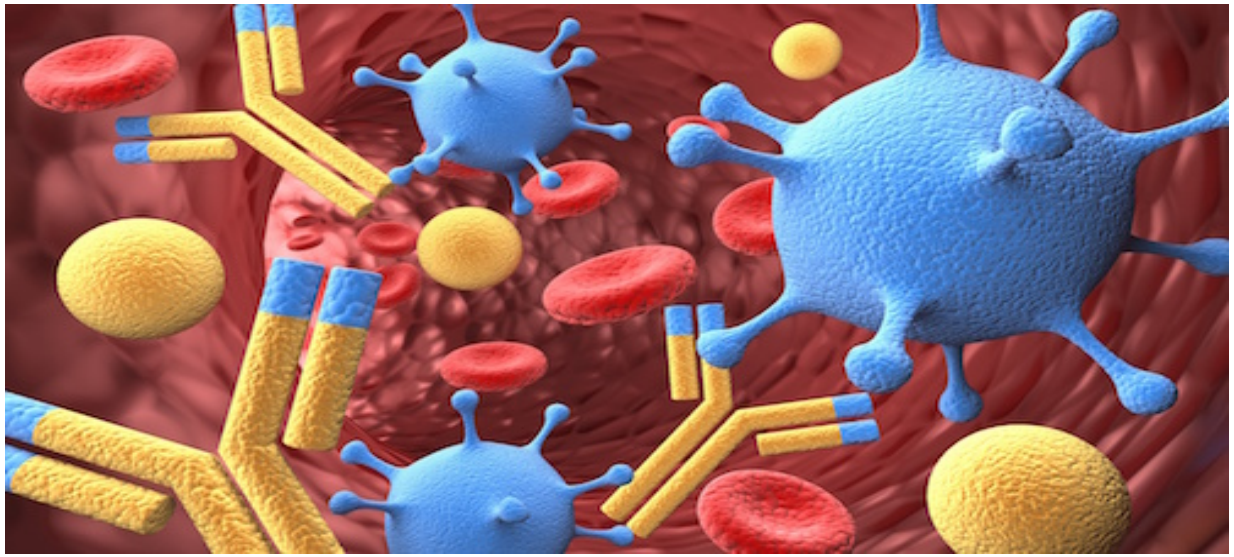
ABO incompatible transplant

exchange transfusion CPB setup

- Infants have a very small donor pool
- Many infant recipients have multiple exposures to blood products pre transplant therefore often have been exposed to multiple antigens
- Immature immune system allows successful transplant with ABO incompatible hearts

- Prior to receiving an incompatible heart, recipient antibodies need to be removed or reduced
- Plasma exchange or plasmaphoresis pre-op may successfully reduce the antibody titre to an acceptable level
- Some patients cannot tolerate plasma exchange or plasmaphoresis
- When the antibody titre remains high the exchange may need to be repeated prior to cross clamp removal on donor heart



- Upon initiation of bypass the patient blood is drained into a cell saver reservoir and replaced with blood bank blood.
- To ensure complete exchange two times the blood volume is removed and replaced

CPB setup for exchange transfusion

- Attach secondary reservoir to prime line
- Insert wye on venous line with ¼“” tubing connecting to cell saver reservoir. Clamp ¼” line
- Prime CPB circuit with blood as per your usual protocol

Exchange Volume Calculations

Total blood volume (TBV)
Newborns <5kg= 85ml/kg
5-20kg=80ml/kg
>20kg=70ml/kg

O-ve Blood(ml)= 2x TBV x 0.69
AB+ve FFP(ml)= 2x TBV x 0.31
Heparin= 3u/ml total volume
$NaHCO_3$= 0.02mmol/ml total volume
CaCl= 0.15mg/ml total volume

Add exchange prime components to reservoir attached to prime line, keep clamped out to CPB reservoir.

When bypass initiated do not open venous line to CPB reservoir…leave it clamped

Open ¼” line to cell saver reservoir and open prime line from exchange reservoir. Flow forward as you normally would

Exchange transfusion

Drain patient’s blood into cell saver and fill the cpb reservoir with replacement volume. When replacement reservoir empty and cpb reservoir has adequate volume to pump at full flow unclamp venous line to reservoir and clamp ¼‘” line to cell saver reservoir.

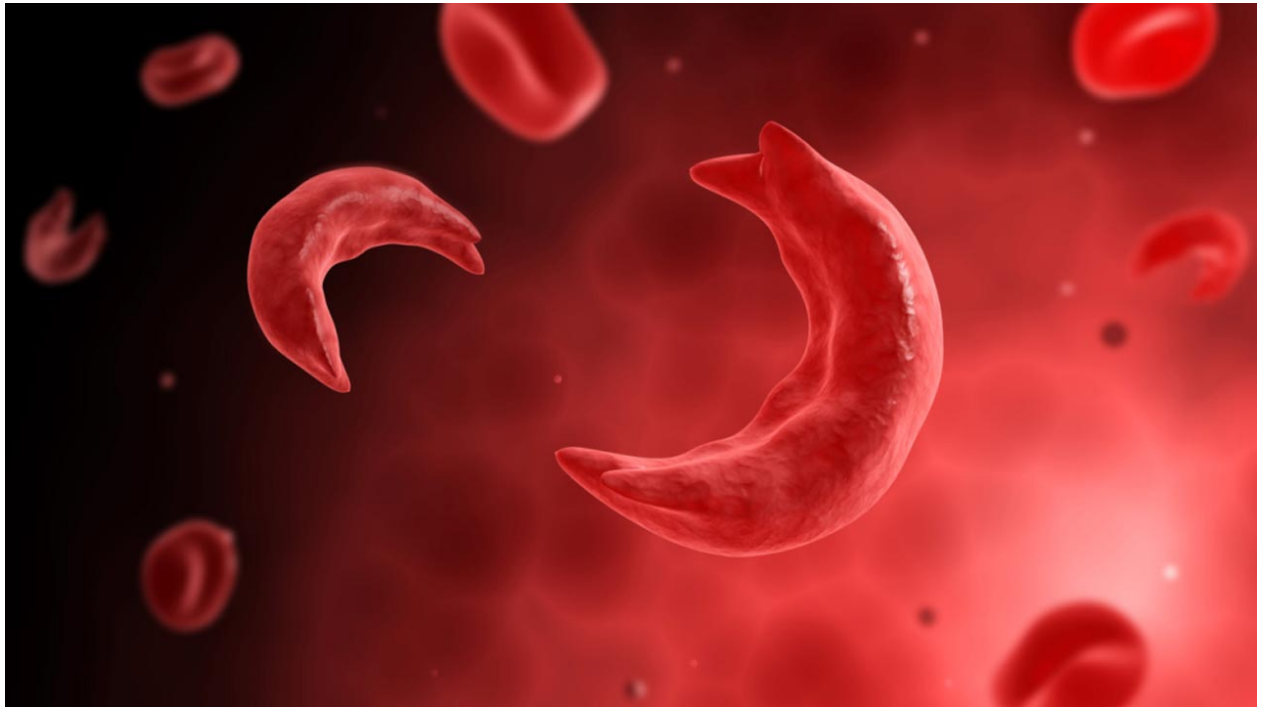
Wash collected patient blood in cell saver and retransfuse only if required

What else do we do?

- Antibody titre samples sent prior to exchange to determine if it is required
- May have to repeat process if titres come back high after initial exchange

Other uses for setup

- Exchange transfusion for sickle cell or thalacemia patients
- Larger patients have larger TBV and may require 2 exchange reservoirs wyed into the CPB reservoir.



Thank you