

Polycythaemia – Management of Symptomatic Neonate

This guideline is for the management of symptomatic neonates with polycythaemia. For asymptomatic neonates found incidentally to have a raised haematocrit (Hct) >65% take a free-flowing venous sample to re-check the haematocrit and monitor until the free-flowing haematocrit falls below 65%. Please read the guidance below for information and be aware that the haematocrit is likely to rise and peak around 8-12 hours of age.

Background:

Polycythaemia is a relatively common finding in the neonatal period. It is defined as an abnormally high ratio of red blood cells to plasma volume and therefore can be measured as a raised haematocrit. Most polycythaemic babies will not show clinical signs, therefore it is important to be aware of those babies at risk in order to monitor them and anticipate the associated problems of polycythaemia. Most babies who develop the clinical signs will present within 24 hours as the haematocrit rises with the physiological decrease in plasma volume.

Measuring polycythaemia:

Below a haematocrit of 60% there is a linear relationship between viscosity and haematocrit. However, above this level there is an exponential rise in viscosity. Capillary sample haematocrits are often artificially high, so a free-flowing venous or arterial sample is the gold standard. Laboratory measurements of haematocrit and MCV are less reliable than spun samples due to the deformability of neonatal erythrocytes

At risk neonates:

Increased erythropoiesis	Erythrocyte transfusion
IUGR	Maternal-fetal
Maternal diabetes	Twin-Twin
Neonatal thyrotoxicosis	Delayed cord clamping
Congenital adrenal hyperplasia	
Chromosomal abnormalities	

Clinical signs:

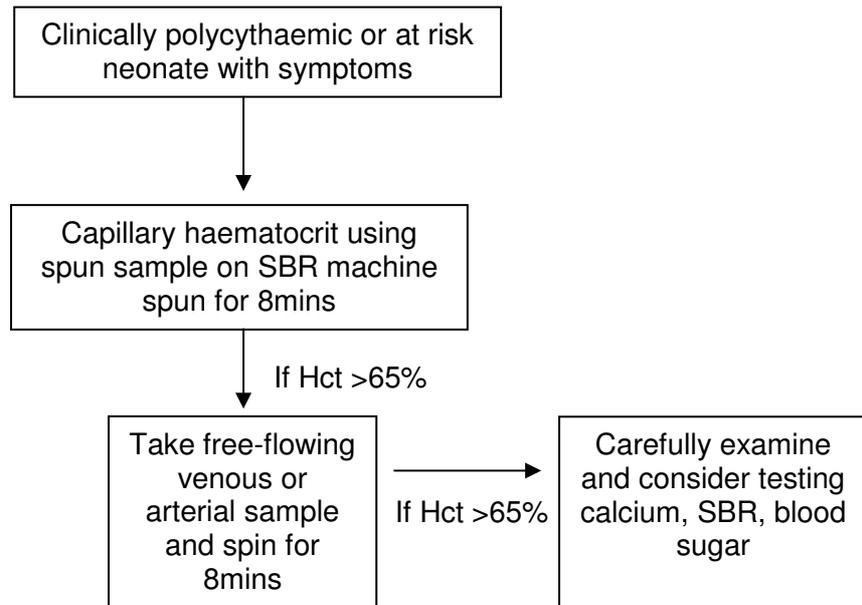
- Plethora or even cyanosis (sometimes only apparent when disturbed)
- Lethargy, poor suck, irritability, jitteriness
- Jaundice
- Hypoglycaemia
- Tachypnoea, tachycardia, heart failure

Possible sequelae:

Due to hyperviscosity microthrombi may form and may lead to

- Cerebral vascular occlusion,
- Renal vein thrombosis,
- Intestinal vascular occlusion
- Platelet consumption leading to thrombocytopenia

Management:



- ★ If the haematocrit is between 65% - 70% dilutional exchange unlikely to be needed but careful monitoring of spun haematocrit (Hct) will be necessary
- ★ If the haematocrit is >70% a dilutional exchange should be considered but discuss with the consultant first. There is no evidence of improved outcome and there is an increased risk of NEC, so the decision is based on the symptoms and potential for more serious complications
- ★ Maintenance fluids – normal maintenance fluids should be prescribed, ensuring that blood sugars are monitored and attended to. There is no evidence that giving “extra” fluids is helpful and may cause additional complications

Dilutional (partial) exchange: (After discussion with Consultant)

Volume to be exchanged = Total blood volume x $\frac{\text{observed Hct} - \text{desired Hct (55)}}{\text{Observed Hct}}$

e.g. 3kg baby with Hct 70%
= 3x 80ml/kg = 240ml

$$= 240 \times \frac{70-55}{70} = 51\text{ml}$$

It is necessary to have both arterial and venous access, preferably peripheral because polycythaemic babies are at greater risk of NEC. However, if there is an umbilical catheter already present this can be used, or if peripheral access is difficult.

Use a 3-way tap on the sampling side to take off the aliquots of blood and discard. Take off 10mls at a time, except in VLBW babies where 5mls should be taken at a time. Clearly document the volumes going in and out on the exchange transfusion chart. The process should take 30 minutes, therefore replace the fluid loss with 0.9% normal saline as an infusion to run at a corresponding rate.

Following the exchange take a repeat free-flowing haematocrit and a gas to measure the sodium, ionised calcium and glucose.

During/after this procedure continue to feed the baby as normal unless there are other concerns.

References:

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