1 ANTEPARTUM CARE

1.9 BLOOD GROUPING AND ANTIBODY TESTING

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1.9.2 The Kleihauer Test
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1.9.2 THE KLEIHAUR TEST

OVERVIEW

The Kleihauer Test is used to identify women with a large fetomaternal haemorrhage (> 6 mL of packed fetal red cells) who may need ADDITIONAL anti-D immunoglobulin to ensure clearance of all fetal red cells. A negative Kleihauer Test indicates that one dose of anti-D immunoglobulin is sufficient.

A standard CSL 625 International Units dose of anti-D is sufficient to destroy 240 fetal red cells / 50 low power fields (LPF), which is equivalent to a 6 mL bleed of packed fetal red cells. For Kleihauer counts > 240 fetal cells/50 LPF a repeat Kleihauer Test is required 48 hours after administration of anti-D to ensure effective prophylaxis.

For antepartum Kleihauer Tests, the result may stay positive in cases where the fetus is Rh(D) negative even though one or more doses of anti-D have been given. In these cases, TM will liaise with the physician.

INDICATIONS FOR PERFORMANCE OF THE KLEIHAUER TEST

URGENT TESTING DURING THE ANTEPARTUM

The indications for an urgent Kleihauer are rare.

An **urgent** Kleihauer test should be ordered **ONLY** in the following situations:

1. Unexpected/ unexplained stillbirth in which case the Kleihauer is performed prior to the commencement of induction of labour.
2. Significant maternal abdominal trauma, when the CTG is not reassuring and/or the fetus is inactive on ultrasound.
3. Sinusoidal fetal heart rate trace in a non-immunised woman.
4. Non immune hydrops in association with an abnormally raised MCA PSV.
5. Decreased fetal movements after two consecutive non reactive non stress tests ***UNLESS*** the first non stress test has:
    - very reduced variability,
    - a sinusoidal pattern
    - specific clinical signs suggestive of a fetal maternal haemorrhage
    - an inactive fetus on ultrasound

In these circumstances a Kleihauer should be done immediately.

Requests for an urgent Kleihauer MUST be accompanied by a phone call to the scientist in the haematology laboratory.

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A KLEIHAUER TEST SHOULD NOT BE REQUESTED IN THE SETTING OF AN ANTEPARTUM HAEMORRHAGE IN ORDER TO DIAGNOSE ABRUPTION. THIS IS AN INAPPROPRIATE USE OF THE TEST.

All non-urgent requests for Kleihauer testing (eg. for quantitation of anti-D in Rhesus negative women, investigation of an unexpected stillbirth) will be batched and processed once a day

NON-URGENT DURING THE ANTEPARTUM

Women who have undergone an ECV (whether or not this was successful) and where the blood group in Rh negative.

TESTING AT THE TIME OF BIRTH / POSTPARTUM

Maternal sample

A pre-delivery G&S sample should be collected on admission to the Maternal Fetal Assessment Unit/ Labour and Birth Suite (or the Pre-Admission Clinic if an elective Caesarean section birth is planned) if:

- atypical red cell antibodies are present,
- the woman's serological history is unknown,
- prophylactic anti-D immunoglobulin has been given,
- there is an increased risk of requiring a blood transfusion.

In order to determine the extent of the fetomaternal haemorrhage and therefore the appropriate dose of anti-D, a maternal Kleihauer sample must be taken from all Rh(D) negative women who have given birth to a Rh(D) positive infant and who do not have preformed immune anti-D antibodies. This sample must be taken within 72 hours of placental separation.

If the fetomaternal haemorrhage is greater than 6mL of Rh(D) positive fetal packed red cells, Transfusion Medicine will contact the ward and supply additional doses of anti-D immunoglobulin as required. A negative Kleihauer Test indicates that one dose of anti-D is sufficient.

CORD SAMPLE

A cord blood sample is collected from all babies born at KEMH and sent to Transfusion Medicine.

A request for blood group and a Direct Antiglobulin Test (DAT) should be made for all infant's born to a mother who:

- is Rh(D) negative or,
- has known clinically significant antibodies or,
- has unknown maternal blood group and antibody status.

Where the cord sample is Rh(D) positive and the mother is Rh(D) negative, anti-D immunoglobulin will be supplied by TM for administration to the mother without delay.

A request for a blood group and DAT should be made for all infants with unexplained neonatal jaundice and, where the DAT is positive, a bilirubin estimation should be performed on the cord blood. In addition, a haemoglobin level should be determined on a peripheral blood sample taken from the infant.

Note: When a Rh(D) negative mother receives anti-D immunoglobulin during pregnancy, especially as routine prophylaxis at 28-30 and 34-36 weeks gestation:

- **the Rh(D) positive infant may be born with a positive DAT but have no evidence of haemolysis and**
- **the maternal sample will often show anti-D reactivity, as the half-life of anti-D immunoglobulin in the absence of significant fetomaternal haemorrhage, is approximately 21 days.**

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