

When the Laboratory and the Fetus Disagree: A Diagnostic Challenge in Suspected Fetomaternal Haemorrhage

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Background

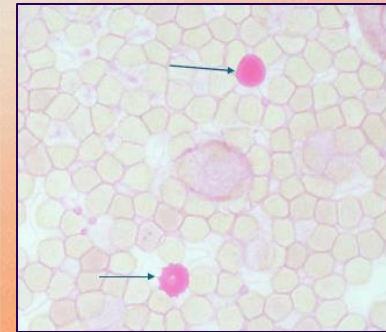
Fetomaternal haemorrhage (FMH) is an important cause of fetal anaemia and stillbirth. The Kleihauer-Betke test is commonly used to estimate FMH volume; however, interpretation may be complicated by maternal conditions associated with elevated fetal haemoglobin (HbF).

Case

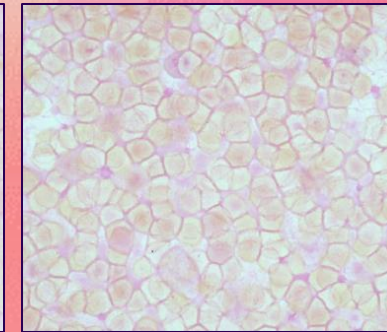
A 32-year-old G2P1 Rhesus-positive woman presented at 33+0 weeks gestation with reduced fetal movements. Her pregnancy was complicated by class III obesity (BMI 46), gestational diabetes managed with metformin, and enteroviral meningitis at 18 weeks gestation. Initial maternal and fetal assessment was reassuring, with a normal CTG and resolution of reduced fetal movements. She was discharged home.

Results

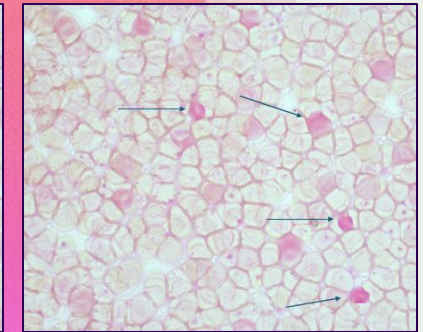
A Kleihauer-Betke test, reported 24 hours after presentation, estimated 2.2 mL of fetal red blood cells in the maternal circulation. The patient was recalled for repeat testing, which demonstrated an increase to 6.2 mL, raising concern for significant FMH. Despite these findings, maternal and fetal assessment remained reassuring, prompting flow cytometry on the same specimen. Flow cytometry estimated only 1.1 mL of fetal red blood cells. Haematology review identified numerous intermediate-staining cells on the Kleihauer film and advised that maternal HbF-containing erythrocytes may have led to overestimation of FMH. Subsequent testing demonstrated low and stable FMH estimates, while serial cardiotocography, ultrasound assessment, amniotic fluid indices and Doppler studies remained reassuring throughout.



Positive control



Negative control



The patient's results

Explanation

The Kleihauer-Betke test uses acid elution to estimate the volume of FMH¹. However, acid elution cannot reliably distinguish fetal erythrocytes HbF from maternal erythrocytes containing HbF, which may result in overestimation of FMH¹. In contrast, flow cytometry can differentiate these cell populations, providing a more accurate estimate of FMH volume, particularly when laboratory findings are discordant with the clinical picture¹.

Discussion

This case highlights an important limitation of the Kleihauer-Betke test. Maternal HbF persistence should be considered when interpreting elevated Kleihauer results. Clinical management should integrate laboratory findings with ongoing assessment of fetal wellbeing, with flow cytometry providing a useful adjunct in selected cases.

¹British Society for Haematology. (2026). Guideline for the estimation of fetomaternal haemorrhage. *Transfusion Medicine*.