Sinusoidal pattern: a key to a rare case of fetal anaemia

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DESCRIPTION
A 35-year-old healthy pregnant woman, A+ blood type, with a history of one vaginal childbirth appeared at the emergency department for reduced fetal movements (RFM). She was 37-week pregnant and no major complications were described during her pregnancy. She had negative indirect Coombs test. She had normal uterine tone, with no blood or amniotic fluid loss. On the ultrasound examination, fetal heart rate and amniotic fluid volume were normal, but there were no active fetal movements. The cardiotocography (CTG) examination displayed a low variability tracing with sinusoidal pattern with no uterine contractility (figure 1). Emergent caesarean section was performed, assuming fetal distress. The newborn weighed 2665 g and the Apgar score at birth was 0/3/4. Umbilical cord blood gas analysis did not show acute hypoxia or metabolic acidosis (pH 7.31; HCO\(_3\^-\) 20.1 mmol/L; base excess 5.3 mmol/L; pCO\(_2\) 40 mmHg; pO\(_2\) 53 mmHg; lactate 6.7 mmol/L and undetectable haemoglobin (Hb)). By posterior analyses, the newborn was diagnosed with severe anaemia (Hb: 4.8 g/dL), and was transferred to the neonatal intensive care unit. Fetomaternal haemorrhage (FMH) was confirmed by flow cytometry, which estimated 237.7 mL of fetal blood in maternal blood. Anatomopathological examination of the placenta revealed no changes.

Spontaneous massive FMH is a rare complication that can occur at any time during pregnancy. It represents a life-threatening condition for the fetus, as it could be responsible for acute fetal anaemia and intrauterine death. Several studies have suggested that FMH could only be revealed by RFM. In women with RFM in the third trimester of pregnancy, it is mandatory to perform a non-stress test/CTG. According to National Institute of Child Health and Human Development, and concerning CTG, category III fetal heart rate (FHR) pattern is associated with an increased likelihood of severe hypoxia and metabolic acidemia. Sinusoidal pattern is considered a category III FHR pattern. Although many suspicious signs, severe FMH can only be diagnosed by the presence of fetal erythrocytes in the maternal circulation. It is consensual that FMH ≥20% of fetal blood volume or 10–150 mL of fetal blood in maternal circulation could be considered massive FMH. There are two major forms to estimate the volume of fetal blood lost in an FMH. The Kleihauer-Betke (KB) test is inexpensive and requires no special equipment. Anti-HbF flow cytometry is an automated test unaffected by maternal levels of fetal Hb or by fetal levels of Hb A. Comparative analysis of flow cytometry and the KB test has shown that flow cytometry is more accurate, more reproducible and less labour intensive.

Figure 1 Cardiotocographic tracing showing sinusoidal pattern and the absence of uterine contractions.

Learning points
- Massive fetomaternal haemorrhage could be asymptomatic. In the antepartum period, decreased or absent fetal movement is the most common presenting symptom.
- Sinusoidal pattern is exceedingly rare and thus intervention has not been studied in a systematic way.
- The sinusoidal pattern is associated with severe fetal anaemia, although the pathophysiological mechanism has not been definitively proven. Emergent delivery is indicated if resuscitative measures do not improve the pattern.
This case, although rare, is quite illustrative of FMH: our patient had RFM as well as category III FHR pattern in non-stress test/CTG (sinusoidal pattern). The newborn had severe anaemia and flow cytometry estimated 237.7 mL of fetal blood in maternal circulation, which allow us to conclude that was a case of massive FMH. Both the recognition of non-reassuring CTG pattern and the timely intervention were the key to a favourable outcome.

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