

EP15.92- Timely MCA-PSV guided intervention in severe Kell alloimmunisation with recurrent pregnancy losses

M. Edirisinghe¹, N.A. Fonseka¹, T. Dias¹, V. Kajeepan¹, H. Thilakarathne¹

¹Colombo North Teaching Hospital, Sri Lanka

Background

Anti-Kell alloimmunisation is an uncommon but important cause of severe haemolytic disease of the fetus and newborn (HDFN). Unlike RhD disease, fetal anaemia results from both haemolysis and suppression of erythropoiesis, making disease severity poorly correlated with maternal antibody titre. Middle cerebral artery peak systolic velocity (MCA-PSV) is the preferred non-invasive method for detecting fetal anaemia and guiding intrauterine transfusion (IUT).

Case Presentation

A gravida 6 para 0 woman was referred to the fetal medicine unit at 16 weeks' gestation with anti-Kell alloimmunisation. Her obstetric history included two unexplained intrauterine fetal deaths, one neonatal death due to severe anaemia, and a 20-week miscarriage complicated by early-onset hydrops. Her anti-K antibody titre was 1:8, and weekly MCA-PSV surveillance was initiated. At 25 weeks, the MCA-PSV increased to 1.5 MoM, indicating severe fetal anaemia. An intrauterine transfusion (IUT) was performed, with a pre-transfusion fetal haemoglobin of 5.8 g/dL. Recurrent fetal anaemia necessitated a second IUT; however, fetal hydrops developed at 28 weeks, prompting delivery.

Neonatal Outcome

The neonate received six postnatal blood transfusions and intravenous immunoglobulin (IVIG). Serum bilirubin remained below the threshold for phototherapy, and the infant was discharged in a stable condition with a favourable early neonatal outcome.

Discussion

Kell antibodies suppress fetal erythropoiesis in addition to causing haemolysis, making maternal antibody titres unreliable predictors of disease severity. Serial MCA-PSV assessment provides a sensitive, non-invasive method for identifying moderate-to-severe fetal anaemia and determining the optimal timing of IUT. Accurate Doppler technique including sampling the proximal MCA with minimal insonation angle is essential for reliable assessment.

Clinical Significance

This case demonstrates that:

- Previous unexplained pregnancy losses may represent unrecognised Kell-mediated fetal anaemia.
- Regular MCA-PSV surveillance enables timely intervention before irreversible fetal compromise.
- Even when hydrops develops, coordinated fetal medicine, neonatal and transfusion support can achieve favourable neonatal outcomes.

Learning Points

- Anti-Kell disease causes fetal anaemia through haemolysis and suppression of erythropoiesis.
- MCA-PSV ≥ 1.5 MoM is a reliable indicator for fetal anaemia and the need for IUT.
- Maternal antibody titre alone should not guide management.
- Early referral to a fetal medicine unit and multidisciplinary care improve perinatal outcomes.

References

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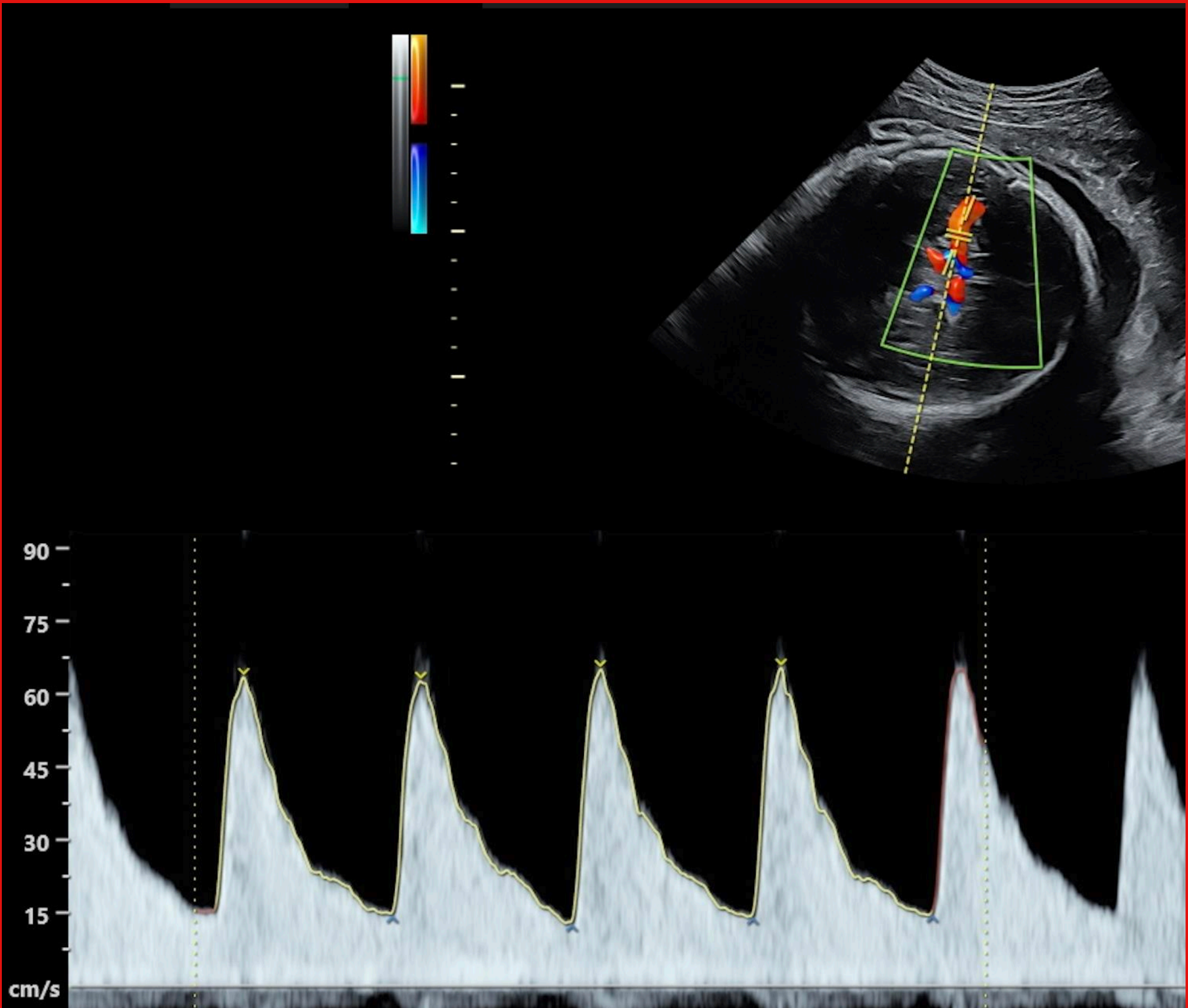


Figure 1. Middle cerebral artery peak systolic velocity (MCA-PSV) measurement.

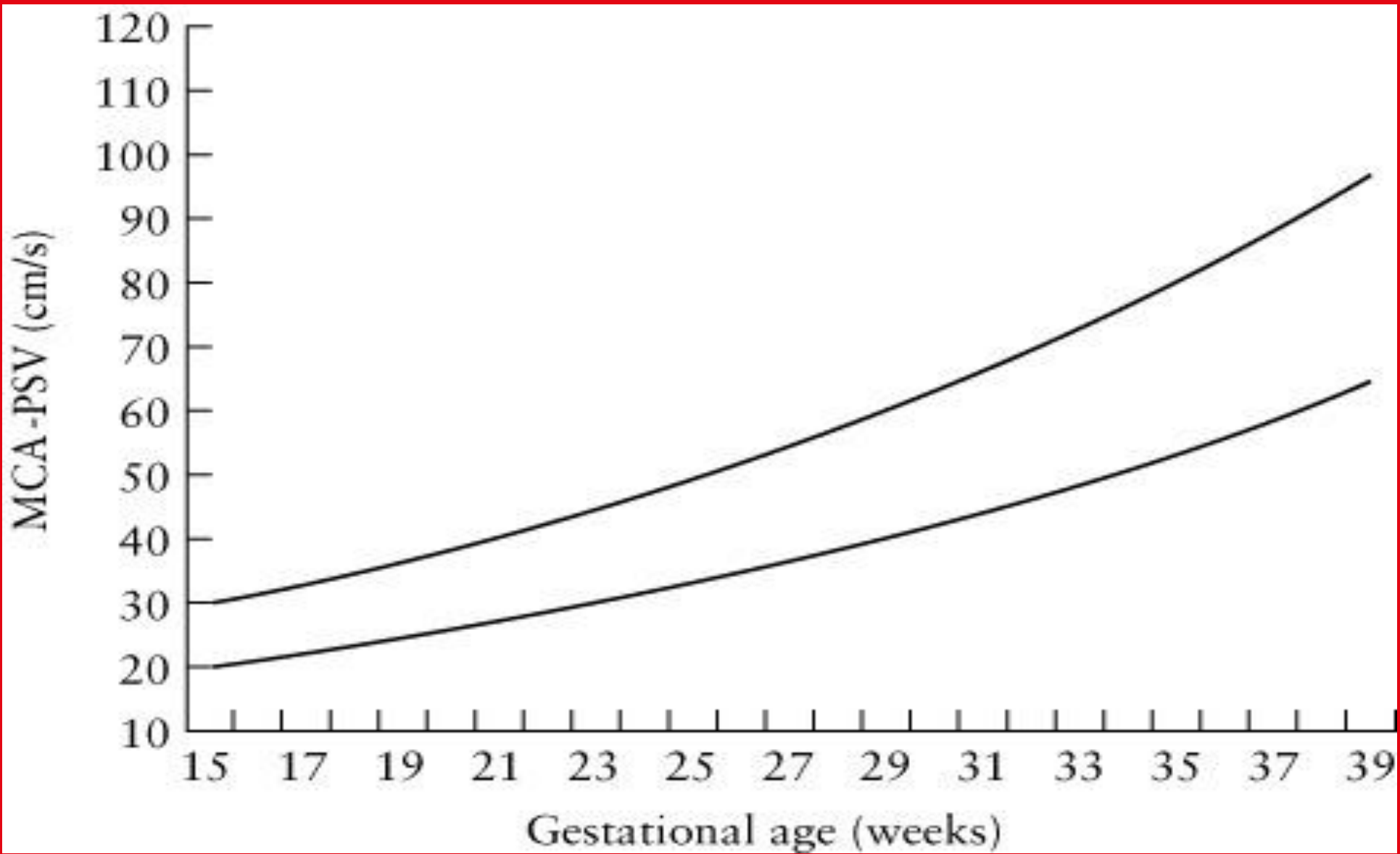


Figure 2. Reference ranges for fetal MCA peak systolic velocity (MCA-PSV) according to gestational age. The lower and upper curves represent the median and 1.5 MoM, respectively. Adapted from Mari et al., N Engl J Med. 2000;342:9–14.

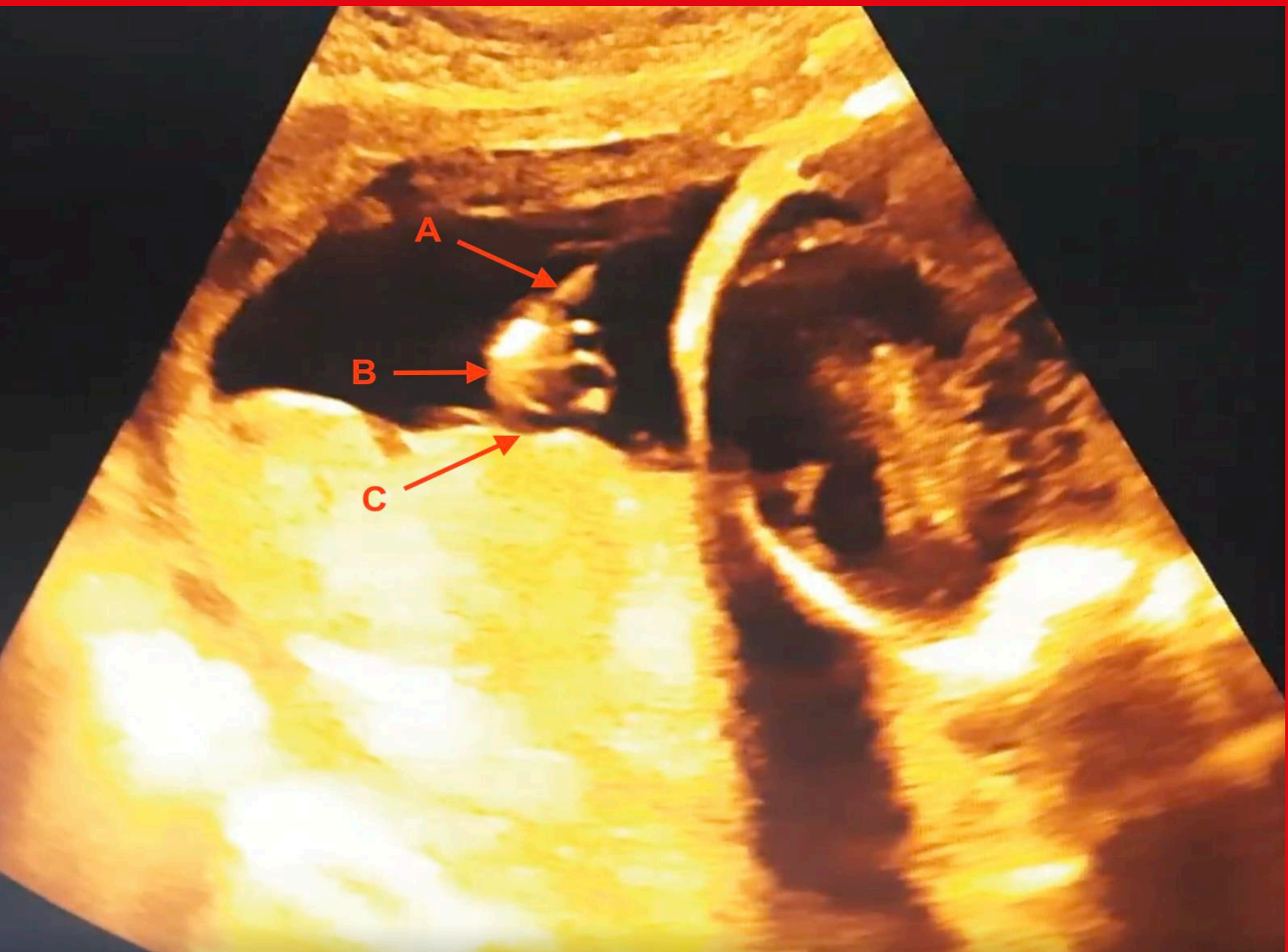


Figure 3. Ultrasound-guided IUT. (A) needle tip within the umbilical vein (B) umbilical cord. (C) placental side umbilical cord insertion