Paternal Malignant Hyperthermia and Risk to Susceptible Fetus During Maternal Anesthesia

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Background

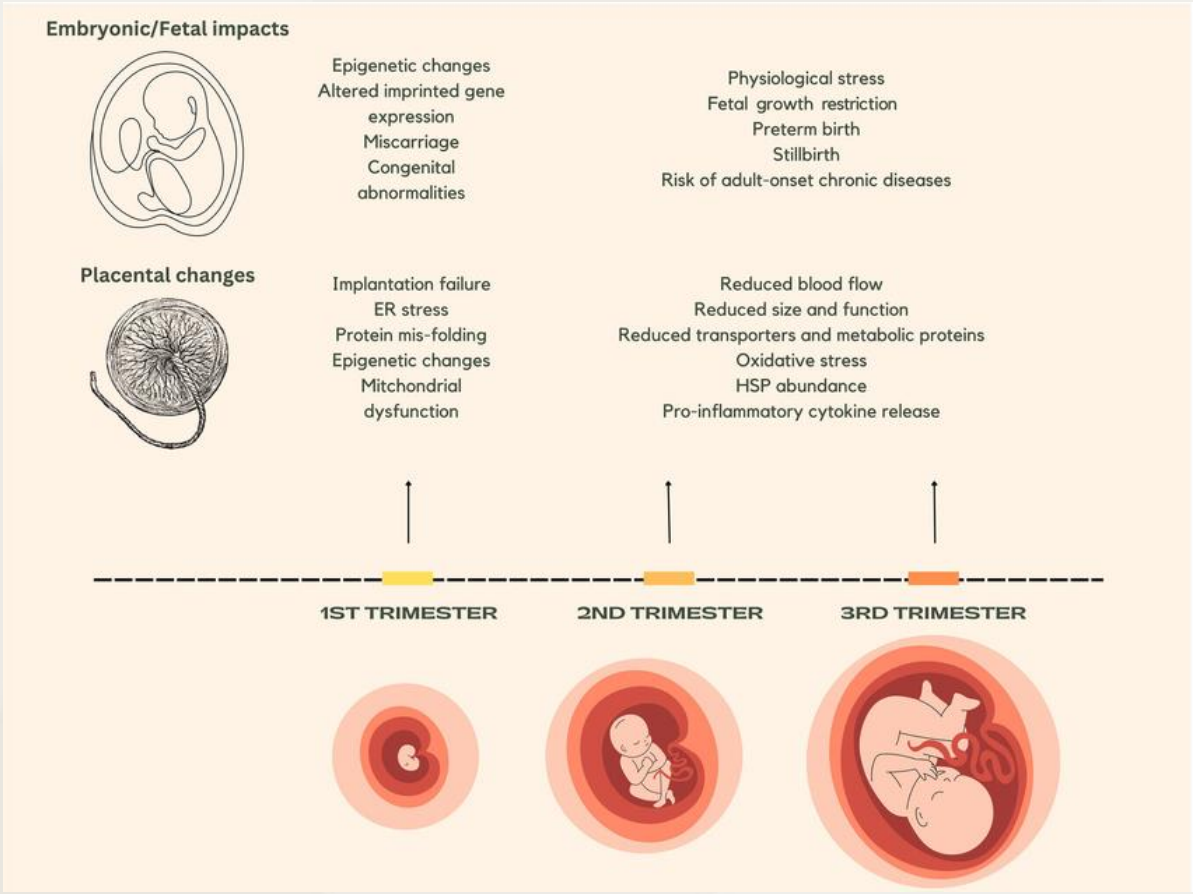
- Genetically inherited disorder, 60-70% of cases caused by mutation in RYR1 gene (encodes ryanodine receptor protein)
- Autosomal dominant
- Exposure to succinylcholine/volatile anesthetics triggers uncontrolled calcium release from sarcoplasmic reticulum --> acidosis, hypercapnia, tachycardia, hyperthermia, rhabdomyolysis, cardiac arrhythmias.
- Without recognition and treatment, mortality ~ 80%
- Treatment: IV dantrolene at 2.5 mg/kg until symptoms abate, stop triggering agents, increase minute ventilation, cooling, monitor electrolytes and creatine kinase.
- Paternal MH --> fetus at risk of MH during maternal anesthetic

Case

- 31-year-old G5P0040 at 12 weeks 2 days gestational age, pmhx of hypothyroidism and asthma, presenting for cerclage placement due to cervical incompetence and history of recurrent pregnancy loss.
- Husband had history of genetically confirmed MH, diagnosed after an acute episode requiring 8 doses of dantrolene, cooling, and ICU admission.
- Patient herself denied any personal or family history of MH.
- Primary anesthetic: spinal injection at L4 with intrathecal hyperbaric bupivacaine and fentanyl.
- Appropriate precautions were taken: anesthesia circuit was flushed and inhalational agents were removed, with plans to use IV anesthetics if needed.
- Patient tolerated neuraxial analgesia well and no issues arose.

Teaching Points

- This case of paternal MH highlights unique aspects of pregnancy care.
- Recommended that when fetus is considered at-risk, triggering anesthetics be avoided.
- Dantrolene crosses placenta and can be used for suspected MH crises in fetus, however prophylactic dantrolene not recommended in these cases
- Challenging to diagnose, as detection of clinical signs limited to fetal heart rate monitoring and indirect maternal lab abnormalities.
- Literature review has found impacts of maternal hyperthermia on fetal development, suggesting serious effects if fetus survives
- More research required for earlier detection of MH in susceptible fetuses and guidance on management



References: