Management of Alloimmunization

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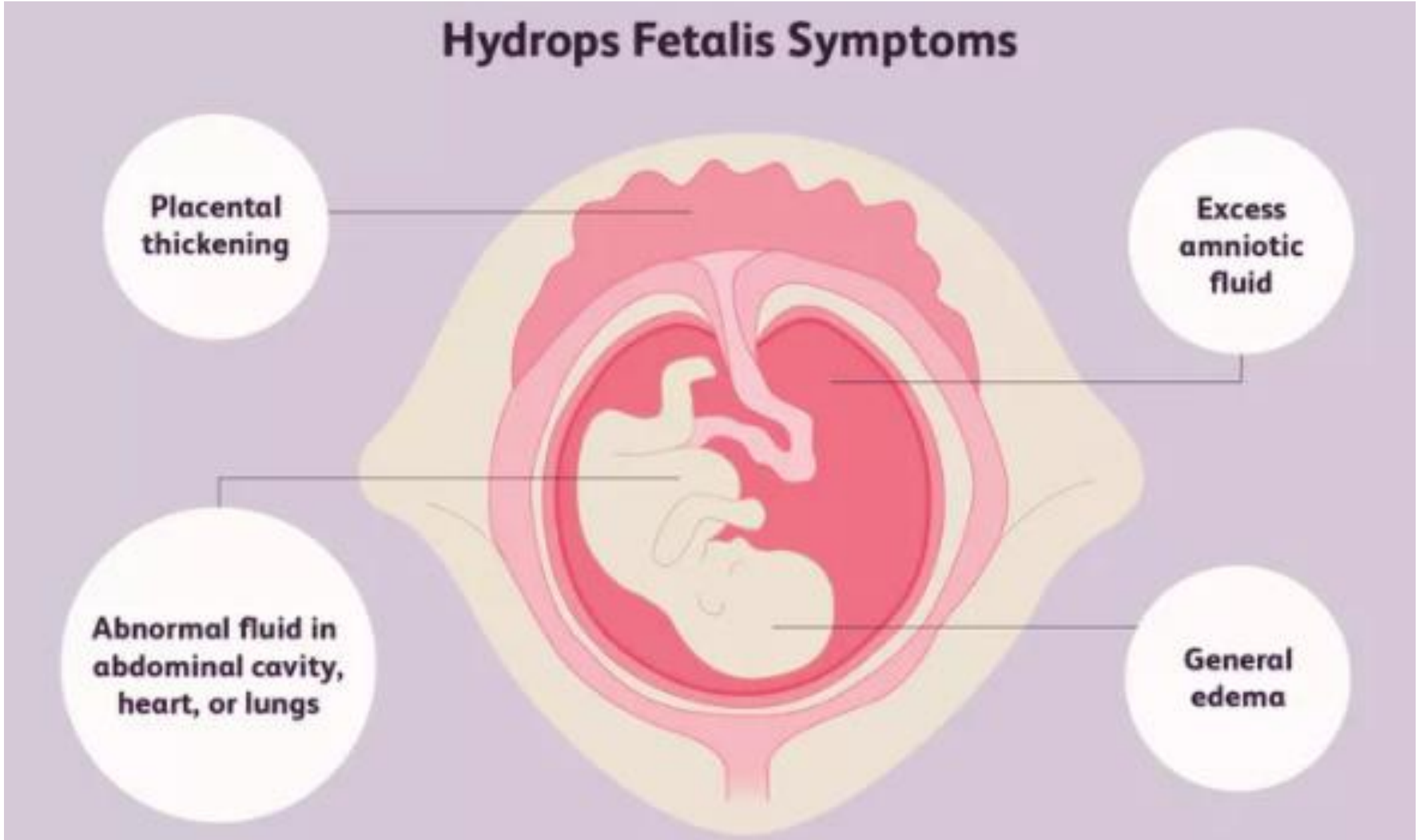
Nomenclature

- Nomenclature previously reviewed in last lecture
- Many blood group systems and different antibodies. Presence has different pregnancy implications (refer to Table 1 in Practice Bulletin 192).

Fetal implications of allo-immunization

- Can lead to hemolytic disease of the fetus and newborn
- Mild/moderate hemolytic anemia can lead hyperbilirubinemia and/or symptomatic anemia manifesting in lethargy or tachycardia
- Severe hemolytic anemia can lead to extramedullary hematopoiesis → reticuloendothelial clearance→ hepatosplenomegaly→ decrease liver function→ hypoproteinemia → ascites/anasarca
- Hydrops fetalis- severe life threatening condition with skin edema, pleural or pericardial effusion, or ascites.

Hydrops Fetalis Symptoms



What should be done if antibodies are detected?

- All woman should have ABO blood group, Rh D type, and presence of antibodies checked upon entry into prenatal care.
- Initial management of alloimmunized patient is determination of paternal genotype, if paternity is certain.
  - If father is negative for for erythrocyte antigen in question, further assessment is not necessary.
  - In cases of Rh D alloimmunization in which father is Rh D positive, tests can be used to determine if he is homozygous or heterozygous.
- Fetal antigen should be assessed in cases where paternity genotype is unknown or heterozygous.
- Antibody titers should also be sequentially tested.

Determination of Fetal Genotype

- Done via amniocentesis
- Sensitivity and specificity of PCR genotype 98.7% and 100%, respectively.
- PPV and NPV 100% and 96.9%, respectively.
- If fetus tests negative for antigen in question, further testing may not be warranted

At what antibody titer should additional evaluation be initiated?

- A mother with positive antibody screen should reflexively have antibody titer assessment.
- Titer values are reported as the integer of greatest tube dilution with positive agglutination reaction.
- Critical titer is one that is associated with significant risk for erythroblastosis fetalis and hydrops.
  - If the initial antibody titer is 1:8 or less, may monitor titers q 4wks.
  - Critical titer value between 1:8 to 1:32, in which more fetal assessment is indicated
- Kell-sensitized is the exception as titers do not correlate with fetal status.
  - "KELL KILLS!"

What is the role of Middle Cerebral Artery (MCA) Dopplers?

- Non-invasive sonographic measurement used as proxy in evaluation for fetal anemia.
- Measures peak systolic velocity (PSV) of the fetal middle cerebral artery (MCA).
  - Increased PSV in MCA reveals "brain-sparing" given that fetal blood is re-distributed to this vessel in a compensatory manner

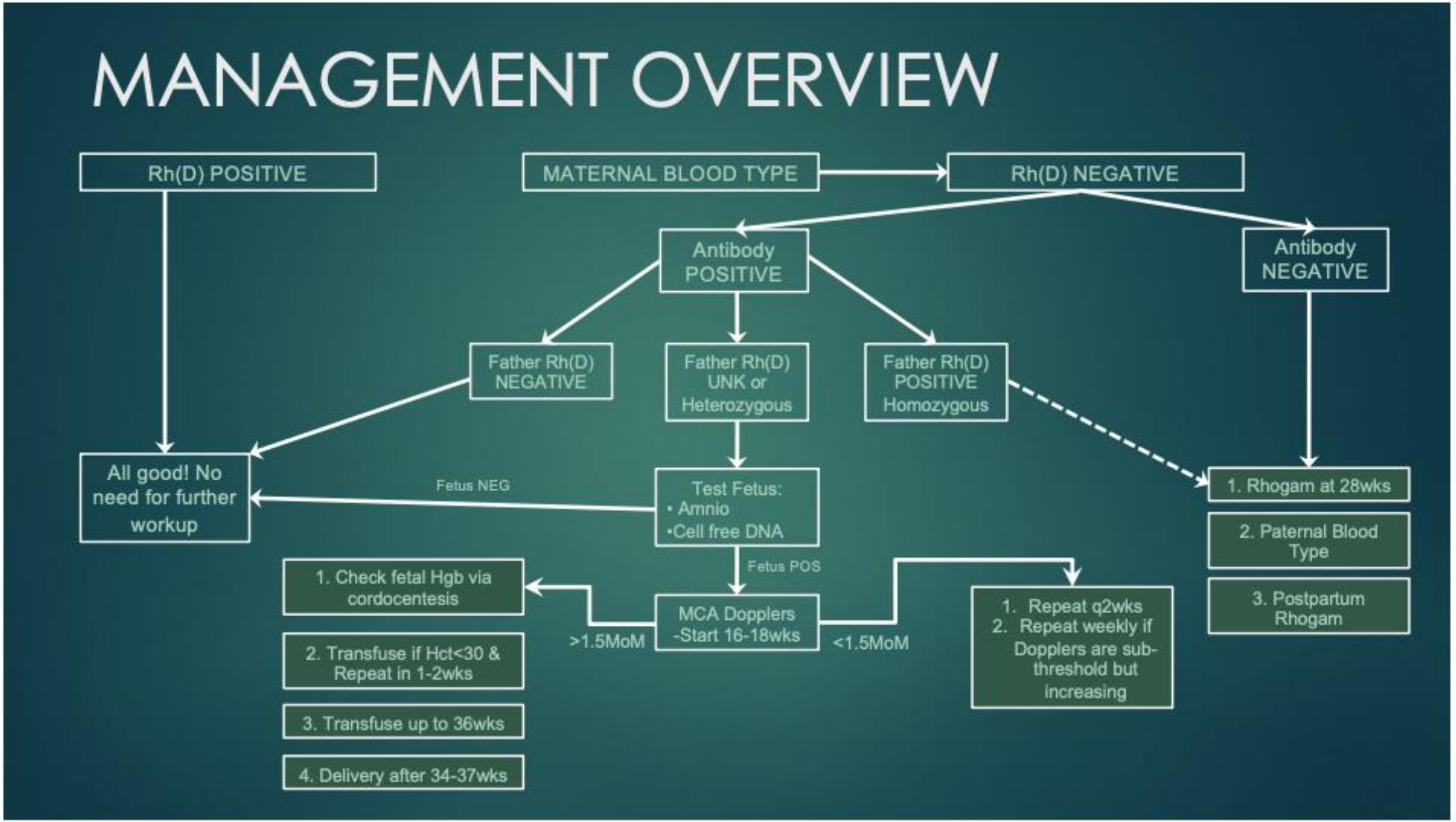
What is the role of Middle Cerebral Artery (MCA) Dopplers?

- Once critical titer reached, monitor MCA dopplers q 1-2 weeks starting at 16-18 weeks.
- If MCA PSV < 1.5 MoM, continue regular MCA dopplers scans
- If MCA PSV >1.5 MoMs, there is significant concern for fetal anemia warranting fetal Hgb assessment via cordocentesis (aka percutaneous umbilical blood sample, PUBS)
  - If anemia confirmed, fetal transfusion is necessary; this can occur in the umbilical cord, in a fetal perihepatic vessel, or even into the fetal abdominal cavity (because it will be absorbed)
  - If titers are >1:1028 or mom has previous baby with hydrops, can consider IVIG/plasmapheresis

When to deliver allo-immunized patient?

- Controversial
- If studies indicate mild hemolytic disease, reasonable to deliver 37-38 weeks.
- If studies indicate severe disease, may deliver between 32-34 weeks, after betamethasone for fetal lung maturity.

MANAGEMENT OVERVIEW



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