14. TWIN GESTATIONS

INTRODUCTION

Definition of twin gestations:
- Dichorionic twins: Non-identical, or fraternal twins
  - From 2 fertilized ova; separate placentas (dichorionic); same or opposite genders
- Monochorionic twins: Identical twins
  - From single fertilized ovum
  - Degree of separation depends on early embryonic stage at which twinning occurs
  - Single placenta, single chorionic membrane (monochorionic)
  - May have single, or separate amniotic sacs
    - Monochorionic, monamniotic gestation (“MoMo”)
      - Two fetuses in single amniotic cavity (very rare)
      - High risk of complications, such as cord entanglement
    - Monochorionic, diamniotic gestation (“DiMo”)
      - More common form of identical twin gestation (3.5/1000 deliveries)
      - Single placenta, but each twin fetus in its own amniotic cavity

TWIN-TO-TWIN TRANSFUSION SYNDROME (TTTS)

Definition and diagnosis
- Most (all?) monochorionic twins share blood flow via AV, and sometimes AA and VV anastomoses
- Usually: transfusion is balanced (net balance of twin A to twin B and twin B to twin A)
- In 10%: unbalanced transfusion = Twin-to-twin transfusion syndrome (TTTS)
- Diagnosis:
  - (At birth: difference in weight, hemoglobin level: is acute TTTS, a benign condition)
  - Prenatally: ultrasound findings:
1. Single placenta (monochorionic), same gender
2. One chorionic membrane, but two amniotic membranes (“twin peaks,” delta sign)
3. Polyhydramnios in one twin and oligohydramnios in the other
4. Other signs (advanced TTTS): discordant size, bladder not visible in the small twin, hemodynamic or cardiac anomalies, or hydrops in either twin

**Complications and Treatment of TTTS**

Natural evolution
- **Donor:**
  - chronic hypovolemia → chronic oliguria → oligohydramnios
  - failure to grow, high output cardiac failure → hydrops → death
- **Recipient:**
  - chronic hypervolemia → chronic polyuria → polyhydramnios
  - cardiomegaly → tricuspid regurgitation; hydrops → death
- High mortality if severe form, and/or diagnosed early (< 20 weeks gestation)
- **Morbidity:** TRAP sequence (twin reversal arterial perfusion):
  - If donor dies, sudden hypotension in recipient: high mortality/morbidity
  - Hyperviscosity in recipient: may lead to peripheral thrombosis
  - Cardiac anomalies (recipient) may be permanent
  - Sequelae in survivors (up to 30%): CNS, cardiac anomalies; limb necrosis
- **Severity:** staging system
  - Stage I: oligo/polyhydramnios, but no fetal distress
  - Stage II: Donor bladder no longer visible (severe oligo-/anhydramnios)
  - Stage III: “Critical doppler” indicating significant hemodynamic stress (pulsatile umbilical blood flow, absent or reversed end-diatolic arterial umbilical flow)
  - Stage IV: Fetal hydrops
  - Stage V: Single or dual fetal demise
- **Limitations of staging:** evolution unpredictable
  - Not all cases worsen rapidly/some spontaneously improve
  - Additional factors: velamentous cord insertion, small placental share: more often in donor
  - Intervention only justified if severe disease – usually Stage II or above
Treatment options
- Observation/bedrest: no effect (but some cases remain at stage I or improve)
- Amnioreduction
  - Rationale: (repeated) drainage of polyhydramnios may prolong gestation; may improve umbilical blood flow in recipient twin
  - Improved survival over observation alone, but morbidity (30%) unchanged
  - Risk of single amniодrainage minimal; cumulative risk if serial drainage
  - Does not address underlying TTTS problem
- Fetoscopic laser ablation of communicating placental vessels
  - Rationale: eliminate all offending anastomoses, by laser-occluding intertwin vessels
  - Success rate: survival of at least 1 twin: 70-80%; morbidity:< 10%
  - Randomized controlled studies (amnioreduction vs. laser): Eurofoetus (study completed, 16% survival advantage of laser); NIH study (in progress)
  - Risks (fetal surgery): placental/uterine bleeding, membrane disruption, PPROM
  - Only in specialized centers
- Other options: septostomy: no longer recommended. Selective feticide: if we were able to tell with near-certainty which twin was going to die in utero, this could be an option. In the absence of other lethal anomalies, this approach may be difficult to justify

ACARDIAC TWIN

Definition
- Special form of twin-to-twin transfusion:
- Acardiac, often anencephalic parasitic 'monster'
- TRAP sequence: perfusion of acardiac by healthy twin via reversed flow in acardiac’s umbilical artery
- Danger for healthy twin: high output heart failure, hydrops, death
- Predicting factors: risk ↑ if size of acardiac > 75% of healthy twin

Management options
- If acardiac small: observe
- If impending hydrops of normal twin
  - Digoxin administration (to mother) → transplacental to fetus: to counteract cardiac failure
  - Cord occlusion of acardiac
    - Laser, bipolar coagulation: only early in gestation
- endoscopic surgery and cord ligation: effective, but risk of fetal surgery

**Monoamniotic twins**

Rare
Rarely develop TTTS (reasons unclear; protective effect of AA anastomoses?)
High risk of dual fetal demise from other causes
- Cord entanglement

**Dichorionic (fraternal) twins, higher order pregnancies**

If discordant for fetal anomaly
- Intervention often risky
- Ethical considerations:
  - If dichorionic gestation: risk to the healthy twin with any intervention
  - Risk of higher order gestation vs. risk to healthy twins