14. TWIN GESTATIONS

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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-diastolic 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 amniodrainage 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: selective feticide, septostomy: not recommended?

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