Multiple Gestations

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Multiple Gestations
Contribution to Preterm Delivery

- Multifetal births account for 3% all births, but…
  - 17% of all preterm births (< 37 wks)
  - 23% of early preterm births (< 32 wks)
  - 24% of LBW infants (< 2500 g)
  - 26% of very LBW infants (< 1500g)

- Perinatal outcomes
  - 5x risk of IUFD and 7x risk of NND
  - 6x risk of PTD and 13x risk of delivery < 32 weeks

- All survivors of preterm multi-fetal births are at increased risk of physical and neurologic handicap

Multiple Gestations
Contribution to Preterm Delivery

- 2002: > 130,000 infants born of multifetal gestations in US
  - Since 1980
    - 79% increase in twin frequency
    - 500% increase in triplet/high order births
    - Ovulation induction and ART responsible
- 2010
  - Twin birth rate 33.1/1000 (60% spontaneous)
  - Cost 5 times singleton pregnancies
  - Triplet or greater birth rate 1.4/1000 (20% spontaneous)
  - Cost 20 times singleton pregnancies
Twin Gestations
Incidence

Pregnancy
1-2% Twin gestation

2/3 dizygotic
1/3 monozygotic

Incidence

33% di/di
65% mono/di
2% mono/mono

conjoined

15% TTTS
100% di/di

Twin Gestations
Chorions & Amnions

ACOG Practice Bulletin #169, October 2016

ACOG Practice Bulletin #169, October 2016

Twin Gestations
Monozygotic Divisions

< 3 days
- Dichorionic/diagnostic

4-8 days
- Monochorionic/diagnostic

9-13 days
- Monochorionic/monoamniotic

>13 days
- Conjoined twinning

ACOG Practice Bulletin #169, October 2016
Twin Gestations
Identification of Chorionicity

- Crucial to identify
- Stratifies risks and guides appropriate management
- 2/3 of twin pregnancies fetuses are of same sex
- Need more exact data
- Ultrasound is most reliable method to identify chorionicity
  (Best done by late first or early second trimester)

Twin Gestations
Monochorionic/Monoamniotic

- Same sex fetuses
  - Split at 9-13 days
- Single placenta
- No dividing membrane on 2 studies
- Cord entanglement frequently noted
- Observation of fetuses and relationship within sac consistent with single amnion

Twin Gestations
Outcome Mono-Mono

- 30-70% perinatal mortality
  - Due to cord entanglement
  - Also, increased incidence of congenital anomalies (25%)
- Aggressive management advocated
  - Daily NST starting 26 weeks
  - Weekly US for growth with Doppler velocimetry starting 26 weeks
  - BMZ 26 weeks
  - CS 32-34 weeks unless clinical status dictates earlier delivery
Twin Gestations
Caution After 14 Weeks

Twin Gestations
Mortality Rates versus Chorionicity

Multiple Gestations
Morbidity and Mortality

<table>
<thead>
<tr>
<th></th>
<th>Twins</th>
<th>Triplets</th>
<th>Quads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight</td>
<td>2336 g</td>
<td>1660 g</td>
<td>1291 g</td>
</tr>
<tr>
<td>Gest age</td>
<td>35.3 wk</td>
<td>31.9 wk</td>
<td>29.5 wk</td>
</tr>
<tr>
<td>% IUGR</td>
<td>14-25%</td>
<td>50-60%</td>
<td>50-60%</td>
</tr>
<tr>
<td>% NICU</td>
<td>25%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>NICU LOS</td>
<td>18 days</td>
<td>30 days</td>
<td>58 days</td>
</tr>
<tr>
<td>% Handicap</td>
<td>-</td>
<td>20%</td>
<td>50%</td>
</tr>
<tr>
<td>Risk of CP</td>
<td>7/1000</td>
<td>28/1000</td>
<td>na</td>
</tr>
<tr>
<td>Infant Mortality</td>
<td>24/1000</td>
<td>53/1000</td>
<td>96/1000</td>
</tr>
</tbody>
</table>

Difference in mortality rates requires different management strategies.
Twin Gestations
Complications: Preterm Birth

- Much higher rate of preterm delivery
  - 20% of preterm births are multiples
    - 50% of twins deliver preterm
    - 90% of triplets deliver preterm
  - 6x risk of PTD and 13x risk of delivery < 32 weeks
- Increasing incidence of multiple gestations
- Are there different factors involved?

Twin Gestations
Preterm Birth Management

- Uncertain how to modify risk
- Work in singletons with 17-OHP shows reduction in preterm delivery rates; multiple studies in twins showed no benefit
- No consistent evidence there is role for cerclage based on cervical length
  - May increase risk PTD with CL < 25 mm
- No role for prophylactic cerclage for twins
- Prophylactic cervical pessary not beneficial
- HUAM not effective in decreasing risk PTD

Twin Gestation
Growth Restriction

- IUGR 10x more common in twins than singletons
- 4x increase in MoDi vs Di/Di
  - May be due to unequal splitting of initial cell mass
- Early difference concerning
  - At <8 weeks, >3mm difference in CRL associated with 50% demise smaller fetus
Twin Gestations
Growth Restriction Management

- Recommend increase maternal weight gain vs singleton pregnancy (35-45 pounds)
- Recommend 300 calories additional per fetus over singleton (National Academy of Sciences)
- Serial scanning to identify problems to aid timing of delivery and antenatal assessment

Twin Gestations
Anomalies

- Risk of anomalies in dizygotic twins is no different than singletons
  - Risk is same as sibling risk
- Rate of structural defects in monochorionic gestations is 2-3 times higher than singleton
- Concordance of defects
  - 10% of dichorionic
  - 20% of monochorionic

Twin Gestations
Anomaly Management

- Competent screening ultrasound
- 2nd trimester screening biochemistry
  - 63% detection rate for Trisomy 21 with 10% false positive rate for quad screen
- Nuchal translucency screening may be helpful in patients with twins
  - Better detection rate with 5% false positive rate
  - Trisomy 21: 75-85%
  - Trisomy 18: 67%
  - Identifies higher risk of TTTS
- Role of cff DNA/NIPT?
Twin Gestations
Maternal Risks

- In developed countries no documented increase in maternal mortality with twin gestation
- In women with underlying cardiac disease, cardiovascular changes may increase risk

Twin Gestations
Maternal Risks: GDM

- Twin gestations: 6+%
- Triplet gestations: 22-39%
- Early screening with glucola
- Repeat screening at 24-28 weeks if initial screen negative

Twin Gestations
Preeclampsia Management

- Heightened awareness and frequent visits for blood pressure surveillance
  - Twins 12.7%
  - Triplets 20%
- Usually occurs earlier
- Usually more severe
- More often atypical
- Low-dose aspirin prophylaxis
- USPSTF recommendation 2014
Twin Gestations
Maternal Risks

- Anemia (2.5x risk)
  - Supplement with at least 60 mg iron and 1 mg folic acid
  - Consider parenteral iron if necessary
- Urinary tract infections (1.5x risk)
  - Screening regularly at prenatal visits
  - Dip stick for nitrates and esterase sufficient
- Acute fatty liver
  - Triplets > twins > singleton
- Thromboembolism
- Pruritic urticarial papules/pustules of pregnancy
  - 0.5% singletons; 3% twins; 14% triplets

Twin Gestations
Antepartum Surveillance

- Biophysical profiles or NST’s not required for Di/Di twins with normal growth and no maternal medical conditions/complications
  - Fetal testing recommended in all situations in which testing would ordinarily be performed for singletons
  - In reality, however, twins often tested earlier
- All other pregnancies individualize
- Mortality begins to increase at 38-40 weeks
  - 2 weeks earlier than singleton
- Morbidity may increase earlier also

Twin Gestation
Intrapartum Management

- Timing of delivery often dictated by clinical events
  - Average gestational age at delivery 35-37 weeks
  - Nadir of perinatal morbidity occurs at 38th weeks
  - For triplets, nadir of morbidity occurs at 39th weeks
- Timing of Indicated LPT-ET Birth
  - Spong, et al; NICHD consensus opinion
  - Di-Di twins: 38 weeks
  - Mono-Di twins: 34-37 weeks
  - Di-Di or Mo-Di w/single IUFD
    - > 34 weeks, consider delivery
    - < 34 weeks, individualize management
  - Mono-Mono twins: 32-34 weeks
Recent ultrasound to exclude discordance
- Continuous electronic fetal monitoring
  - Early AROM/scalp lead first twin
- Epidural analgesia preferable
  - Intrauterine manipulation; emergency cesarean
- Experienced and available “team”
  - Obstetrician, nurses, anesthesia, pediatrics
- Plan for delivery in operating room
  - IV access, blood products, uterotonic agents, ultrasound
  - Key is to have well thought-out plan
- Cord prolapse, placental separation, change in position of second twin after delivery of first, postpartum hemorrhage

Vertex/vertex presentation in 40-45%
- Routine c/s has not been shown to improve perinatal outcome in these cases
- But, 20% of second twins change position
  - After vaginal delivery of first twin:
    - Rate of cesarean 6.3%; rate of forceps/vacuum 8.3%
    - Most often due to cord prolapse or fetal bradycardia
  - Some advocate oxytocin augmentation after delivery of first twin to shorten inter-twin delivery interval
- Shorter inter-twin delivery interval associated with higher cord pH and fewer combined vaginal-cs deliveries

Vertex/non-vertex in 35-40%
- Assess size of second twin prior to first twin’s delivery
  - Larger twin usually delivers first
- Presence of growth discordance
  - If second twin 25% larger, not a candidate for breech extraction
  - After delivery of first twin, assess position of second twin
    - If cephalic, augment with oxytocin
    - If not cephalic, proceed with breech extraction
  - Skill of delivering obstetrician and team critical
    - External cephalic version of second twin successful in 70% of cases
    - Some authors, however, don’t support practice
- Non-vertex presenting twin 15-20%
  - C/S recommended
  - With appropriate counseling, VBAC safe with twins
Twin Gestation
Intrapartum Management

- Canadian trial of planned CS vs. TOL
  - Elective delivery planned 37th-38th weeks
    - First twin cephalic; EFW’s 1500-4000 g at enrollment
    - Enrolled from 32nd-38th weeks
    - Typical antepartum-intrapartum management
  - Primary outcome measures
    - Composite fetal-neonatal mortality or serious morbidity
    - Composite maternal death or serious morbidity
    - Plan to report neonatal-maternal outcomes at 2 years

In twin pregnancy between 32nd and 38th weeks of gestation, with the first twin in the cephalic presentation, planned cesarean delivery did not significantly decrease or increase the risk of fetal or neonatal death or serious neonatal morbidity, as compared with planned vaginal delivery.
Higher Order Multiple Gestations

Multi-fetal Pregnancy Reduction

- Three options
  - Abort entire pregnancy
  - Continue pregnancy with all fetuses
  - Perform multi-fetal pregnancy reduction (MFPR)
- All options involve critical emotional and ethical issues
- MFPR associated with approximately 5-8% loss rate
- Risk of severe neonatal morbidity non-reduced triplets 5-6%
- Risk/benefit analysis different with quads
- Similar 5-8% procedure related loss rate
- Risk of pre-viable loss of non-reduced quads 5-6%
- Selective Fetal Reduction (SFR) associated with higher loss rate
- Later gestational age
- Fetal location may play a role

ACOG Recommendations (Level B)

- Tocolytic agents should be used judiciously
- Higher-order multiples should be monitored carefully for signs/symptoms of HELLP, preeclampsia, and GDM.
Higher Order Multiple Gestations
ACOG Recommendations (Level C)

- NIH: steroids be given for same indications as singletons
- Cerclage, hospitalization, HUAM not routinely indicated
- Invasive prenatal diagnostic procedures (e.g., CVS, amniocentesis) should be performed only by experienced clinicians in high-order multiple gestations
- Women should be counseled about the risks of high-order multiple gestations prior to ART
- Management of discordant IUGR or IUFD of one fetus in a high-order multiple gestation should be individualized

Twin-Twin Transfusion Syndrome

- Affects about 10-15% monochorionic twins
- Results from uncompensated arteriovenous anastomoses which lead to greater net blood flow to recipient twin
  - Recipient: plethoric, larger, hydramnios
  - Donor: anemic, growth restricted, appears "stuck" due to severe oligohydramnios
- TAPS: Twin Anemia Polycythemia Sequence
  - Small caliber AV anastomoses
  - Spontaneous (5-10%) or after laser Rx for TTTS (16%)
  - Leiden staging

Twin-Twin Transfusion Syndrome

- Potential adverse outcomes include
  - IUFD either twin
  - Cardiac failure; hydrops
  - PPROM, preterm labor, previable loss
- Ultrasound diagnosis
  - Monochorionic; same gender; AFV discordance
    - MVP > 8cm and MVP < 2cm
Twin-Twin Transfusion Syndrome

- TTTS: Quintero Staging System
  - I: Donor bladder remains visible
  - II: Donor bladder collapsed, not visualized
  - III: Severely abnormal Doppler studies
    - Absent/reversed end diastolic velocity UA
    - Absent/reversed flow ductus venosus
    - Pulsatile flow umbilical vein
    - F: Fetal hydrops present
    - V: Demise of either twin

- TAPS: Leiden Staging System
  - I: MCA-PSV > 1.5 and < 1.0
  - II: MCA-PSV > 1.7 and < 0.8
    - Absent/reversed end diastolic velocity UA
    - Absent/reversed flow ductus venosus
    - Pulsatile flow umbilical vein
  - III: Fetal hydrops
  - IV: Demise of either twin

**FIGURE 2**

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Twin-Twin Transfusion Syndrome

- TTTS presenting < 28 weeks if untreated
  - 90% mortality with expectant management
  - Laser to obliterate communicating vessels
    - 90% have at least one fetus survive
    - > 70% will have both survive; 5% risk CP
- Amnioreduction
  - 66% have at least one fetus survive
  - 15% risk CP
- Septostomy; Umbilical cord occlusion
- Pregnancy termination

Twin Gestations