Ultrasound in the Evaluation and Management of TWINS

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Ultrasound in Twins

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Monochorionic versus Dichorionic
Complications of Monochorionicity
Focus on Growth and Fluid
High-risk issues to consider

US & Multiple Gestations

Perinatal complications are more common in twin pregnancies:
- PTL, HTN, Fetal anomalies, Poly/Oligo, IUGR, Fetal demise, Malpresentation, Abruption, Previa, Postpartum hemorrhage
- Perinatal mortality rate 4-10X that of singletons
- Risks differ with chorion/amnion types
- Ultrasound is critically important!
Zygosity & Chorionicity

- DI-chorionic = EITHER Mono- or Di-zygotic twins
- MONO-chorionic = Mono-zygotic twins

FIRST TRIMESTER: Important Ultrasound Observations

- Accurate head count!
  - Undercounting is easy, esp with MC twins
  - Outcomes are better when detected early
- NT
- MOST critical piece of information: CHORIONICITY!
Chorionicity

- Chorionicity is the most important U/S predictor of outcome for twins
- Under 14 weeks, can be detected with 99% sensitivity and 100% specificity
- Chorionicity determination when <14 weeks is considered the standard of care

Dichorionic Diamniotic

Monochorionic Diamniotic
What would you say........?

Dichorionic Diamniotic

What would you say........?

Monochorionic Diamniotic

FIRST TRIMESTER: Risk Correlation

Why all the fuss? Determining CHORIONICITY will:

- Influence ultrasound plan and surveillance for the pregnancy
- Inform overall pregnancy risk counseling
If DICHORIONIC

US Plan:
- Twin anatomy
- Monthly growth scans
- Cervical length
- 2 placentations: rule out previa

Genetics:
- Assume dizygotic; increases risk of aneuploidy (AMA pts)

Overall Risks:
- Usual twins risks:
  - PTB/PTL, cervical shortening, abruption, previa, IUGR, pre-eclampsia, diabetes, PPH, etc

If MONOCHORIONIC:

US Plan:
- Level II twin anatomy
- q2 week fluid pockets & growth (esp 16-28 weeks)
  - Fluid discordance, TTTS, unequal placental sharing
  - Frequent 3rd trim due to increased risk IUFD
- Cervical length

Genetics:
- Must be monozygotic; risk of aneuploidy equals that of a singleton fetus

Overall risks:
- Compared to DC twins: higher risks of IUFD, PTB <32wk (2x), IUGR (4x), SAB (6x), CP (8x)

Cervical Length in Twins

- Serial cervical length measurement may aid in identifying patients at risk
  - <1.5 cm at increased risk
- Cerclage for US-detected cervical shortening in twins very controversial
- Common protocol: b/w 16 to 24/28wks
- Targeted scan: transvaginal / translabial

SECOND TRIMESTER:
Important Ultrasound Observations

- Cervix
- CHORIONICITY (if unknown)
- Anomalies (increased in twins)
- Fetal size and AFV – r/o discordance
SECOND Trimester Chorionicity

U/S Clues:
- Placental Number
- Fetal Gender
- “Twin Peak” Sign, if present
- Membrane Thickness

2 Placental Masses ➔ Dichorionic

XY & XX ➔ Dizygotic ➔ Dichorionic

Dichorionic
Monochorionic
"Twin Peak" Sign indicates DICHOSONIC twin pregnancy.

Membrane Thickness

SECOND TRIMESTER US:

- All things being equal, 2nd trim focus is on MC TWIN COMPLICATIONS
  - WHY do some MC twins develop complications?
  - WHAT is TTTS?
  - Not all complications are TTTS!
A placenta is designed to support 1 fetus
When 1 placenta supports 2 fetuses, no set plan/roadmap
Each MC placenta is like a ‘snowflake’
How the circulations interact (angioarchitecture) will be unique

SHARING of placental territory and CROSS-TALK
Inter-twin Vascular CONNECTIONS – number, size, type
Arterial-Venous Anastomosis

Arterio-Arterial Anastomosis

Doppler Interrogation for an A-A: start with umbilical cord insertion sites
AAs are detectable by antenatal ultrasound
AAs associated with: 10-fold reduction in TTTS and 7-fold reduction in IUFD

Twin Twin Transfusion Syndrome (TTTS)
- May or may not be weight discordant
- Staging:
  - Based on bladders, Dopplers, ?hydrops
- True TTTS carries up to 90% dual mortality rate
- Both donors and recipients face other organ morbidities

Defined by POLY with OLIGO
\[ \geq 8cm + <2cm \]
Not "discordant AFV"
"Stuck" Twin / Donor

Oligohydramnios / Polyhydramnios

Recipient

Donor

EFW discordance

(346 - 197) ÷ 346 = 43%

Minimally invasive
Single port
3 mm device
Laser Ablation of TTTS

Discordant size ≠ TTTS

Unequal Placental Sharing

Cord Insertions

Central

Velamentous

Equator

Central

Velamentous
Unequal Placental Sharing

- Normal growth
- Normal fluid
- No poly
- Sub-optimal growth
- Possible Oligo

% Weight Discordance: \( \frac{295 - 206}{295} = 30\% \)

Monochorionic Pregnancies

TTTS \( \approx 10\% \)
Monochorionic Pregnancies

- Discordant EFWs
- TTTS ≈ 10%

Unequal Sharing

- TTTS ≈ 10%
- AFV = Poly AND Oligo

THIRD Trimester
Important Ultrasound Observations

- Growth
- Amniotic Fluid Volume
- Delivery planning:
  - Position
  - Presentation (A, B)
  - EFW (esp non-presenting)

IUFD of one twin

- Are they MC or DC?
  - MC = surviving co-twin has high risk of neurologic injury (up to 40%) from ischemia (vascular connections)
    - Consider fetal MRI, best sensitivity for ischemic injury
  - DC = surviving twin not typically at risk unless ongoing maternal process

MC = surviving co-twin has high risk of neurologic injury (up to 40%) from ischemia (vascular connections)

DC = surviving twin not typically at risk unless ongoing maternal process
Conclusions

• Twins have increased risk of perinatal complications vs. singletons
• MC more complications than DC twins
• Management of twin pregnancies depends on knowledge of chorionicity!

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<td>-Anatomy</td>
<td>-Continued MC surveillance</td>
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<td>-Chorionicity</td>
<td>-Serial growth &amp; fluid</td>
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<td>-NT</td>
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• CHORIONICITY can be determined by US
• Assessment is easiest in 1st Trimester
• US Examination and Report should address CHORIONICITY!
• Note: Discordant weight and fluid
• Unequal Placental Sharing
• Vascular Anastomoses in shared placenta