Background

- Monochorionic-diamniotic (MCDA) twins account for 20% of all twin pregnancies.
- MCDA twins have a 3 to 5 fold increased risk of perinatal morbidity and mortality compared to dichorionic twins due to the presence of two fetal circulations that are interconnected by a shared placenta.
- Unbalanced vascular anastomoses can result in complications specific to MCDA twins:
  1. Twin-to-twin transfusion syndrome (TTTS)
  2. Twin-anemia polycythemia sequence (TAPS)
  3. Selective intrauterine growth restriction (siUGR)
- Due to the increased risk of complications, MCDA twin pregnancies require closer surveillance.
- Evidence for optimal timing and component of evaluations is limited.

Objective

To investigate the role of intertwin discrepancy in cerebroplacental ratio (CPR-△) for the prediction of TTTS in MCDA twin pregnancies.

Study Design

- Retrospective cohort study of all MCDA pregnancies followed at a maternal fetal medicine center from January 1, 2007 to July 15, 2017.
- 220 MCDA twin pregnancies
- Exclusion criteria:
  - Structural anomalies
  - Chromosomal abnormalities
  - Intrauterine fetal demise (IUID) prior to 16 weeks
  - Referral after development of TTTS or TAPS
- 143 MCDA pregnancies (286 newborns)

Ultrasounds performed biweekly (or as clinically indicated) between 16 and 37 weeks.

<table>
<thead>
<tr>
<th>Ultrasound variables</th>
<th>MCDA pregnancies (286 newborns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated fetal weight</td>
<td></td>
</tr>
<tr>
<td>Umbilical artery (UA) Dopplers</td>
<td></td>
</tr>
<tr>
<td>Middle cerebral artery (MCA) Dopplers</td>
<td></td>
</tr>
</tbody>
</table>

Results

- 143 MCDA twin pregnancies (16 lost to follow-up) and 249 newborns met inclusion criteria

<table>
<thead>
<tr>
<th>Median maternal age</th>
<th>35 years (IQR 31 – 38)</th>
</tr>
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<tbody>
<tr>
<td>Median maternal BMI</td>
<td>26.1 kg/m2 (IQR 22 – 28.9)</td>
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</table>

MCDA-specific complications

<table>
<thead>
<tr>
<th>siUGR (41)</th>
<th>TTTS (16)</th>
<th>TAPS (7)</th>
<th>IUID of one twin (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.7%</td>
<td>11.2%</td>
<td>4.9%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Outcomes of pregnancies complicated by TTTS

- Median gestational age at delivery: 30 weeks and 5 days (IQR 28w1d – 34w6d)
- Mode of delivery:
  - Cesarean section: 85.7%
  - Vaginal: 14.3%
- Median birth weight: 1,675 grams (IQR 917 – 1,927)
- Treatment:
  - Laser ablation: 56.3%
  - Amnioreduction: 12.5%
  - IUFD: 31%

Statistical Analysis

- Logistic regression analysis identified maximum CPR-△ in the second trimester as a predictor for the development of TTTS

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTTS</td>
<td>2.23</td>
<td>1.10 – 4.76</td>
<td>0.03</td>
</tr>
<tr>
<td>TAPS</td>
<td>1.09</td>
<td>0.39 – 3.04</td>
<td>0.87</td>
</tr>
<tr>
<td>siUGR</td>
<td>1.23</td>
<td>0.73 – 2.05</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Results (continued)

- ROC curve identified maximum CPR-△ in the second trimester as a predictor of MCDA twin specific complications

Conclusions

- In MCDA twin pregnancies, CPR-△ in the second trimester is associated with early prediction of TTTS
- CPR evaluation may be of clinical utility in the surveillance of MCDA twin pregnancies to assist in early detection of TTTS