Prenatal ultrasound as a predictor of growth abnormalities in triplets

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Background

- Triplet pregnancies are associated with fetal growth restriction (FGR), low birth weight (LBW), small for gestational age (SGA) and severe growth discordance (GD)
- Paucity of evidence regarding accuracy of prenatal ultrasound (US) in predicting FGR, LBW and severe growth discordance for triplets.

Research Question

- What is the accuracy of prenatal US to predict growth abnormalities (FGR, LBW, SGA, GD) in triplet pregnancies from Northern Alberta?

Study Objectives

To estimate:
- Sensitivity
- Specificity
- Negative predictive value (NPV)
- Positive predictive value (PPV)

of prenatal US in predicting growth anomalies.

Methodology

- Retrospective cohort study
- Estimated US accuracy to detect FGR, LBW, SGA and GD, when comparing EFW and ABW’s placement on growth curves for each triplet pregnancy
- Fetal Growth Discordance: was measured in percentage (%) using the formula:
  \[
  \text{Discordance} = \frac{\text{Largest EFW} - \text{Smallest EFW}}{\text{Largest EFW}} \times 100
  \]
- Discordant sets defined as difference between largest and smallest triplet ≥ 25% in EFW

Results (n = 78 pregnancies, 234 babies)

- Median GA at delivery 31.7 weeks (IQR 5.3)
- Median BW at delivery 1518g (IQR 840)
- 6 pregnancies monochorionic, 27 dichorionic, and 45 trichorionic
- All babies included in analysis were born alive

Figure 1 – Inclusion and Exclusion Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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</thead>
<tbody>
<tr>
<td>• Triplet pregnancy documented on prenatal US</td>
<td>• Delivery at GA &lt; 23 weeks</td>
</tr>
<tr>
<td>• GA ≥ 23 weeks</td>
<td>• Fetal reduction to triplet pregnancy from higher order multiple pregnancy</td>
</tr>
<tr>
<td>• Prenatal US performed at RAH perinatal clinic</td>
<td>• Fetal reduction from triplet pregnancy to twin/singleton pregnancy</td>
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<td>• Delivered at the RAH between Jan 1 2004- May 31 2015</td>
<td>• Triplet pregnancy with no prenatal care or prenatal US</td>
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| Interval from last US to delivery > 21 days |

Results (Cont’d)

<table>
<thead>
<tr>
<th>Estimated Fetal Weight Discordance</th>
<th>Actual Birth Weight Discordance</th>
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<tbody>
<tr>
<td>&gt;25%</td>
<td>True positive (A)</td>
</tr>
<tr>
<td>False positive (B)</td>
<td>8</td>
</tr>
<tr>
<td>≤25%</td>
<td>False negative (C)</td>
</tr>
<tr>
<td>Positive Predictive Value 66.7% (95% CI 47.4 – 84.5)</td>
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</tr>
<tr>
<td>Negative Predictive Value 97.0% (95% CI 90.2 – 99.1)</td>
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Conclusion

- First study to assess ability of prenatal US to detect severe GD among triplets
- Prenatal US has less than ideal sensitivity to detect growth anomalies in triplets
- This results in a number of missed cases of fetal growth restriction and severe growth discordance amongst triplets
- Relaxing diagnostic criteria in future may be considered
- New advanced modalities to estimate fetal weight (i.e. 3D US) may increase sensitivity in future

Acknowledgments

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