Management of growth discordance in twin pregnancies

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Introduction

- Growth discordance in twin pregnancies is defined as a difference in birth weight of more than 25%.

- Incidence is between 7 to 25% of monochorionic pregnancies

- Mortality of selective intra uterine growth impairment (sIUGR) is 9 to 11%
Introduction

• Important to understand the architecture of monochorionic placentas
Fig 1. Postnatal injection in monochorionic twin placenta. Blue dye representing vein from one twin and yellow arterial dye from other twin meet in center to indicate arteriovenous anastomosis. A superficial arterioarterial anastomosis is also present at top of figure (indicated by mixing of arterial dyes [yellow and red] within one vessel).
Fig 2. Slicing through 3 deep arteriovenous anastomoses indicating mixing of *red arterial dye* (dashed arrow) from one twin with *green venous dye* (white arrow) from other.
Introduction

- Causes of sIUGR in dichorionic pregnancy same as for singletons
- Causes in monochorionic pregnancies:
  - Not genetic
  - TTTS
  - Discordant placenta sharing
  - Discordant implantation
  - Placental transfer of nutrients
  - Differences in insulin-like growth factor II
Discordant placental sharing
Screening

- Kagan et al used discordance in NT >20% and difference in CRL
  - 52% will develop TTTS
  - Positive predictive value of 36%
- Lewi et al used: Predictive high risk of fetal outcome:
  - First trimester
    - Discordant amniotic fluid
    - Difference in CRL > 12mm
  - 16 Weeks assessment
    - Discordant amniotic fluid (AF) and discordant cord insertions or
    - Difference in AC ≥ 6mm if discordant AF and concordant cord insertions or
    - Difference in AC ≥ 13mm if concordant AF and discordant cord insertions or
    - Difference in AC ≥ 24mm if all others are equal
Screening

- Two step assessment:
  - First trimester low risk
  - 16 weeks high risk
Screening

• Predictive Low risk:
• First trimester
  – Concordant amniotic fluid
  – Difference in CRL < 12mm
• 16 Weeks assessment
  – Concordant amniotic fluid (AF) and concordant cord insertions or
  – Difference in AC < 6mm if discordant AF and concordant cord insertions or
  – Difference in AC < 13mm if concordant AF and discordant cord insertions or
  – Difference in AC < 24mm if all others are equal
### Screening

<table>
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<th>Predicted high risk of adverse fetal outcome</th>
<th>Predicted low risk of adverse fetal outcome</th>
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<tr>
<td><strong>First trimester assessment</strong></td>
<td>Probability 79% Survival 50%</td>
<td>Probability 80% Survival 93%</td>
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<tr>
<td><strong>16 weeks assessment</strong></td>
<td>Probability 73% Survival 76%</td>
<td>Probability 84% Survival 94%</td>
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<tr>
<td><strong>Two-step assessment</strong></td>
<td>Probability 65% Survival 83%</td>
<td>Probability 86% Survival 94%</td>
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Follow up of patients with a monochorionic pregnancy

- Patients with low risk features should be seen at
  - 11-14 weeks
  - 16 weeks
  - 20 weeks
  - 26 weeks
  - 30 weeks
  In a specialised unit
- Scans every 2 weeks
- From 32 weeks
  - Non stress testing
  - Biophysical profile was done
  - Corticosteroids only if preterm delivery were anticipated.
Outcome

• If followed up as described above the outcome is:
  • 85% survival of both
  • 92.5% survival of at least 1 twin
  • Most losses were 24 weeks or less
Classification of sIUGR in monochorionic pregnancies

- Classification is based on Doppler of the umbilical artery.
- Type 1: Positive end-diastolic flow in the umbilical artery
- Type 2: Absent or Reversed end-diastolic flow (ARED) constantly observed during all the examinations
- Type 3: Intermittent Absent or Reversed end-diastolic flow (iARED)
Importance:

- Type 3 has more and larger AA anastomoses
- Unexplained intrauterine deaths occurred in 15.4% of Type 3 and only in 2.6% and 0% of Type 1 and Type 2
- The cases of IUFD in Type 3 all had normal PI of the middle cerebral artery and Ductus venosus in the previous scan
- All died between 0 and 7 days after the last scan.
- Different process than in Type 1 and 2.
Management of sIUGR

• Will depend on the gestational age of diagnosis
• Diagnosis based on:
  – Weight difference of 25% or more
  – The big twin does not have polyhydramnios or other signs of TTTS
• Once the diagnosis is made a careful assessment of the placenta to identify AA anastomoses and Doppler studies.
Management

• Options:
• If less than 26 weeks:
  – Selective cord occlusion

• More than 26 weeks:
  – Admission to hospital if uterine artery Doppler abnormal
  – Intensive fetal monitoring
  – Corticosteroids
  – Delivery at 32 weeks or if CTG abnormalities
Indications for selective cord occlusion:

- Absent end diastolic flow in the umbilical artery of the small twin with other signs of imminent death
  - Absent or reversed a wave in the ductus venousus
  - Hydrops
  - Anuria and anhydramnios
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Timing of delivery

- Barigye and co-workers proposed delivery at 32 weeks.
- They found a 4.6% risk of fetal death after 32 weeks.
- Lewi and co-worker suggested delivery at 37 weeks in uncomplicated cases.
- They found a risk of death after 32 weeks 1.2%.
- Complicated cases should be decided on an individual basis.
Monoamniotic twin pregnancies

- Hack and co workers:
- Evaluated the architecture of monoamniotic twin pregnancies with perinatal outcome
- 98% had AA anastomoses
- 4% had velamanetous cord insertion compared to 20% in diamniotic monochorionic twin pregnancies
- 91% had AV anastomoses
Monoamniotic twin pregnancies

- The perinatal mortality was 22%
- Growth discordance occurred in 14%
Management

- The same as for diamniotic pregnancies for sIUGR
- Will consider delivery if uncomplicated between 32 and 34 weeks.
Dichorionic pregnancy with sIUGR

- **Management:**
- Influenced by the gestational age at the time of diagnosis
- Selective fetocide has been described as an option
- Delivery should be considered once the healthy twin has a good change of survival without neurological handicap
- Death of the co-twin does not increase the risk for the survivor
Conclusion

• Patients with high risk factors for complications should be identified
• Need careful follow up
• Invasive procedures did improve the outcome of the survivor
• After invasive therapy there is less double deaths
• Currently in uncomplicated cases timing of delivery can be closer to term if there is good fetal surveillance possible.