IUGR in monochorionic twins, or is it just growth discordancy?

Josep M Martínez, Eduard Gratacós
Maternal-Fetal Medicine Service. Hospital Clínic, Barcelona
Epidemiology twins

• Resulting from:
  – Fertilization > 1 oocite (polizygotic)
  – Splitting from 1 embryonic mass (monozygotic)
    • 1/250 newborns

• Prevalence: ± 3% newborns (ICGON: 4%)
  – Before TAR: 1:80\(^{n-1}\)

• Responsible 10-14% perinatal mortality
  – morbimortality MC x10
• 70%: DZ twins
  – DC BA 100%

• 30%: MZ twins (‘identical’)
  – DC BA (< 4 days) 25%
  – MC BA (4-8 days) 70%
  – MC MA (> 8 days) 2-5%
  – Siameses (> 12 days) 1%

• 1%: higher range multiples (1%)
± 100% diagnosis accuracy by US < 14 sg

Single placenta + thin membrane + ‘T’ vs delta + sex
Chorionicity matters, not zygosity

<table>
<thead>
<tr>
<th></th>
<th>DC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major malformation</td>
<td>1%</td>
<td>6%</td>
</tr>
<tr>
<td>Intrauterine death</td>
<td>1%</td>
<td>6%</td>
</tr>
<tr>
<td>Growth restriction</td>
<td>10%</td>
<td>14%</td>
</tr>
<tr>
<td>Preterm delivery &lt;32 wks</td>
<td>9%</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Severe brain damage</strong></td>
<td>0.3%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Monochorionic twins: the problem is the single placenta
Vascular anastomosis
Artery to artery / vein to vein anastomosis (‘superficial’, real anastomosis)
Artery to vein anastomosis
(‘deep’, shared cotiledon)
Main problem: demise 1 MC twin

- Risk to the healthy cotwin:
  - 25-50% concomitant death
  - 25-50% severe brain damage
Complications in MC twins: 30-40%

1. TTTS (15%)
2. sIUGR (10-15%)
3. Monoamniotics (1-2%)
4. TRAP (< 1%)
5. Discordant anomaly (5%)
Complications in MC twins: 30-40%

1. TTTS (15%)
2. sIUGR (10-15%)
3. Monoamniotics (1-2%)
4. TRAP (< 1%)
5. Discordant anomaly (5%)
MC twins discordant for growth

Diagnostic criteria

Estimated fetal weight < 10th percentile

1. Intertwin discordant EFW > 25%
   - (large twin – small twin) x 100 / large twin

2. Absence signs of TTTs
   - 20%: both TTTs + sIUGR= TTTs
Discordant growth
Discordant EFW: 46%  
AC 1- AC 2: 46 mm
NO ‘stuck’
Estimated fetal weight < 10th percentile

1. Intertwin discordant EFW > 25%
   - (large twin − small twin) x 100 / large twin

2. Absence signs of TTTs
   - 20%: both TTTs + sIUGR= TTTs
Pathophysiologica basis

1. Asymmetric distribution of the placenta

2. Presence interfetal vascular anastomoses
   - Risk of intrauterine death
Unbalanced sharing placenta: 10-15%
Unbalanced sharing placenta: 10-15%
A classification system for selective intrauterine growth restriction in monochorionic pregnancies according to umbilical artery Doppler flow in the smaller twin

E. GRATACÓS†, L. LEWI‡, B. MUÑOZ†, R. ACOSTA-ROJAS*†, E. HERNANDEZ-ANDRES*, J. M. MARTINEZ*, E. CARRERAS† and J. DEPREST‡
• Type I (1/3) – Normal UA PI
• Type II (1/3) – Constant A-REDV
• Type III (1/3) – Intermittent A-REDV
## Type of anastomoses

<table>
<thead>
<tr>
<th>AV</th>
<th>AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>normal</td>
<td>&gt; 60%</td>
</tr>
<tr>
<td>small</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>scanty</td>
<td></td>
</tr>
<tr>
<td>indferent</td>
<td>95% ≥ 1 large (&gt; 2 mm)</td>
</tr>
</tbody>
</table>
Clinical management type I

- Clinical behavior 'expected'
  - > 95%: benign, good perinatal outcome
    - follow-up / 1-2 weeks
  - < 5%: Doppler shift to type II
    - If late onset: MCA Doppler to rule out TAPS

- Elective delivery criteria:
  - If no arrest of growth: 34-37 weeks
Type II sIUGR
Clinical management type II

- Clinical behavior 'expected'
  - 90% critical worsening < 28 weeks
  - high risk IUFD (> 90%)
    • usually indicated by DV Doppler

- Clinical management: wk?
  - ≥ 30-32 wk: elective delivery (steroids)
  - < 26 wk: option of fetal therapy

26-30 wk: ¿?
Type III sIUGR
Intermittent A-REDV

- **Cause:**
  1. Large A-A anastomosis
  2. Highly discordant fetal weights
  3. Close cord insertions

- **Clinical behaviour**
  1. Unexpected evolution
    - Difficult clinical management
  2. High rate of complications
AA anastomoses
UA pattern: intermittent
UA pattern: intermittent
close placental insertion
maternal quiescence
high sweep velocity
UA pattern: intermittent
Collision of the blood flows
Intermittent A-REDV

• Cause:
  1. Highly discordant fetal weights
  2. Large A-A anastomosis
  3. Close cord insertions

• Clinical behaviour
  1. Unexpected evolution
    • Difficult clinical management
  2. High rate of complications
Clinical features type III

- Unexpected clinical behaviour:

1. Sudden IUFD small twin: 10-15%
   - 50% double demise

2. Neonatal CNS lesion normal twin: 10-20%
   a. HMCP ± cardiac overload normal twin: 25%
   b. Polyhydramnios, mild hydropic signs
Clinical management type III

- 75% no fetal deterioration: weekly follow-up
  - Elective cesarean section at 30-32 wk (corticoids)
- 25% fetal deterioration: fetal therapy ??
  1. early diagnosis (< 24 wk)
  2. risk IUFD small twin (10%)
  3. great oscillation flow, predominant/marked REDV
  4. polyhydramnios / cardiac overload normal twin
  5. hydrops
Main problem: death MC twin

- Risk to the healthy cotwin:
  - 25-50% concomitant death
  - 25-50% severe brain damage

- ‘Therapy’: to protect the healthy cotwin!!!
  - ↑%: cord occlusion
  - ↓%: laser sparing
Laser coagulation of AA
Before laser ...
After laser ...

IUFD ?

Survival ?

www.medicinafetalbarcelona.org/
### Table: Fetoscopic laser in type III sIUGR

<table>
<thead>
<tr>
<th></th>
<th>Expectant (n= 31)</th>
<th>Laser (n= 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA diagnosis</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>GA delivery</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>IUFD</td>
<td>Small: 20%</td>
<td>Small: 70%</td>
</tr>
<tr>
<td></td>
<td>Normal: 10%</td>
<td>Normal: 5%</td>
</tr>
<tr>
<td>Survival</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>80%</td>
<td>28%</td>
</tr>
<tr>
<td>≥ 1</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td>CNS damage (IVH or PVL)</td>
<td>Small: 5%</td>
<td>Small: 15%</td>
</tr>
<tr>
<td></td>
<td>Normal: 20%</td>
<td>Normal: &lt;5%</td>
</tr>
</tbody>
</table>

... cord occlusion ???
Cord occlusion: bipolar forceps
Cord occlusion: laser (< 18 wk)
Complications in MC twins: 30-40%

1. TTTS (15%)

2. sIUGR (10-15%): TO RESUME

3. Monoamniotics (1-2%)

4. TRAP (< 1%)

5. Discordant anomaly (5%)
MC + sIUGR (EFW< p10)

Doppler N

“Expected good” evolution
- >90% NO deterioration
- good prognosis

TYPE I

AREDF

“Expected bad” evolution
- >90% deterioration
- unexpected IUFD <5%
- PVLM larger fetus < 5%

TYPE II

iAREDF

Unpredictable evolution
- 15% deterioration IUGR
- unexpected IUFD 15 %
- PVLM large twin 10-20%

TYPE III


www.medicinafetalbarcelona.org
MC + sIUGR: management options

High risk deterioration/ unpredictable evolution, consider: GA, severity, parents wishes, technical issues

1. If expectant managed: deliver if deterioration / 32-34 wk
2. If active managed: cord occlusion or laser (not legal or acceptable for parents)

ich danke Ihnen sehr

jmmarti@clinic.ub.es