Twin Pregnancy – Epidemiology, Complications, When and How to Deliver

אז בקייזר, בכל (כמעט) על תאומים לא MC ...

פרופ' אדי ייסבר
מנהל היחידה לרפואת האם והעובר
חטיבת נשים ויולדות
המרכז הרפואי קפלן, רחובות

Outline

• Epidemiology
• Antenatal issues
• Complications
• Timing of delivery
• Delivery issues
Twin Birth Rate - USA

The number of live births in twin deliveries per 1,000 live births

http://www.cdc.gov

Triplet and other higher-order Birth Rate - USA

The number of live births in triplet and other higher-order deliveries per 100,000 live births

http://www.cdc.gov
Israel

Hellin’s Law

• A Polish pathologist, Dyonizy Hellin (1867–1935)
  – “Among human beings there is on average one twin maternity per 89 singleton maternities, one triplet maternity per \((89)^2\) singleton maternities, one quadruplet maternity per \((89)^3\) and in general, within the range of the possibility, one \(x\)-tuplet maternity per \((89)^{x-1}\) singleton maternities”.
  
  Hellin D, 1895

• In natural pregnancies:
  – Twins – 1/89 births
  – Triplets – \(1/89^2\) births (1 / 7,921)
  – Quadruplets – \(1/89^3\) births (1 / 704,969)

Natural conceptions

- Basal rate (according to USA data, 1949-1966):
  - 20.1 per 1,000 live births

- Currently, more than 3% of live births in the US
  - Twins - 97%
  - Triplets / other high-order pregnancies – 3%

- More than a third are attributed to iatrogenic interventions

Superfecundation vs. Superfetation

- **Superfecundation** = fertilization of two different ova released in the same cycle

- **Superfetation** = fertilization of two ova released in different cycles
Zygocity

**Dizygotic**
- Fertilization of 2 separate ova
- 1-1.5% of natural conceptions
- Same/different sex – 50%/50%
- Rates affected by maternal age, family history, parity, race, geographic area, fertility tx
- Prevalence is increasing:
  - Early diagnosis by US
  - ART
  - Increase in maternal age at first pregnancy (>35 years-old)

**Monozygotic**
- Fertilization of a single ovum
- 0.4% of natural conceptions
- Similar sex
- Not genetically determined
- Rates affected only by ART (up to 9 times higher)

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**Zygosity vs. Chorionicity**

**Dizygotic 70%**
- Dichorionic diamniotic
  - Separate placenta
  - Fused placenta

**Monozygotic 30%**
- Monochorionic diamniotic
  - 70-75%
  - 25-30%
  - <72 h
- Monochorionic monoamniotic
  - 1-2%
  - 4-7 d
  - 8-12 d
  - Conjoined 1/60,000
  - ≥13 d

https://www.pinterest.com/isfeather/armadillo/
Zygosity vs. Chorionicity

- About 80% of twin pregnancies are DC
  - DZ (70%) + ~1/3 MZ (10%)
- Same sex DC twins
  - 1/2 of the 70% DZ twins = 35%
  - 1/3 of the 30% MZ twins = 10%
- In 45% of twin pregnancies, zygosity cannot be determined without genetic studies

Why it is important to discriminate between DZ to MZ twins?

- Higher risk of complications / adverse outcomes in MZ twins
- Probably, monochorionicity (and not monozygocity) is associated with pregnancy outcome
There is NO diagnosis of twins

Kenneth J. Moise Jr, MD; Anthony Johnson, DO

“There is NO diagnosis of twins. There are only monochorionic twins or dichorionic twins. This diagnosis should be written in capital red letters across the top of the patient’s chart.”

Kipros Nicolaides


How to accurately diagnose the type of twining?

ISUOG Practice Guidelines: role of ultrasound in twin pregnancy

Ultrasound Obstet Gyneco 2016; 47: 247–263
Dating of twin pregnancy

- Ideally, when the CRL measurement is between 45-84 mm (i.e. 11+0 to 13+6 weeks)
- In spontaneous pregnancies, the larger of the two CRLs should be used to estimate gestational age
- If the woman presents after 14 weeks’ gestation, the larger head circumference should be used

How to determine chorionicity?

- Every attempt should be made to determine chorionicity
- Should be determined between 11+0 and 13+6 weeks using:
  - membrane thickness at the site of insertion of the amniotic membrane into the placenta
  - T-sign or lambda sign (twin peak)
  - the number of placental masses
- In women presenting at ≥ 14 weeks, the same ultrasound signs are used, in particular the number of membrane layers, and noting discordant fetal sex
Prediction of chorionicity by US at ≤ 14 weeks’ gestation

- Sensitivity - 89.8%
- Specificity - 99.5%
- Positive predictive value - 97.8%
- Negative predictive value - 97.5%


How to determine chorionicity?

- At the time chorionicity is determined, amnionicity should be determined
- In case of doubt:
  - absence of the intertwin membrane is best confirmed by transvaginal scan
  - cord entanglement is a useful finding
    - almost universal in MCMA twin pregnancy using color and pulsed-wave Doppler ultrasound
    - Using pulsed-wave Doppler, two distinct arterial waveform patterns with different heart rates are seen within the same sampling gate

Ultrasound Obstet Gynecol 2016; 47: 247–263
How to determine chorionicity?

**The thickness of the membrane**

- > 2 mm => DC
  - PPV 95-96%
- ≤ 2 mm => MC
  - PPV 90%

- But...
  - as a single parameter membrane thickness is not reliable
  - reproducibility of measurement is limited

How to determine chorionicity?

**The number of placental masses**

- Reliability is questionable
- Dichorionic placentae are commonly adjacent to each other, appearing as a single mass
- In 3% of monochorionic twin pregnancies, two placental masses can be seen on ultrasound – it does not preclude the presence of vascular anastomoses

If after all there is uncertainty about the chorionicity, it is safer to classify the pregnancy as monochorionic

Ultrasound Obstet Gynecol 2016; 47: 247–263
Labeling of twin fetuses

- The labeling of twin fetuses should follow a reliable and consistent strategy
- Should be documented clearly in the charts
- Options for labeling:
  - Left / right, upper / lower
  - Consistency - twin A – on the right side, while Twin B is on the left
- Describe each twin using as many features as possible (e.g. twin A/B, female/male, maternal right/left, posterior/anterior placenta)

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Routine US surveillance

Modified from Ultrasound Obstet Gynecol 2016; 47: 247–263
**ACOG 2014 - Antenatal fetal surveillance of DC twins**

- **No evidence-based recommendations** on the frequency of fetal growth scans after 20 weeks
- It **seems reasonable** that serial US surveillance be performed every 4-6 weeks in the absence of evidence of FGR or other pregnancy complications
- The use of antepartum testing or UA Doppler in women with uncomplicated DC gestations is **not associated** with improved perinatal outcomes
- Antenatal fetal surveillance generally is reserved for women with DC twin gestations complicated by maternal or fetal disorders

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**Routine US surveillance of MC twins**

<table>
<thead>
<tr>
<th>Time</th>
<th>Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-14 wks</td>
<td>• Dating, labeling, Chorionicity, Screening for trisomy 21</td>
</tr>
<tr>
<td>14-16 wks</td>
<td>• Detailed anatomy, Biometry, Amniotic fluid volume</td>
</tr>
<tr>
<td>18 wks</td>
<td>• Fetal growth, DVP, UA-PI</td>
</tr>
<tr>
<td>20-22 wks</td>
<td>• Detailed anatomy, Biometry, DVP, UA-PI, MCA-PSV, Cervical length, Fetal echocardiography</td>
</tr>
<tr>
<td>Every two wks between 22 and 36 wks</td>
<td>• Fetal growth, DVP, UA-PI, MCA-PSV</td>
</tr>
<tr>
<td>Delivery</td>
<td></td>
</tr>
</tbody>
</table>

Modified from *Ultrasound Obstet Gynecol* 2016; 47: 247–263
Prenatal diagnosis in twin pregnancies

Limitations of screening for aneuploidy in multifetal gestations

- Serum screening tests are not as sensitive as compared with singleton gestations
- Analytes from the normal and the affected fetuses enter the maternal serum and are averaged together – may mask the abnormal levels of the affected fetus
- The analyte levels are estimated by mathematical modeling
- Counseling is more complex when only one fetus is affected
Screening for trisomy 21 in twin pregnancies

- The risk of having at least one fetus with trisomy 21 at 32 yrs is similar to the risk in singletons at 35 yrs
- Can be performed in first trimester (11-13 6/7 wks) using the combined test - NT, free β-hCG and PAPP-A
- An alternative - combination of maternal age and NT only
- In DC twin pregnancy:
  - the risk is calculated per fetus (~90% are dizygotic)
- In MC twin pregnancy:
  - The risk is calculated per pregnancy based on the average risk of both fetuses (same karyotype)

Ultrasound Obstet Gynecol 2016; 47: 247–263
Systematic review of screening for trisomy 21 in twin pregnancies in first trimester combining nuchal translucency and biochemical markers: a meta-analysis

Pilar Prats, Ignacio Rodríguez, Carmina Comas, and Bienvenida Puerto

1Fetal Medicine Service, Department of Obstetrics, Gynecology and Reproductive Medicine, Hospital Universitari Quirón Dexeus, Barcelona, Spain
2Department of Maternal Fetal Medicine, Institut Clinic de Ginecologia, Obstetricia I Neonatologia, Hospital Clinic, Barcelona, Spain
*Correspondence to: Pilar Prats. Email: pilar@dexeus.com

- 5 studies, 12,794 twin fetuses
- 69 cases of trisomy 21
- Similar performance as singletons (89%) at a FPR of 5%
  - 86% for DC twins
  - 87% for MC twins


Invasive procedures risk in twin pregnancies

- Invasive testing carries greater risks in twins
- A recent meta-analysis showed in twin pregnancy a pregnancy loss before 24 weeks of: CVS - 2.88% and amniocentesis – 2.54%
- Others reported lower rates: CVS - 2% and 1.5–2% amniocentesis
- ACOG 2014 - The quoted procedure-associated pregnancy loss rates for CVS and amniocentesis are similar - 1–1.8%
- The risk is similar for transabdominal and transcervical approaches, use of a single-needle or double-needle system, and single or double uterine entry
Cell-free DNA in twin pregnancies

- Potential advantage over conventional screening
- higher DR and lower FPR
- In singleton pregnancy - the weighted pooled DR for trisomy 21 was 99% for a FPR of 0.1%
- In twin pregnancy:
  - DR - 94.4% with a FPR - 0%
  - However, the reported number of trisomy 21 cases in twin pregnancy diagnosed using cfDNA testing was low


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Maternal complications

Maternal complications: Aggravated symptoms

- Hyperemesis gravidarum
- Mechanical effects of the larger uterus
  - Cardio-respiratory - shortness of breath, palpitations, supine hypotension syndrome
  - Gastrointestinal – dyspepsia
  - Genitourinary – Obstructive uropathy, rec. UTI
- Varicose veins
- Lower limb edema
- Hemorrhoids
Maternal complications

Antenatal

<table>
<thead>
<tr>
<th>Condition</th>
<th>Twins (n=1694)</th>
<th>Singleton (n=71,851)</th>
<th>Relative risk</th>
<th>95% Confidence intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperemesis</td>
<td>5.1%</td>
<td>1.7%</td>
<td>3.0</td>
<td>2.1–4.1</td>
</tr>
<tr>
<td>Threatened miscarriage</td>
<td>26.5%</td>
<td>18.6%</td>
<td>1.4</td>
<td>1.3–1.6</td>
</tr>
<tr>
<td>Anemia</td>
<td>27.5%</td>
<td>16.2%</td>
<td>1.7</td>
<td>1.5–1.9</td>
</tr>
<tr>
<td>Abruption</td>
<td>0.9%</td>
<td>0.5%</td>
<td>2.0</td>
<td>1.2–3.3</td>
</tr>
<tr>
<td>Placenta previa</td>
<td>0.2%</td>
<td>0.3%</td>
<td>0.6</td>
<td>0.2–1.8</td>
</tr>
<tr>
<td>AFH of unknown origin</td>
<td>9.3%</td>
<td>7.8%</td>
<td>1.2</td>
<td>1.0–1.4</td>
</tr>
<tr>
<td>Gestational hypertension</td>
<td>23.8%</td>
<td>17.8%</td>
<td>1.3</td>
<td>1.2–1.5</td>
</tr>
<tr>
<td>Pre-eclampsia</td>
<td>12.5%</td>
<td>3.4%</td>
<td>3.7</td>
<td>3.3–4.3</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>0.2%</td>
<td>0.1%</td>
<td>3.4</td>
<td>1.2–9.4</td>
</tr>
<tr>
<td>Antenatal thromboembolism</td>
<td>0.5%</td>
<td>0.1%</td>
<td>3.3</td>
<td>1.3–8.1</td>
</tr>
</tbody>
</table>

Maternal complications

Intrapartum

- Preterm labor - spontaneous or induced
- Uterine dystocia
- Abnormal fetal presentation
- Cord accident
- Cord prolapse
- Vasa Praevia (d/t velamentous insertion of cord)
- Cesarean sections
- Locked twins
Maternal complications
Postpartum / Puerperium

- Increased maternal mortality
- Puerperal Sepsis
- Psychological problems – postpartum depression

<table>
<thead>
<tr>
<th></th>
<th>Twin %</th>
<th>Singleton %</th>
<th>RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual removal of</td>
<td>6.7</td>
<td>2.5</td>
<td>2.7</td>
<td>2.2–3.2</td>
</tr>
<tr>
<td>placenta</td>
<td>(n = 1694)</td>
<td>(n = 71,851)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evacuation of retained</td>
<td>2.0</td>
<td>0.6</td>
<td>3.1</td>
<td>2.0–4.8</td>
</tr>
<tr>
<td>products</td>
<td>(n = 1694)</td>
<td>(n = 71,851)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary PPH (&gt; 1000 ml)</td>
<td>3.1</td>
<td>0.9</td>
<td>3.4</td>
<td>2.9–4.1</td>
</tr>
<tr>
<td>(n = 1086)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary PPH</td>
<td>1.7</td>
<td>0.6</td>
<td>2.9</td>
<td>1.8–4.6</td>
</tr>
<tr>
<td>(n = 1694)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postnatal</td>
<td>0.6</td>
<td>0.2</td>
<td>2.6</td>
<td>1.1–5.9</td>
</tr>
<tr>
<td>thromboembolism</td>
<td>(n = 1,052)</td>
<td>(n = 42,439)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Campbell DM and Templeton A. Int J Gynecol Obstet 2004;84:71–73

Maternal complications

- Only macrosomia a postterm gestation are less common than in singletons
- Most complications are also more severe and profound in twin pregnancies as in singletons

Campbell DM and Templeton A. Int J Gynecol Obstet 2004;84:71–73
Preeclampsia

- More frequent – RR 2.26 (95% CI 2.03-3.38)
- Occurs earlier in pregnancy
- Higher rates of placental abruption and SGA
- Eclampsia – RR 6.0
- The higher the number of fetuses the higher the risk

Day MC et al. Obstet Gynecol 2005;106:927-931
Douglas & Redman, 1994

The Effect of Fetal Number on the Development of Hypertensive Conditions of Pregnancy

Misty C. Day, MD, John R. Barton, MD, John M. O’Brien, MD, Niki B. Istvan, RN, and Baba M. Sibai, MD

<table>
<thead>
<tr>
<th></th>
<th>Singletons (n=24,781)</th>
<th>Twins (n=6,859)</th>
<th>Triplets (n=2,545)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age at delivery (wk)</td>
<td>37.3 ± 2.5</td>
<td>35.0 ± 2.5</td>
<td>33.2 ± 2.1</td>
</tr>
<tr>
<td>Any hypertensive disorder</td>
<td>6.5</td>
<td>12.7</td>
<td>20.0</td>
</tr>
<tr>
<td>Severe hypertensive disease</td>
<td>0.5</td>
<td>1.6</td>
<td>3.1</td>
</tr>
<tr>
<td>Fetal deaths</td>
<td>0.4</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>HELLP</td>
<td>0.2</td>
<td>0.9</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Day MC et al. Obstet Gynecol 2005;106:927-931
Fetal and neonatal complications

Complications of twins

• Preterm delivery
• Low and very low birth weight
  • Chromosomal and anatomic anomalies
  • IUGR
  • Discordant twins
  • IUFD / Single fetal death
• Increased neonatal and infant death rate
• CP
The main problems

- 11% of the twins born “very preterm” (<32 weeks)
- 59% of the twins born “preterm” (<37 weeks)
- 10% of the twins born “very low birthweight” (<1500 g)
- 55% of the twins born “low birthweight” (<2500 g)
- >1 of every 2 twins born in 2014 was either preterm or low birthweight

Adashi EY. Am J Obstet Gynecol 2016;214:311

Multiples vs. Singletons

<table>
<thead>
<tr>
<th></th>
<th>Singleton</th>
<th>Twins</th>
<th>Triplets</th>
<th>Quadruplets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean birth weight (gr)</td>
<td>3,296</td>
<td>2,336</td>
<td>1,660</td>
<td>1,291</td>
</tr>
<tr>
<td>Mean GA (weeks)</td>
<td>38.7</td>
<td>35.3</td>
<td>31.9</td>
<td>29.5</td>
</tr>
<tr>
<td>% &lt; 32 weeks</td>
<td>1.6</td>
<td>11.4</td>
<td>36.8</td>
<td>64.5</td>
</tr>
<tr>
<td>% &lt; 37 weeks</td>
<td>10.4</td>
<td>58.8</td>
<td>94.4</td>
<td>98.3</td>
</tr>
<tr>
<td>Rate of CP (per 1,000 live births)</td>
<td>1.6</td>
<td>7</td>
<td>28</td>
<td>-</td>
</tr>
<tr>
<td>Infant mortality rate (per 1,000 live births)</td>
<td>5.4</td>
<td>23.6</td>
<td>52.5</td>
<td>96.3</td>
</tr>
</tbody>
</table>

Preterm Labor and Birth

1. Prediction
   - History
   - Cervical length
   - fFN

2. Prophylactic prevention
   - Lifestyle changes
   - Progesterone
   - Cerclage
   - Pessary

3. Acute prevention
   - Tocolysis
   - Antibiotics

4. Fetal Protection
   - Corticosteroids
   - Magnesium
   - Transfer

Vanishing twin
“Vanishing Twin”

- Early spontaneous loss (first trimester) of one fetus of a multiple gestation
- Asymptomatic or associated with spotting/mild bleeding
- 27% when diagnosis of twins is made before 7 weeks’ gestation (both sac lost in 9%)
- After two embryos with heart beats confirmed, 21.2% delivered singletons
- MC twin gestation are at higher risk than DC twins
- More common in high-order gestations
  - 53% in triplets and 65% in quadruplets

What is the significance of “Vanishing Twin”?

Vanishing twin syndrome: is it associated with adverse perinatal outcome?

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Vanished twin</th>
<th>Singleton</th>
<th>Twins (male/female)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational diabetes mellitus</td>
<td>14</td>
<td>5.9</td>
<td>10.6</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>IUGR</td>
<td>6.8</td>
<td>2.1</td>
<td>2.7</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Chronic hypertension</td>
<td>4.7</td>
<td>1.5</td>
<td>2.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hypertensive disorder</td>
<td>9</td>
<td>5.5</td>
<td>11.7</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>PROM</td>
<td>12.9</td>
<td>8.4</td>
<td>10.2</td>
<td>.001</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>4</td>
<td>3.6</td>
<td>3.6</td>
<td>.955</td>
</tr>
<tr>
<td>Oligohydramnios</td>
<td>5</td>
<td>2.4</td>
<td>2.2</td>
<td>.012</td>
</tr>
<tr>
<td>Vasa previa</td>
<td>1.1</td>
<td>0.1</td>
<td>0.4</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Cervical insufficiency</td>
<td>3.6</td>
<td>0.5</td>
<td>1.6</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Second semester bleeding</td>
<td>0</td>
<td>0</td>
<td>0.2</td>
<td>.002</td>
</tr>
<tr>
<td>Labor induction</td>
<td>32</td>
<td>27.7</td>
<td>11</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Preterm &lt;37 wk</td>
<td>32.4</td>
<td>7.7</td>
<td>59.5</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Preterm &lt;34 wk</td>
<td>14.7</td>
<td>2.1</td>
<td>17.5</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>NPL stage 1</td>
<td>1.8</td>
<td>1.8</td>
<td>1.9</td>
<td>.901</td>
</tr>
<tr>
<td>NPL stage 2</td>
<td>1.4</td>
<td>1.5</td>
<td>0.7</td>
<td>.026</td>
</tr>
</tbody>
</table>

Evron E et al. Fertil Steril 2015;103:1209

Increased rates of pregnancy and labor complications:
What is the significance of “Vanishing Twin”?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Vanished twin (n = 278)</th>
<th>Singleton (n = 252,994)</th>
<th>Twins (male/female) (n = 1,801)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal malformations</td>
<td>15.5</td>
<td>6.2</td>
<td>11.5</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Malpresentation</td>
<td>14.4</td>
<td>5.3</td>
<td>33.3</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Low Apgar 1 min (&lt;7)</td>
<td>14.4</td>
<td>6</td>
<td>13.5</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Low Apgar 5 min (&lt;7)</td>
<td>5</td>
<td>2.6</td>
<td>3.9</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Macrosomia (birth-weight above 4 kg)</td>
<td>2.9</td>
<td>4.7</td>
<td>0.1</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>LBW (≤2,500 g)</td>
<td>30.2</td>
<td>7.7</td>
<td>60.4</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>VLBW (≤1,500 g)</td>
<td>10.8</td>
<td>1.2</td>
<td>8.9</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Perinatal mortality</td>
<td>3.6</td>
<td>1.2</td>
<td>2.9</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Maternal outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placental abruption</td>
<td>5</td>
<td>0.7</td>
<td>1.8</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Postpartum hemorrhage</td>
<td>0.4</td>
<td>0.6</td>
<td>1.1</td>
<td>&lt; .01*</td>
</tr>
<tr>
<td>Cesarean section</td>
<td>36.7</td>
<td>14.2</td>
<td>56.5</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Vacuum delivery</td>
<td>2.9</td>
<td>3.1</td>
<td>1.5</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Blood transfusions</td>
<td>0.7</td>
<td>1.3</td>
<td>5.2</td>
<td>&lt; .001*</td>
</tr>
</tbody>
</table>

Evron E et al. Fertil Steril 2015;103:1209

Vanishing twin

- In case of a vanished twin, if there is still a measurable fetal pole, NT alone in combination with maternal age, should be used for trisomy 21 risk estimation
- CVS results and fetal karyotype of the surviving fetus may be different

Sankaran S et al. Prenat Diagn 2011;31:600-601
Malformations

Anomalies in twin pregnancies

• The risk of fetal anomaly is greater in twin compared with singleton pregnancy – approximately 2-fold increase
• The rate per fetus in DZ twins is probably the same as that in singletons
• In MZ twins the risk of fetal anomaly is two-to-three times higher
• In most cases (even in MZ), when there is a major congenital anomaly in one twin, the co-twin is usually normal
• Affects:
  – ~ 1 in 25 DC twin pregnancies
  – ~ 1 in 15 MCDA twin pregnancies
  – ~ 1 in 6 MCMA twin pregnancies
Congenital anomalies in twins: a register-based study

S.V. Glinianaia, J. Rankin and C. Wright

1Institute of Health and Society, Newcastle University, William Leech Building, The Medical School, Framlington Place, Newcastle upon Tyne NE2 4HH, UK; 2Regional Maternity Survey Office, Newcastle upon Tyne NE2 4AA, UK; 3Department of Cellular Pathology, Royal Victoria Infirmary, Queen Victoria Road, Newcastle, Newcastle upon Tyne NE1 4LP, UK.

- 2329 twin pregnancies (4658 twins) and 147,655 singletons from Northeast of England (1998–2002)
- The rate of congenital anomalies:
  - Singletons: 238.2 / 10,000
  - Twins: 405.8 / 10,000 (RR 1.7, 95% CI 1.5–2.0)
    - DC twins - 343.7 / 10,000
    - MC twins - 633.6 / 10,000 (RR 1.8, 95% CI 1.3–2.5)

Glinianaia SV. Hum Reprod 2008;23:1306-1311

Rates of congenital anomaly

<table>
<thead>
<tr>
<th>Type of anomalies</th>
<th>Twins rate (n)</th>
<th>Singletons rate (n)</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central nervous system</td>
<td>53.8 (24)</td>
<td>22.1 (326)</td>
<td>2.44 (1.61-3.69)</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>114.3 (51)</td>
<td>77.6 (1146)</td>
<td>1.47 (1.11-1.95)</td>
</tr>
<tr>
<td>Genito-urinary system</td>
<td>56.1 (25)</td>
<td>28.9 (427)</td>
<td>1.94 (1.30-2.90)</td>
</tr>
<tr>
<td>Musculoskeletal system</td>
<td>42.6 (19)</td>
<td>19.8 (292)</td>
<td>2.15 (1.36-3.42)</td>
</tr>
<tr>
<td>Other anomalies</td>
<td>69.5 (31)</td>
<td>45.9 (677)</td>
<td>1.52 (1.06-2.17)</td>
</tr>
<tr>
<td>Chromosomal</td>
<td>44.8 (20)</td>
<td>44.0 (649)</td>
<td>1.02 (0.65-1.59)</td>
</tr>
<tr>
<td>Total</td>
<td>405.8 (181)</td>
<td>238.2 (3517)</td>
<td>1.70 (1.47-1.97)</td>
</tr>
</tbody>
</table>

Glinianaia SV. Hum Reprod 2008;23:1306-1311

- Congenital heart anomalies are more prevalent in MC twins (5-7.5%)
- More placental malformations – SUA, velamentous insertion of cord
Discordant twins

Growth abnormalities in twins

- One twin small for gestational age
- Both twins small for gestational age
- One twin significantly smaller than the other twin = discordant twins
Discordant twins

$$\text{Discordance} (\%) = \frac{\text{Weight of larger twin} - \text{Weight of smaller twin}}{\text{Weight of larger twin}} \times 100$$

Definition of discordant fetal growth (ACOG, 2014): a 20% difference in estimated fetal weight between the larger and smaller fetus

Etiologies for discordant growth

- Fetal gender
- Unequal placental mass
- Lower segment implantation
- Genetic difference
- Congenital anomaly in one twin
- TTTS in MC
The distribution of birth weight discordance

<table>
<thead>
<tr>
<th>Discordance</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15%</td>
<td>94,198</td>
<td>73.5%</td>
</tr>
<tr>
<td>15-19%</td>
<td>14,717</td>
<td>11.5%</td>
</tr>
<tr>
<td>20-24%</td>
<td>8825</td>
<td>6.9%</td>
</tr>
<tr>
<td>25-29%</td>
<td>4879</td>
<td>3.8%</td>
</tr>
<tr>
<td>≥30%</td>
<td>5549</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

Branum AM and Schoendorf KC. Obstet Gynecol 2003;101:570

Definition of Intertwin Birth Weight Discordance

- Prospective multicenter cohort study
- 977 patients with twins who continued the study with both fetuses alive beyond 24 weeks
  - 789 dichorionic (89%) and 188 monochorionic (11%, 14 with TTTS)
- Mean birthweight discordance: dichorionic - 13.2% (range, 0.1–53%) monochorionic - 11.4% (range, 0–58%)
- Birth weight:
  - Both twins appropriate for gestational age in 84% of cases (n=819)
  - One twin of a pair < 5th centile in 11% (n=108)
  - One twin of a pair > 95th centile in 2.5% (n=25)
  - Both twins SGA in 1% (n=10) or LGA 0.1% (n=1)

Breathnach FM et al. Obstet Gynecol 2011;118:94-103
Definition of intertwin birthweight discordance

Perinatal mortality and morbidity in discordant DC twins (18% threshold)

<table>
<thead>
<tr>
<th></th>
<th>Concordant (Less Than 18% BW Discordance) (n = 1,244)</th>
<th>Discordant (18% or Greater BW Discordance) (n = 334)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Smaller Twin (n = 167)</td>
<td>Either Twin (n = 334)</td>
<td>Larger Twin (n = 167)</td>
</tr>
<tr>
<td><strong>Gestational age at delivery (wk)</strong></td>
<td>37.1 (35.9–38.0)</td>
<td>36.3 (34.4–37.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Mortality</strong></td>
<td>12.2</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>NICU admission</strong></td>
<td>12.6</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>HIE</strong></td>
<td>1.9</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>IVH</strong></td>
<td>1.7</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>PVL</strong></td>
<td>1.7</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>NEC</strong></td>
<td>1.7</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>RDS</strong></td>
<td>1.7</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Sepsis</strong></td>
<td>1.7</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Composite adverse perinatal outcome</strong></td>
<td>143 (12)</td>
<td>31 (19)</td>
<td>72 (22)</td>
</tr>
</tbody>
</table>

Adjusted for gestational age at delivery

Breathnach FM et al. Obstet Gynecol 2011;118:94-103
### Neonatal mortality among larger and smaller twins

<table>
<thead>
<tr>
<th></th>
<th>NMR</th>
<th>Crude OR (95% CI)</th>
<th>Adjusted OR* (95% CI)</th>
<th>Adjusted OR† (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smaller twins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No discord</td>
<td>3.8</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>15-19%</td>
<td>5.6</td>
<td>1.49 (1.17, 1.89)</td>
<td>1.48 (1.16, 1.88)</td>
<td>1.08 (0.85, 1.38)</td>
</tr>
<tr>
<td>20-24%</td>
<td>8.5</td>
<td>2.25 (1.75, 2.89)</td>
<td>2.10 (1.63, 2.70)</td>
<td>1.24 (0.96, 1.61)</td>
</tr>
<tr>
<td>25-29%</td>
<td>18.4</td>
<td>4.91 (3.91, 6.23)</td>
<td>4.42 (3.49, 5.59)</td>
<td>2.02 (1.58, 2.69)</td>
</tr>
<tr>
<td>≥30%</td>
<td>43.4</td>
<td>11.93 (10.11, 14.09)</td>
<td>7.53 (6.35, 8.93)</td>
<td>2.03 (1.66, 2.51)</td>
</tr>
<tr>
<td><strong>Larger twins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No discord</td>
<td>3.1</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>15-19%</td>
<td>3.7</td>
<td>1.17 (0.88, 1.57)</td>
<td>1.16 (0.86, 1.55)</td>
<td>1.23 (0.92, 1.65)</td>
</tr>
<tr>
<td>20-24%</td>
<td>4.2</td>
<td>1.34 (0.95, 1.89)</td>
<td>1.22 (0.87, 1.72)</td>
<td>1.31 (0.93, 1.86)</td>
</tr>
<tr>
<td>25-29%</td>
<td>4.7</td>
<td>1.31 (0.98, 1.81)</td>
<td>1.29 (0.84, 1.98)</td>
<td>1.32 (0.86, 2.04)</td>
</tr>
<tr>
<td>≥30%</td>
<td>12.4</td>
<td>4.01 (3.08, 5.22)</td>
<td>2.21 (1.60, 2.80)</td>
<td>2.23 (1.71, 2.96)</td>
</tr>
</tbody>
</table>

**Branum AM and Schoendorf KC. Obstet Gynecol 2003;101:570**

---

### What about the larger twin?

**Odds Ratios (95% CI) of neonatal mortality for all twins (using larger non-discordant twins as reference):**

<table>
<thead>
<tr>
<th></th>
<th>No discord</th>
<th>15-19%</th>
<th>20-24%</th>
<th>25-29%</th>
<th>≥30%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crude</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Larger</td>
<td>1.0</td>
<td>1.17 (0.88, 1.57)</td>
<td>1.34 (0.95, 1.89)</td>
<td>1.51 (0.98, 2.31)</td>
<td>4.01 (3.08, 5.22)</td>
</tr>
<tr>
<td>Smaller</td>
<td>1.21 (1.20, 1.22)</td>
<td>1.80 (1.69, 1.92)</td>
<td>2.73 (2.52, 2.95)</td>
<td>4.08 (3.04, 5.15)</td>
<td>14.45 (13.67, 15.30)</td>
</tr>
<tr>
<td>Adjusted for fetal growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Larger</td>
<td>1.0</td>
<td>1.27 (0.94, 1.71)</td>
<td>1.47 (1.03, 2.09)</td>
<td>1.61 (1.04, 2.50)</td>
<td>4.29 (3.28, 5.61)</td>
</tr>
<tr>
<td>Smaller</td>
<td>1.03 (1.02, 1.04)</td>
<td>1.05 (0.99, 1.12)</td>
<td>1.32 (1.21, 1.43)</td>
<td>2.31 (2.03, 2.60)</td>
<td>3.92 (3.70, 4.15)</td>
</tr>
</tbody>
</table>

**Branum AM and Schoendorf KC. Obstet Gynecol 2003;101:570**
Single Fetal Demise

Perinatal outcome after first-trimester risk assessment in monochorionic and dichorionic twin pregnancies: a population-based register study

MK Kristiansen, BS Joensen, CK Ekelund, OB Petersen, P Sandager with the Danish Fetal Medicine Study Group

- Based on a cohort study from the Danish Fetal Medicine Database (July 2008 to July 2011)
- Included data from all twin pregnancies with two live fetuses at the NT scan around gestational week 12
- 3621 twin pregnancies
  - 84.3% DC (n=3053)
  - 15.0% MC/DA (n=544)
  - 0.7% MC/MA (n=24)

Kristiansen MK et al. BJOG 2015;122:1362
### Single Fetal Demise

<table>
<thead>
<tr>
<th></th>
<th>Dichorionic</th>
<th>Monochorionic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>diastolic</td>
</tr>
<tr>
<td>Twin pregnancies</td>
<td></td>
<td>monoamniotic</td>
</tr>
<tr>
<td>Spontaneous loss</td>
<td></td>
<td>% (n)</td>
</tr>
<tr>
<td>Loss of both fetuses</td>
<td>1.2 (37)</td>
<td>20.8 (5)</td>
</tr>
<tr>
<td>&lt;22 weeks</td>
<td>0.9 (29)</td>
<td>20.8 (5)</td>
</tr>
<tr>
<td>&gt;22 weeks</td>
<td>0.3 (8)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Loss of one fetus</td>
<td>1.3 (40)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>&lt;22 weeks*</td>
<td>0.7 (21)</td>
<td>ns</td>
</tr>
<tr>
<td>&gt;22 weeks*</td>
<td>0.6 (19)</td>
<td>ns</td>
</tr>
</tbody>
</table>

|                      | Monochorionic | Monochorionic |
|                      | monoamniotic  | monoamniotic  |
|                      | % (n)         | % (n)         |
| Termination of pregnancy |            | P value (DC vs MCDA) | P value (DC vs MCMA) |
| From NT scan to 24** weeks | 0.5 (14)    | 12.5 (3)      | <0.0005       | <0.0005       |
| Selective termination*** | 1.1 (33)    | 4.6 (23)      | <0.0005       | <0.0005       |
| Preganancies with two live fetuses at 21*** | 96.9 (2958) | 89.5 (487)   | <0.0005       | <0.0005       |
| Neonatal death***     | Of one infant | 0.6 (2)       | ns            | ns            |
|                       | Of two infants | 0.4 (2)       | 6.3 (1)       | ns            |
| Birth of at least one liveborn infant | 98.2 (2999) | 92.3 (502)   | <0.0005       | <0.0005       |
| Birth of two liveborn infants | 96.0 (2928) | 86.2 (468)   | <0.0005       | <0.0005       |

**Kristiansen MK et al. BJOG 2015;122:1362**

### Reviews

#### Co-Twin Prognosis After Single Fetal Death

*Sarah C. Hillman, MRCOG, Rachel K. Morris, MRCOG, Mark D. Kilby, FRCOG*

- 22 articles included
- 6,225 pregnancies and 343 cases of single IUFD

<table>
<thead>
<tr>
<th></th>
<th>MC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>% (95% CI)</td>
</tr>
<tr>
<td>Risk for co-twin death</td>
<td>20/149</td>
<td>15% (9.1–20.9)</td>
</tr>
<tr>
<td>Abnormal cranial imaging postnatally</td>
<td>33/83</td>
<td>34% (28.8–46.1)</td>
</tr>
<tr>
<td>Neurodevelopmental morbidity</td>
<td>16/66</td>
<td>26% (16.5–34.6)</td>
</tr>
</tbody>
</table>

Additional risk of the survivor twin as compared to singletons

- As compared to twin births:
  - Increased risk of congenital anomaly if co-twin demise before 16 weeks

  Pharoah PO et al. Hum Reprod 2009;24:726

- As compared to singletons:
  - Lower mean birth weight (120 g)
  - Increased risk of SGA
  - Increased risk of preterm delivery

  Fertil Steril 2012;97:825

Management of single fetal demise in DC twins

- Optimal management is not clear and depends on gestational age and individual clinical scenario

- Look for conditions that may affect both fetuses (e.g. preeclampsia, chorioamnionitis)

- Close surveillance of the survivor twin

- Corticosteroids

- Anti D

- Only few case reports of maternal DIC
## Multiples vs. Singletons

<table>
<thead>
<tr>
<th></th>
<th>Singleton</th>
<th>Twins</th>
<th>Triplets</th>
<th>Quadruplets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean birth weight (gr)</td>
<td>3,296</td>
<td>2,336</td>
<td>1,660</td>
<td>1,291</td>
</tr>
<tr>
<td>Mean GA (weeks)</td>
<td>38.7</td>
<td>35.3</td>
<td>31.9</td>
<td>29.5</td>
</tr>
<tr>
<td>% &lt; 32 weeks</td>
<td>1.6</td>
<td>11.4</td>
<td>36.8</td>
<td>64.5</td>
</tr>
<tr>
<td>% &lt; 37 weeks</td>
<td>10.4</td>
<td>58.8</td>
<td>94.4</td>
<td>98.3</td>
</tr>
<tr>
<td>Rate of CP (per 1,000 live births)</td>
<td><strong>1.6</strong></td>
<td><strong>7</strong></td>
<td><strong>28</strong></td>
<td>-</td>
</tr>
<tr>
<td>Infant mortality rate (per 1,000 live births)</td>
<td><strong>5.4</strong></td>
<td><strong>23.6</strong></td>
<td><strong>52.5</strong></td>
<td><strong>96.3</strong></td>
</tr>
</tbody>
</table>

The risk of CP is increased among multiples – why?

• Increased rate of preterm delivery
• Increased rate of low birth weight
• Increased rate of IUGR
• Single fetal death
• TTTS
• Intrapartum related

Outline

• Epidemiology
• Antenatal issues
• Complications
• Timing of delivery
• Delivery issues
Prospective risk of stillbirth in multiple-gestation pregnancies

Table 2. Relative Risk of Stillbirth in Multiple Gestations Compared With Postterm Singleton Pregnancies

<table>
<thead>
<tr>
<th>Gestation (wk)</th>
<th>No. of stillbirths per ongoing gestation</th>
<th>Relative risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>1/3655</td>
<td>0.144 (0.02, 1.07)</td>
</tr>
<tr>
<td>34</td>
<td>7/3403</td>
<td>1.65 (0.44, 2.91)</td>
</tr>
<tr>
<td>35</td>
<td>6/1778</td>
<td>0.999 (0.4, 2.49)</td>
</tr>
<tr>
<td>36</td>
<td>9/2817</td>
<td>1.66 (0.75, 3.68)</td>
</tr>
<tr>
<td>37</td>
<td>9/9233</td>
<td>2.01 (0.91, 4.45)</td>
</tr>
<tr>
<td>38</td>
<td>6/1527</td>
<td>2.07 (0.82, 5.18)</td>
</tr>
<tr>
<td>39+</td>
<td>10/691</td>
<td>7.61 (3.52, 16.4)</td>
</tr>
</tbody>
</table>

- The risk of stillbirth in multiple gestations increases progressively to exceed, by 39 weeks, that of postterm singleton pregnancy.
- The pattern of increase in fetal loss in multiple gestations mimics that of singletons, but the gestational age at which the risk increases is 2–3 weeks earlier.
Fetal death rate and prospective risk of fetal death for twins

- 297,622 twin gestations
- from the 1995–1998 National Center for Health Statistics linked birth and death files

The prospective risk of fetal death exceeds neonatal mortality risk in twin gestations at 39 weeks

ACOG recommendations (2014)

- Uncomplicated DC/DA twin gestations at 38 weeks of gestation

To minimize perinatal deaths, in uncomplicated DC twin pregnancies delivery should be considered at 37 weeks' gestation and at 36 weeks in MC pregnancies.

BMJ. 2016 Sep 6;354:i4353. doi: 10.1136/bmj.i4353

Original Article
Neonatal outcome of late preterm uncomplicated monochorionic twins: what is the optimal time for delivery?
Alexandra Berezowsky, Ram Mazkereth, Eran Ashwal, Shali Mazaki-Tovi, Eyal Schiff, Boaz Weisz, Shlomo Lipitz & Yoav Yiron

- The risk of neonatal morbidity of uncomplicated MC twins delivered at 34-37 weeks of gestation significantly decreases with advanced gestation

- Under close fetal surveillance, uncomplicated MC twin pregnancies should be delivered at 37 weeks of gestation

What about timing of delivery in monoamniotic twins?

**Effects of interventions**

No trials were identified for inclusion in the review.

**DISCUSSION**

This review did not identify any trials for inclusion.

- Retrospectively multicenter cohort study (8 hospitals, 2003-2012)
- 193 pregnancies (386 fetuses)
- IUFD in 18.1% of fetuses (n=70, 42 pregnancies)
- The prospective risk of a nonrespiratory neonatal complication was lower than the prospective risk of IUFD after 32+4/7 weeks (95%CI 32+0/7 - 33+4/7)
- In the absence of results from RCTs, monoamniotic pregnancies will need to be managed based on results from observational studies…
- Elective delivery at ~33 weeks of gestation should be considered

---

### Timing of delivery for uncomplicated twin pregnancies

<table>
<thead>
<tr>
<th>Type</th>
<th>ACOG, 2014 (&quot;can undergo delivery at...&quot;)</th>
<th>favor delivery at</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC/DA twins</td>
<td>37-39 weeks</td>
<td>34-37 weeks</td>
</tr>
<tr>
<td>MC/DA twins</td>
<td>34-37 weeks</td>
<td>32-34 weeks</td>
</tr>
<tr>
<td>MC/MA twins</td>
<td>32-34 weeks</td>
<td>33 weeks</td>
</tr>
</tbody>
</table>

ACOG, 2014 ("can undergo delivery at...")

38 weeks 34-37 6/7 weeks 32-34 weeks

האיגוד הישראלי למיילדות והגינקולוגיה, נייר עמדה 9, 2011

לילד עד שבוע 37 ל العبון 40 שבי

32-34 weeks

Current data on optimal timing of delivery for uncomplicated twins

<table>
<thead>
<tr>
<th>Type</th>
<th>favor delivery at</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC/DA twins</td>
<td>37 - 37+6/7 weeks</td>
</tr>
<tr>
<td>MC/DA twins</td>
<td>36-37 weeks</td>
</tr>
<tr>
<td>MC/MA twins</td>
<td>33 weeks</td>
</tr>
</tbody>
</table>

Outline

- Epidemiology
- Antenatal issues
- Complications
- Timing of delivery
- Delivery issues

Mode of delivery
Factors to be taken into consideration in planning mode of delivery in twins

• Type of twins pregnancy
• Presentation of each twin
• Gestational age
• Parity
• Previous cesarean section
• Estimated fetal weight of each twin
• Order of twins according to their size
• Comorbid conditions (maternal or fetal)
• Expertise and training of obstetricians
Planned vaginal delivery vs. planned cesarean delivery of twins

• Data from retrospective cohort studies suggests:
  – In the vaginal delivery group the second twin had increased risk of perinatal death or poor neonatal outcome (both in Vx/Vx and Vx- non Vx, term and preterm and DC or MC)

  Smith G et al. BMJ 2002;325:1004–1008
  Smith G et al. BMJ 2005;112:1139–1144

A Randomized Trial of Planned Cesarean or Vaginal Delivery for Twin Pregnancy

Jon F.R. Barrett, M.B., B.Ch., M.D., Mary E. Hannah, M.D.C.M., Eileen K. Hutton, Ph.D., Andrew R. Willan, Ph.D., Alexander C. Allen, M.D.C.M., B. Anthony Armson, M.D., Amiram Gafni, D.Sc., K.S. Joseph, M.D., Ph.D., Dalah Mason, M.P.H., Arne Ohlsson, M.D., Susan Ross, Ph.D., J. Johanna Sanchez, M.I.P.H., and Elizabeth V. Asztalos, M.D., for the Twin Birth Study Collaborative Group

• 32 +0 - 38+6 weeks with the first twin cephalic
• RCT, 1398 women assigned to planned CS and 1406 women to planned VD (2003-2011, 106 centers)
• Elective delivery planned between 37+5 and 38+6 weeks
• Primary outcome - a composite of fetal or neonatal death or serious neonatal morbidity – no significant differences
  – planned-cesarean-delivery group 2.2%
  – planned-vaginal-delivery group 1.9%
  – OR with planned cesarean delivery, 1.16 95%CI 0.77-1.74, p=0.49
• No significant differences in maternal composite outcome
• Second twin did worse in both groups (OR 1.9, 95%CI 1.34-2.69)

Barrett JFR et al. NEJM 2013;369:1295-1305
Table 2. Characteristics of Labor and Delivery for All Pregnancies.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Planned Cesarean Delivery (N=1393)</th>
<th>Planned Vaginal Delivery (N=1393)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of delivery — no./total no. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cesarean for both                                 1252/1392 (89.9)</td>
<td>551/1393 (39.6)</td>
<td></td>
</tr>
<tr>
<td>Vaginal and cesarean                              11/1392 (0.8)</td>
<td>59/1393 (4.2)</td>
<td></td>
</tr>
<tr>
<td>Vaginal for both                                  129/1392 (9.3)</td>
<td>783/1393 (56.2)</td>
<td></td>
</tr>
<tr>
<td>Presentation at delivery — no./total no. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both twins in cephalic presentation               798/1391 (57.4)</td>
<td>845/1393 (60.7)</td>
<td></td>
</tr>
<tr>
<td>First twin in cephalic presentation and second twin in noncephalic presentation</td>
<td>542/1391 (39.0)</td>
<td>507/1393 (36.4)</td>
</tr>
<tr>
<td>First twin in noncephalic presentation and second twin in cephalic or noncephalic presentation</td>
<td>51/1391 (3.7)</td>
<td>41/1393 (2.9)</td>
</tr>
</tbody>
</table>

“In conclusion, we found no benefits of planned cesarean section, as compared with planned vaginal delivery, for the delivery of twins between 32 and 38 weeks of gestation, if the first twin was in the cephalic presentation.”

Barrett JFR et al. NEJM 2013:369:1295-1305

Indications for elective cesarean delivery for twins (Common practice)

- As for singletons
- Monochorionic / Monoamniotic twins
- First twin non-vertex (interlocking twins)
- First twin vertex / second twin non-vertex and:
  - gestational age <32 weeks and/or
  - EFW of second twin < 1500 g
  - if EFW of second twin is higher by more than 20% from that of first twin (relative indication)
ע"פ ביר עמדה מס' 9 של האיגוד
הישראלי לאמדות וינを与えיה

הוראות מותלות להנחת קיסר:
• כל הוריה לנחת קיסר המסגר יחיד
• התאומיםモノאומיוטיים

הוראות יסוד להנחת קיסר:
– יציב לאחרי לנחת קיסר חזרה קודם (חורץ רוחבי בכסגן התחות)
– דיסקורדנטים בין התאומים בה الحديد משל התאום השני
– 20% ממסכמלה الحديدの大ישום司马ן בטן ראש
– הוריות שלישיות

"ז"פ עמדה מס' 9 של האיגוד
הישראלי לאמדות וינ qualità

• כארתי מתוכננת לידה גרתיית:
  – משקל העוברים ציר הליון מעל 1500 גרם
  – ההזנת ציר ציר יוצא על יימון להיל ציר שה
  – רצוי כי הוריות הרמה אטפורט
  – רצוי שהחטושות המסלה לא ידיא גדולים (דיסקרדנט) לעומת
  — התרופה VARIANT

Vertex / non Vertex
ONLY THEIR MOTHER CAN TELL THEM APART.

TWINS

https://he.wikipedia.org/w/index.php?curid=285020