Mode of Delivery and Pregnancy Outcome in Women with Congenital Heart Disease

A single-center study

J. Hrycyk, H. Kaemmerer, N. Nagdyman, M. Hamann, K.T.M. Schneider, B. Kuschel
Background

- women with congenital heart disease (CHD) reaching childbearing age
- cardiologists – in general – recommend vaginal delivery due to significant cardiovascular changes at Caesarean section
- C-section rate remains higher in patients with CHD
Method

- historical cohort study (2005-2013)
- n=116 patients with CHD ↔ n=348 without CHD
- matching parameters: maternal age, gravidity, parity, year of delivery

Objectives

mode of delivery, pregnancy outcome and indications for Caesarean section and induction of labor
Results (1): Mode of delivery

- **Spontaneous Delivery**
  - With CHD: 44.8%
  - Without CHD: 56.0%

- **Vacuum Extraction**
  - With CHD: 8.6%
  - Without CHD: 0.9%

- **Forceps**
  - With CHD: 25.9%
  - Without CHD: 14.7%

- **C-Section**
  - Primary C-section:
    - With CHD: 20.7%
    - Without CHD: 18.9%
  - Secondary C-section:
    - With CHD: 9.5%
    - Without CHD: 14.7%
**Results (1): Mode of delivery**

With CHD:
- 8.6% spontaneous vaginal delivery
- 25.9% vacuum extraction
- 0.9% forceps
- 53.4% primary C-section
- 20.7% secondary C-section

Without CHD:
- 44.8% spontaneous vaginal delivery
- 9.5% vacuum extraction
- 66.4% primary C-section
- 14.7% secondary C-section

$P = 0.012$
Results (2): Indications for Caesarean sections

<table>
<thead>
<tr>
<th>Type</th>
<th>With CHD</th>
<th>Without CHD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary C-sections</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cardiac</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>obstetric</td>
<td>37.5%</td>
<td>84.3%</td>
</tr>
<tr>
<td>other</td>
<td>29.2%</td>
<td>15.7%</td>
</tr>
<tr>
<td><strong>Secondary C-sections</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cardiac</td>
<td>6.7%</td>
<td></td>
</tr>
<tr>
<td>obstetric</td>
<td>90.0%</td>
<td>93.9%</td>
</tr>
<tr>
<td>other</td>
<td>3.3%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>
Results (2): Indications for Caesarean sections

Primary C-sections

- Cardiac: 33.3% (with CHD)
- Obstetric: 37.5% (with CHD)
- Other: 15.7%

Secondary C-sections

- Cardiac: 6.7% (with CHD)
- Obstetric: 90.0% (without CHD)
- Other: 3.3% (6.1%)
Results (2): Indications for Caesarean sections

**Primary C-sections**
- Cardiac: 33.3% (with CHD), 15.7% (without CHD)
- Obstetric: 37.5% (with CHD), 84.3% (without CHD)
- Other: 29.2% (with CHD), 15.7% (without CHD)

**Secondary C-sections**
- Cardiac: 6.7% (with CHD), 6.1% (without CHD)
- Obstetric: 90.0% (with CHD), 93.9% (without CHD)
- Other: 3.3% (with CHD), 6.1% (without CHD)
Results (2): Indications for Caesarean sections

Primary C-sections

- **Cardiac**: 33.3% with CHD
- **Obstetric**: 37.5% without CHD
- **Other**: 12.5% with CHD, 16.7% without CHD

Secondary C-sections

- **Cardiac**: 6.7%
- **Obstetric**: 90.0%
- **Other**: 3.3% with CHD, 6.1% without CHD

→ maternal request
Results (3): Induction of labor

- 45.7% in patients with CHD vs. 27.9% without CHD

**with induction:**
- 63.2% vaginal vs. 36.8% secondary C-section

**without induction:**
- 81.1% vaginal vs. 18.9% secondary C-section

**Indications for induction of labor**

<table>
<thead>
<tr>
<th></th>
<th>with CHD</th>
<th>without CHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>medical</td>
<td>64.3%</td>
<td>98.8%</td>
</tr>
<tr>
<td>logistic</td>
<td>35.7%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>
Results (3): Induction of labor

- **45.7%** in patients with CHD vs. **27.9%** without CHD
  
  *P* = 0.001

With induction:

- 63.2% vaginal vs. 36.8% secondary C-section

Without induction:

- 81.1% vaginal vs. 18.9% secondary C-section

Indications for induction of labor:

- Medical: 64.3% with CHD vs. 98.8% without CHD
- Logistic: 35.7% with CHD vs. 12% without CHD
Results (3): Induction of labor

- 45.7% in patients with CHD vs. 27.9% without CHD

**With induction:**
- 63.2% vaginal vs. 36.8% secondary C-section

**Without induction:**
- 81.1% vaginal vs. 18.9% secondary C-section

Indications for induction of labor

- **Medical:**
  - With CHD: 64.3%
  - Without CHD: 98.8%

- **Logistic:**
  - With CHD: 35.7%
  - Without CHD: 1.2%

\[ P < 0.001 \]
Results (3): Induction of labor

- 45.7% in patients with CHD vs. 27.9% without CHD

With induction:
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Indications for induction of labor

- Medical: 64.3% with CHD vs. 98.8% without CHD
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Indications for induction of labor

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<tbody>
<tr>
<td>Medical</td>
<td>64.3%</td>
<td>98.8%</td>
</tr>
<tr>
<td>Logistic</td>
<td>4.7%</td>
<td>31.0%</td>
</tr>
</tbody>
</table>

"because of long distance"

$P < 0.001$
Results (4): Pregnancy outcome

No significant difference:
- postpartum hemorrhage
- pregnancy duration
- preterm delivery
- APGAR score

Significant difference:
- lower mean birth weight ($P = 0.004$)
- more SGA (16.4% vs. 2.3%, $P < 0.001$)
Conclusion

Findings

- higher rate of C-section in CHD patients
- higher rate of induction of labor in CHD patients
- higher rate of C-section following induction
- similar pregnancy outcome: lower birth weight, more cases of SGA & one case of postpartum hemorrhage in patients with CHD
(Possible) Implications

Primary C-section
- we now try to refuse C-section on request in all pts.

Secondary C-section
- concerns about maternal deterioration resulting in higher rates of “planned vaginal delivery“ (i.e. with elective induction) seem unjustified in most cases
- possible reduction of inductions for logistic reasons
Thank you for your attention