Timing of repeat elective caesarean delivery and neonatal respiratory outcomes

Compared with other industrialised countries, Italy has one of the highest caesarean delivery rates, which increased from 26.1% in 1995 to 38.3% in 2005. While the overall effect of this mode of delivery on neonatal respiratory outcomes among term newborns is well known, few studies have compared the impact of gestational age at delivery on respiratory morbidity (ie, at 37 and 38 weeks’ gestation vs 39 weeks). We conducted this analysis in the Lazio region (53 000 births/year), where the caesarean delivery rate was 42.7% in 2005; the proportion of term elective caesarean delivery was 24.1% and the risk of repeat caesarean delivery was almost 97.5%.

Data on 13 529 term singleton infants born in 2003–2005 by repeat elective caesarean delivery were retrieved from the regional birth and hospital discharge databases. Mothers with chronic and pregnancy-related diseases and infants with congenital anomalies and intrauterine fetal growth retardation were excluded.

Neonatal respiratory morbidity was defined as: pulmonary interstitial emphysema/pneumothorax, transient tachypnoea, respiratory distress syndrome, severe asphyxia (asphyxia and 5-minute Apgar score <7) and other neonatal respiratory problems, and respiratory therapy (need for oxygen and nasal continuous positive airway pressure). Adjusted odds ratios (ORs) with 95% CI were calculated using logistic regression models. We considered birth weight, gender, maternal age, maternal place of birth and parity as potential confounders.

In our at-term cohort 16% of repeat elective caesarean deliveries were performed at 37 weeks completed, 56% were performed at 38, 5% at 39, and 23% at 40–41. We adjusted risks of neonatal respiratory morbidity at 37 weeks, at 38, and at 40–41 compared with the risk at 39 weeks are presented in table 1. The adjusted risk of neonatal respiratory morbidity at 37 weeks was almost three times higher than in infants delivered at 39 weeks (OR 2.70, 95% CI 1.79 to 4.08); it was 1.34 at 38 compared with 39 weeks (95% CI 1.00 to 1.82); and about 40% higher at 40–41 weeks than at 39 (OR 1.44; 95% CI 0.87 to 2.38). In our region repeat elective caesarean delivery at 39 instead of 37 weeks would have saved 86 infants from respiratory problems, and repeat elective caesarean delivery at 39 instead of 38 weeks would have saved 36 infants from respiratory problems.

Our population-based analysis, although in a different context and using administrative data, confirms the findings of Tita et al. Since most women with a previous caesarean delivery are designated to a repeat elective caesarean delivery, the timing of elective caesarean delivery is a relevant public health issue, especially in countries where caesarean deliveries are widely performed.

**Table 1** Association between gestational age and neonatal respiratory morbidity among infants delivered by elective repeat caesarean section, Lazio region, Italy, 2003–2005

<table>
<thead>
<tr>
<th>Gestational age (completed weeks)</th>
<th>N (%)</th>
<th>Neonatal respiratory morbidity*</th>
<th>OR† (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>2139 (16.0)</td>
<td>134</td>
<td>2.70 (1.79 to 4.08)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>38</td>
<td>7467 (56.0)</td>
<td>227</td>
<td>1.34 (1.00 to 1.82)</td>
<td>0.057</td>
</tr>
<tr>
<td>39</td>
<td>672 (5.0)</td>
<td>23</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>40–41</td>
<td>3051 (22.9)</td>
<td>69</td>
<td>1.44 (0.87 to 2.38)</td>
<td>0.158</td>
</tr>
</tbody>
</table>

*Defined as: pulmonary interstitial emphysema/pneumothorax, transient tachypnoea, respiratory distress syndrome, severe asphyxia (asphyxia and 5-minute Apgar score <7) and other neonatal respiratory problems, and respiratory therapy (need for oxygen and nasal continuous positive airway pressure).
†Odds ratio (OR) was calculated with a logistic model adjusted by: birth weight, gender, maternal age, maternal place of birth and parity. Clustering for birth centre (n = 57) was calculated.

**References**


**Correction**

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Arch Dis Child Fetal Neonatal Ed 2009;94 (Supplement 1): Fa58-Fa71. In PM.03, Uterine natural killer cells in patients with recurrent miscarriage show evidence of proliferation and differentiation but not trafficking, the authors are listed incorrectly. The correct list of authors is as follows: A Karam, L Khan, J Drury, A Tag, M Turner, S Quenby.