Risk selection and detection. A critical appraisal of the Dutch obstetric system
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Chapter 7

Vaginal birth after caesarean section in a population with a low overall caesarean section rate

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**Abstract**

**Objective:** To determine the clinical outcome of vaginal birth after caesarean section (VBAC) in a Dutch population with a low overall caesarean section (CS) rate of 6.5%.

**Study Design:** Prospective population-based cohort study of 252 patients with a previous caesarean section (CS). Outcome parameters were trial of labour (TOL), success rate and VBAC rate.

**Results:** The TOL rate in the study cohort was 73%, success rate 77%, VBAC rate 56%. The reason for the previous CS influenced success rate. Complications, morbidity and mortality were not different between elective, emergency CS and TOL group, except for a higher incidence of haemorrhage more than 500 ml in the elective CS compared to the TOL group (29 vs 17%, relative risk (RR) 1.74 (1.15–2.34)).

**Conclusions:** In this Dutch study the success rate is comparable to the rate in USA study reports. Increase of the VBAC rate can mainly be achieved by increasing the number of women attempting TOL.

**Keywords:** Vaginal birth after caesarean section (VBAC); Trial of labour (TOL); Caesarean section

7.1. Introduction

Caesarean section (CS) rate varies in different countries. Compared to the USA (1997: 20.8% [1]) and UK (1994–1995 about 15% [2]) the Netherlands has a low CS rate (1998: 11% (estimated)).

However, in 1993 the CS rate in the USA was 24% [3] and in the Netherlands 8.5% [4]. The decrease of the USA CS rate is mainly ascribed to a policy of trial of labour (TOL) after a previous CS. The Royal College of Obstetricians and Gynaecologists stated in their general guidelines also that all women who have had a previous CS should be considered for vaginal delivery, taking into account the reason for the previous CS and also the wishes of the woman and her partner.

Especially compared to the USA, different factors are responsible for the low CS rate in the Netherlands. In general Dutch women regard childbirth as a natural process. A second factor is the risk approach of the obstetric care system. Low-risk pregnant women receive primary care by independent midwives or general practitioners, high-risk women receive secondary care by obstetricians. Obstetricians consider breech presentation or twin pregnancy not as routine indication for elective CS [5]. A third factor is the medico-legal context of Dutch obstetric care. In the Netherlands,
defensive obstetrics for the fear of litigation is as yet uncommon [6]. Moreover, trial of labour (TOL) after CS is common practice.

This paper investigates TOL policy in the Netherlands in 252 consecutive pregnancies with previous CS. As the indications for CS in the Netherlands are strict, this implies the presence of a previous pregnancy with overt obstetric pathology. We determined the TOL rate, the success rate and the VBAC rate, and we analysed maternal and perinatal outcome. The influence of the indication of the previous CS on the TOL rate and the success rate of the TOL was investigated. We hypothesised that despite of stricter indications of the previous CS, the success rate of TOL in this Dutch group was comparable to the rates reported in USA studies.

7.2. Materials and methods

The study data were obtained from a prospective obstetric database in a regional hospital located in the Zaanstreek district, the Netherlands. All pregnant women in this area, who had their last period from 1 January 1990 to 1 July 1994, and who booked for prenatal care at the midwifery practices or at the obstetricians of the regional hospital were included. We selected all women with a previous CS, who delivered after 20 weeks of gestation, with a singleton pregnancy. In women with more than one previous CS the indication of the first CS was selected for analysis.

The following definitions were applied. The indications for previous CS were assigned to one of five categories: breech presentation, failure to progress in the first stage of labour, failure to progress in the second stage of labour, fetal distress and miscellaneous. If breech presentation coincided with other indications, the case was allocated to the breech group; if both fetal distress and failure to progress have been present, the case was allocated to failure to progress.

The current delivery was assigned to one of three groups: (1) an elective CS, (2) successful TOL (VBAC) and (3) unsuccessful TOL, leading to an emergency CS. If a women with a planned elective CS unexpectedly starts being in labour, it remained an elective CS.

Next we calculated TOL rate, success rate and VBAC rate. We define ‘TOL rate’ as the percentage of patients with a previous CS who underwent a TOL, as it represents a more direct parameter of obstetric policy in these patients. Success rate is defined as the percentage of patients who deliver vaginally. VBAC rate is defined as the percentage of all patients with a previous CS who deliver vaginally. The VBAC rate is TOL rate multiplied by success rate of trial of TOL. For instance, if the TOL rate is 10%, a 80% success rate yields a low VBAC rate (8%), and a 92% repeat CS rate.

Safety was determined by the analysis of labour complications, maternal morbidity (severe or moderate), perinatal mortality and morbidity according to method of treatment. Labour complications were defined as forceps or vacuum delivery, and shoulder dystocia. Severe maternal morbidity was defined as uterine rupture and hysterectomy.
Moderate maternal morbidity was defined as haemorrhage >500 ml and postpartum fever requiring antibiotic treatment. Criteria for perinatal mortality were prenatal death or neonatal death within the first 6 weeks after delivery. Criteria for neonatal morbidity were 5 min Apgar score (AS) below 7, brachial plexus injury, neonatal hospitalisation >6 days and neonatal seizures.

The SPSS statistical package was used for statistical evaluation. Fisher’s exact test was used to compare labour complications, maternal morbidity and perinatal mortality and morbidity. Significant results were expressed as relative risk (RR) and 95% confidence interval (CI).

7.3. Results

The overall CS rate in the Zaanstreek district during this study period was 6.5%. During this period 7904 pregnancies were registered, of which 252 patients had a previous CS. Of these patients, 68 underwent an elective CS (27%) and 184 had a TOL (73%).

Thirty-six patients had a history of two or more caesareans; 30 patients had a history of two previous CSs. Eleven of them underwent a TOL and nine delivered vaginally. Five of them had a history of three CSs, one patient had four previous CSs; they all had an elective CS.

Eighteen patients had a fetus in breech presentation, 15 had an elective CS. Three patients attempted a TOL and they all underwent an emergency CS.

Indications for the previous CS divided into five groups are listed in Table 7.1. The overall TOL rate was 73% and varied in the subgroups between 66 and 81%. The overall success rate was 77%. After a previous CS for breech presentation and fetal distress success rates were high (95 and 86%), in contrast to a previous CS for failure to progress in first or second stage of labour (60%). The overall VBAC rate was 56%.

Table 7.1
Indications for previous CS, delivery outcome and delivery parameters

<table>
<thead>
<tr>
<th>Indication previous CS</th>
<th>Delivery outcome</th>
<th>Delivery parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elective CS</td>
<td>TOL</td>
</tr>
<tr>
<td>Breech presentation</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Failure to progress, 1st</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Failure to progress, 2nd</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Fetal distress</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>42</td>
</tr>
</tbody>
</table>

*Failure to progress, 1st: failure to progress in first stage of labour; failure to progress, 2nd: failure to progress in second stage of labour; failed: emergency CS performed in case of a failed TOL; TOL rate: percentage of patients with a previous CS who underwent a TOL; success rate: percentage of patients who delivered vaginally after a TOL; VBAC rate: percentage of all patients with a previous CS who delivered vaginally.

$N=252$. 

\[ \text{Vaginal birth after caesarean section in a population with...} \]
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Table 7.2
Indications for elective CS

<table>
<thead>
<tr>
<th>Indications for repeat CS</th>
<th>Patients (N=68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two or more previous CSs</td>
<td>23</td>
</tr>
<tr>
<td>Expected disproportion</td>
<td>15</td>
</tr>
<tr>
<td>Breech presentation</td>
<td>11</td>
</tr>
<tr>
<td>On patient’s request</td>
<td>5</td>
</tr>
<tr>
<td>Previous vertical incision</td>
<td>4</td>
</tr>
<tr>
<td>Placenta praevia</td>
<td>3</td>
</tr>
<tr>
<td>Preeclampsia with IUGR</td>
<td>3</td>
</tr>
<tr>
<td>Situs transversus</td>
<td>1</td>
</tr>
<tr>
<td>Previous uterine rupture</td>
<td>1</td>
</tr>
<tr>
<td>Previous surgery for urine incontinence</td>
<td>1</td>
</tr>
<tr>
<td>Active Rh antagonism</td>
<td>1</td>
</tr>
</tbody>
</table>

*IUGR, intrauterine growth retardation.

Indications to perform an elective CS in this cohort are listed in Table 7.2. Five of all patients with a previous CS underwent an elective CS on patient’s request (2%).

Labour complications, maternal morbidity, perinatal mortality and morbidity are listed in Table 7.3. Thirty-three of the 142 patients with a vaginal delivery after TOL had an operative delivery. In four patients delivery was complicated by a shoulder dystocia. Hysterectomy and maternal mortality were not observed in our cohort. The only severe maternal complication was an uterine rupture. This patient had one previous caesarean for placenta praevia. She entered spontaneous labour at 38 weeks. At the beginning of the second stage symptoms of maternal shock and fetal distress required

Table 7.3
Labour complications, maternal morbidity, perinatal morbidity and mortality in TOL vs elective CS, and in emergency CS vs elective CS

<table>
<thead>
<tr>
<th>Complication</th>
<th>TOL (N=184)</th>
<th>Elective CS (N=68)</th>
<th>Emergency CS (N=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Vacuum delivery</td>
<td>30</td>
<td>16</td>
<td>na</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>3</td>
<td>2</td>
<td>na</td>
</tr>
<tr>
<td>Shoulder dystocia</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Brachial plexus injury</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Haemorrhage &gt;500 ml</td>
<td>31</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Haemorrhage &gt;1000 ml</td>
<td>9</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Postpartum fever</td>
<td>16</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>5 min Apgar score &lt;7</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Neonatal admission &gt;6</td>
<td>13</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Perinatal mortality</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

*TOL, trial of labour.
an emergency CS: there was a tear in the lateral segment of the uterus. After delivery, the uterus was repaired. Total blood loss was 3000 cm³. The infant was depressed at birth (Apgar score was 6 after 1 min and 8 after 5 min), but recovered quickly and was discharged on the sixth day with the mother.

The incidence of haemorrhage more than 500 ml was higher in the elective CS group, 29 vs 17% in patients who underwent a TOL (RR 1.74, 95% confidence interval 1.15–2.34), but haemorrhage more than 1000 ml and haemorrhage requiring blood transfusion reached no statistical difference. For the subgroup of patients who underwent an emergency CS the incidence of haemorrhage was equal to the elective CS group.

There were three (1.2%) perinatal deaths that all occurred in the TOL group: one prenatal death was caused by rhesus antagonism, one early neonatal death within the first week was caused by respiratory distress after preterm delivery, and one infant died 8 days after spontaneous vaginal birth because of severe congenital malformations.

Three neonates showed an Apgar score < 7 after 5 min. One infant had a 5 min Apgar score of 4 caused by an abruption on the placenta during delivery. One infant with Apgar score of 5 was born after an emergency CS because of failure to progress in the first stage without signs of fetal distress. One delivery was complicated by cord presentation and after an emergency CS the infant had a 5 min AS of 6. There was one case of permanent brachial plexus lesion. No neonatal seizures were observed.

7.4. Comment

In our study TOL rate was 73%, success rate was 77%, resulting in a VBAC rate of 56%.

The indication of the previous CS did not influence the TOL rate but had a marked influence on the success rate.

To achieve a high VBAC rate, both success rate and TOL rate are important parameters. We calculated the TOL rate in 14 USA studies. The TOL rate ranged from 38 to 86%; in nine of those the TOL rate was below the rate of 73% of our study [7–21]. In three studies the percentages of women refusing TOL were given, respectively, 15, 6 and 12% [7,9,20]. In a meta-analysis of 292 mainly American articles, two thirds of women desired TOL and one third preferred an elective CS [22]. In our study this percentage was 2%, comparable to an Australian study (0.9%) [23]. Even in a Dutch group of 132 primiparous patients with a previous CS for failure in the second stage of labour, 6% had an elective CS on patients’ request [24].

The low primary CS rate in our cohort (6.5%) implies strict criteria to perform a CS and therefore a high rate of obstetric pathology in the group of patients with a previous CS. Despite the high rate of obstetric pathology in our Dutch cohort, our success rate (77%) is quite comparable with studies in the USA reporting success rates varying between 60 and 82% [3,7–21,25–27]. High success rates after CS for fetal distress and breech presentation in contrast to a previous CS for dystocia were found before [9,12–15,17,28]. Success rate even after failure to progress is still substantial; 60% (our study)
and 68% [29]. We distinguished between failure to progress in the first and second stage of labour. Success rate was lower when the previous CS was performed for failure to progress in the first than for failure to progress in second stage (52 and 72%). This result is in contrast with our expectations and the study of Hoskins and Gomez [30]. Duff et al. described equal success rates after a previous CS of arrest of dilatation in active phase and after a previous CS of arrest of descent, respectively, 61 and 65% [26]. A recent Dutch study of Jongen et al. described also a high success rate of 80% after a previous CS for failure to progress in second stage [24]. The high success rate for failure to progress in second stage, in opposite to failure to progress in first stage, may well be the result of selection. We are aware that an unbiased estimate of the influence of the indication of the previous CS on the success rate can only be achieved if all patients undergo TOL except for absolute contraindications like placenta praevia.

It is not surprising that, mainly due to our high TOL rate, the third parameter, the VBAC rate (56%) was higher than in most studies (22–64%). In 12 of these 15 studies it was below our 56% [7–21]. Labour complications, maternal morbidity, perinatal morbidity and mortality were not significantly different between the TOL and the elective CS group, except for a higher incidence of haemorrhage (>500 ml) in the elective CS group, which was also found in a meta-analysis by Roberts et al. [22]. Although the number of women in our study is small, the complication rate confirms that TOL is a safe policy [31]. The incidence of maternal morbidity did not differ between elective and emergency CS. This is in accordance with the study of Miller and Leader who found no difference in amount of blood transfusions when delivery by emergency CS and elective CS were compared [23].

Perinatal morbidity did not show significant differences; the 5 min Apgar scores show an unfavourable tendency in the emergency CS group, while the neonatal hospitalisation is more frequent in the elective CS group. All three perinatal deaths occurred in the TOL group, before or after a vaginal delivery, but are not related to this mode of delivery.

We conclude that even in a cohort of 252 consecutive pregnancies with overt previous obstetric pathology leading to the first CS, a high VBAC rate was achieved. This was mainly due to the high number of women attempting TOL, while the success rate was comparable to studies in the USA. This is another plea for a more liberal approach of TOL all over the world.

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References


