



Birth after caesarean section: changes over a nine-year period in one Australian state

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ABSTRACT

Objectives: to describe the outcomes related to birth after a caesarean section (CS) in one Australian state, New South Wales (NSW), over a nine-year period. The objectives were to determine whether changes had occurred in the rates of attempted and successful vaginal birth after caesarean section (VBAC), induction of labour, place of birth, admission to special care or neonatal intensive care nursery and perinatal mortality.

Design and setting: cross-sectional analytic study of hospital births in New South Wales using population-based data from 1998–2006.

Participants: women experiencing the next birth after a CS where: the total number of previous CS was 1; the presentation at birth was vertex; it was a singleton pregnancy; and, the estimated gestational age was greater than or equal to 37 weeks. A total of 53,455 women met these criteria.

Measurements: data were obtained from NSW Health Department's Midwives Data Collection (MDC). The MDC includes all live births and stillbirths of at least 20 weeks gestation or 400 g birth weight in the state.

Findings: over the nine-year period, the rate of vaginal birth after caesarean section declined significantly (31–19%). The proportion of women who 'attempted a vaginal birth' also declined (49–35%). Of those women who laboured, the vaginal birth rate declined from 64% to 53%. Babies whose mothers 'attempted' a VBAC were significantly less likely to require admission to a special care nursery (SCN) or neonatal intensive care (NICU). The perinatal mortality rate in babies whose mothers 'attempted' a VBAC was higher than those babies born after an elective caesarean section although the absolute numbers are very small.

Key conclusions: rates of VBAC have declined over this nine-year period. Rates of neonatal mortality and proxy measures of morbidity (admission to a nursery) are generally in the low range for similar settings.

Implications for practice: decisions around the next birth after CS are complex. Efforts to keep the first birth normal and support women who have had a CS to have a normal birth need to be made. More research to predict which women are likely to achieve a successful VBAC and the most effective ways to facilitate a VBAC is essential. Midwives have a critical role to play in these endeavours.

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Introduction

Caesarean section (CS) is becoming increasingly common, especially in developed countries. In the United States of America (USA), it is the most common surgical procedure performed on women (Sheppard and Tumarkin, 2005). In many countries, the rate of CS has risen considerably in recent years without any apparent improvement in maternal and fetal well-being. In Australia, the increase in CS has been dramatic, from 19.5% in

1996 (Day et al., 1999) to 30.8% in 2006 (Laws and Hilder, 2008). In England, Scotland and Wales the rates increased from 16% to 17% in 1995 to 23% to 25% in 2005, an increase again of around 50% (Maternity Care Working Party, 2007). Similarly, in the USA, caesarean births have increased by 50% in the past decade, from 20.7% in 1996 to 31.1% in 2006 (MacDorman et al., 2008). An increasing CS rate is also a global concern, with high rates in many developing countries as well (Belizan et al., 1999).

It has been hypothesised by researchers in the USA, that the increase in the CS rate reflects two concurrent trends: an increase in the primary caesarean rate and a decline in the vaginal birth after CS (VBAC) rate (MacDorman et al., 2008). It is likely that this is a similar situation in other developed countries where decisions

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around the next birth after caesarean section are often challenging for women and clinicians.

Concerns about the safety of VBAC have influenced practice around the next birth after CS for more than three decades. The issue is whether or not the uterine scar will rupture during the course of labour and vaginal birth resulting in injury or even death of mother or baby. Women are often advised that a repeat caesarean is the best option or conversely that VBAC is a safe and effective choice. Women in other settings are either denied the choice of attempting a vaginal birth or are persuaded that choosing it is dangerous. There is often a conflict of advice for women in this area. Obtaining accurate data is a high research priority so that women and their clinicians can make truly informed choices about appropriate birth options.

The aim of the study was to describe the outcomes related to the next birth after a caesarean section in one Australian state, New South Wales (NSW) over a nine-year period. The objectives was to determine whether changes had occurred in the rates of attempted and successful VBAC, induction of labour, place of birth, admission to special care or neonatal intensive care (NICU) nursery and perinatal mortality. NSW is the largest Australian State in terms of population and number of births. In 2006, NSW had one-third of all births in Australia (277,436 births in Australia of which 91,303 were in NSW). It was therefore seen as important to measure the changes in this Australian state.

Methods

Data were obtained from NSW Health Department's Midwives Data Collection (MDC). The MDC includes all live births and stillbirths of at least 20 weeks gestation or 400g birth weight that occur in the state, and includes information on maternal demographic factors, pregnancy, labour, birth and perinatal outcomes.

The population included all women whose last birth was by caesarean section. The NSW Health Department Centre for Epidemiology and Research provided the data and these have been used under conditions specified by the providers of the data. The data provided are classified as *re-identifiable* data by Australia's National Health and Medical Research Council (NHMRC) (NHMRC, 2007), that is, the identifiers have been removed and replaced by a code. It remains possible to re-identify a specific individual by, for example, using the code or linking different data sets, however the researchers did not have access to such a capacity and so the data for the purposes of this study are unidentifiable. Ethical approval for this study was therefore not required in line with NHMRC guidelines (NHMRC, 2007).

Eligibility for the study required that: the last birth was by caesarean section; the total number of previous caesarean sections was 1; the presentation at birth was vertex; there was a singleton pregnancy; and, the estimated gestational age was greater than or equal to 37 weeks.

The MDC database does not identify whether women chose to labour in an effort to have a VBAC. The data identifies which women laboured, either spontaneously or after an induction of labour. These variables identify attempting a VBAC and provide a surrogate marker for 'choosing' a VBAC. The rate of attempted VBAC was calculated by selecting women who were 'eligible' for a VBAC. Two rates of vaginal birth (that is, successful VBAC) were calculated. First, the rate of vaginal birth (including vacuum extraction and forceps) for women who were 'eligible' was calculated (that is, the overall VBAC rate). Second, the rate of vaginal birth (including vacuum extraction and forceps) for women who had actually had an onset of labour (either spontaneous or induced) was calculated (that is, VBAC rate in women who 'chose' a VBAC).

Other analyses included the rate of successful VBAC in women who have had a previous vaginal birth compared with women who have not; the outcomes for women who had an induced labour compared with a spontaneous labour; and, the place of birth: birth centre or home birth compared with conventional labour ward. All these analyses were undertaken by year to assess trends over time.

The neonatal outcome measures were: stillbirth or neonatal death; and, admission to a neonatal intensive care unit or special care nursery (SCN). Mothers with a fetal death in utero-diagnosed prior to the onset of labour were excluded. Neonatal outcomes were analysed according to maternal intention to have a VBAC, that is, attempted VBAC vs elective CS.

Crude odds ratios and 95% confidence intervals (95% CI) were produced for each outcome. An odds ratio is a measure of effect size, describing the strength of association or non-independence between two binary data values. It is used as a descriptive statistic. The χ^2 -test for linear trend was calculated to assess changes over the nine-year period.

Findings

During the study period a total of 788,810 women gave birth in NSW. Of these, 53,455 (6.78%) met the inclusion criteria for this study. Fig. 1 presents the trajectory of the sample in terms of onset of labour and mode of birth.

The rate of vaginal birth for women with a previous caesarean section declined significantly from 31% in 1998 to 19% in 2006 (χ^2 for linear trend = 282.3(1 DF) $P < 0.0001$) (Fig. 2).

The proportion of women who commenced labour, either spontaneously or through an induction of labour, had declined significantly over the nine-year period. In 1998, almost half (49%) of women with one previous caesarean section at term, a singleton pregnancy and a vertex presentation commenced labour compared with just over one-third (35%) in 2006 (χ^2 for linear trend = 43.2 (1 DF) $P < 0.0001$). Of the women who commenced labour, the rate of vaginal birth has also decreased significantly over the study period. In 1998, the rate of vaginal birth in women who actually commenced labour was 64% compared with 53% in 2006 (χ^2 for linear trend = 746.0 (1 DF) $P < 0.0001$).

Of the women who had an onset of labour, 18% were induced. Labour was induced using prostaglandins (7.1%), oxytocics (16.9%), through an artificial rupture of membranes (11.0%) or by other mechanisms, for example, using an intracervical catheter (3.4%). The use of prostaglandins decreased significantly in the nine-year period, from 44 women in 1998 to only one woman in 2006.

The rate of vaginal birth for women who underwent induction of labour compared with those who had a spontaneous onset of labour was calculated. The vaginal birth rate for women who commenced labour spontaneously declined significantly from 64% in 1998 to 54% in 2006 (χ^2 for linear trend = 142.15 (1 DF) $P < 0.0001$) as did the rate for women who had an induction of labour. This latter group's rate declined from 65% in 1998 to 50% in 2006 (χ^2 for linear trend = 23.91 (1 DF) $P < 0.0001$). The overall vaginal birth rate for women who spontaneously laboured was 59% and 62% for women who were induced. The women who were induced were more likely to have a vaginal birth than those who laboured spontaneously (OR 1.13; 95% CI 1.05–1.21).

The outcomes for women who had a previous vaginal birth prior to the caesarean section were examined. The proportion of these women going on to have a vaginal birth declined significantly from 83% in 1998 to 70% in 2006 (χ^2 for linear trend = 37.3 (1 DF) $P < 0.0001$). Women with a previous vaginal birth were almost three times more likely to have a vaginal birth compared with women who had not (OR 2.98; 95% CI 2.76–3.22).

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