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Risk of maternal and neonatal complications in subsequent pregnancy after planned caesarean section in a first birth, compared with emergency caesarean section: a nationwide comparative cohort study

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Objective To compare the difference in risks of neonatal and maternal complications, including uterine rupture, in a second birth following a planned caesarean section versus emergency caesarean section in the first birth.

Design Prospective cohort study.

Setting Population-based cohort in the Netherlands.

Population Linked data set of outcomes for term caesarean section in a first birth followed by a consecutive delivery.

Methods We conducted a prospective cohort analysis using data from the Dutch Perinatal Registry. We included primiparous women who gave birth to term singleton infants through planned or emergency caesarean from January 2000 through December 2007, and who had a second singleton delivery during the same period (n = 41 109). Odds ratios and adjusted odds ratios were calculated.

Main outcome measures Maternal and neonatal complications, specifically uterine rupture, in second births associated with planned and emergency caesareans in the first birth.

Results Women with a history of a planned caesarean section in the first birth (n = 11 445) had a 0.24% risk for uterine rupture, compared with a 0.16% risk for women with a history of emergency caesarean section (n = 29 664; aOR 1.4, 95% CI 0.8–2.4). In multivariate logistic regression, women with planned caesareans in a first birth had a significantly increased risk of stillbirth (aOR 1.5, 95% CI 1.0–2.2) and postpartum haemorrhage (aOR 1.1, 95% CI 1.0–1.2) in second births, compared with women with emergency caesareans in the first birth.

Conclusions We found a moderately increased risk of postpartum haemorrhage and a small to moderately increased risk of uterine rupture and stillbirth as a long-term effect of prior planned caesarean delivery on second births.

Keywords Emergency caesarean section, planned caesarean section, postpartum haemorrhage, stillbirth, uterine rupture, vaginal birth after caesarean.

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Introduction

A planned caesarean section has become a fairly normal way of delivering a baby in the developed world. Because of the growing tendency to avoid risks of neonatal complications in cases of multiple gestation or breech presentation, and the growing numbers of caesarean section on maternal request, more pregnant women are choosing this 'safer way of delivering'.[1] Obviously, having a scarred uterus can increase the risks of complications in a consecutive pregnancy. Although obstetricians know about the increased risk in the following pregnancies, and women are counselled about these risks, the number of planned caesarean sections keeps rising.

At present, it is not known what the risks are of a planned caesarean section in comparison with an

emergency caesarean section in a consecutive pregnancy. Previous research has shown that women with a history of caesarean section have a higher risk of haemorrhage, placenta praevia, uterine rupture, stillbirth, and repeat caesarean section in the following pregnancies.[2] These risks, however, have not been investigated separately for previous planned caesarean section and emergency caesarean section. If such differences exist, this should be incorporated in the counselling of women regarding the next pregnancy and family planning.

In this study, we addressed second birth outcomes for women that have had a planned caesarean section or an emergency caesarean section at the first birth. The maternal outcomes investigated were: maternal mortality; uterine rupture; postpartum haemorrhage, defined as blood loss of more than 1000 ml; blood transfusion; and a composite of these outcomes. The neonatal outcomes investigated were: antenatal mortality; neonatal mortality; birth trauma; preterm birth before 37 weeks of gestation; low Apgar score; and a composite of these outcomes.

Methods

We studied women who delivered their first and second infants between 1 January 2000 and 31 December 2007 in the Netherlands. These data were extracted from the Dutch Perinatal Registry (PRN). The PRN database consists of population-based data containing information on pregnancies, deliveries, and neonatal (re)admissions until 28 days after birth. The PRN database is obtained by a validated linkage of three different registries: the midwifery registry (LVR1); the obstetrics registry (LVR2); and the neonatology registry (LNR) of hospital admissions of newborns.[3,4] The coverage of the PRN registry is about 96% of all deliveries in the Netherlands. The caregiver voluntarily records all data contained in PRN during prenatal care, delivery, and the neonatal period. The data are sent annually to the national registry office, where a number of consistency checks are conducted.[5]

The records included in the PRN registry are entered at the child level. There is no unique maternal identifier available in the registry to follow-up on outcomes of subsequent pregnancies of the same mother. Therefore, a longitudinal probabilistic linkage procedure, in which we linked records of children of the same mother, was performed in order to create a mother identifier. For a more elaborate description of the methods used for this longitudinal linkage, we refer to the article of Schaaf et al.[6]

We excluded women who had a preterm caesarean section delivery (before 37 weeks of gestation) in the first pregnancy and women who had a multiple gestation in their first and/or second pregnancy. For this article we addressed second birth outcomes for women that have had a planned caesarean section or an emergency caesarean section at the first birth.

In the PRN registry, planned caesarean section is defined as an elective caesarean section on the basis of obstetrical or medical indication, or at maternal request, generally executed prior to labour. Emergency caesarean section is defined as caesarean section performed during labour by necessity because of fetal distress or non-progressive labour.

We compared baseline characteristics by calculating the appropriate measure for either parametric or non-parametric continuous variables, and testing them using the Student's *t*-test or Mann–Whitney *U*-test. Discrete variables were tested using the chi-square test (Table 1).

Our main outcomes were maternal and neonatal complications at second births associated with planned caesarean section and emergency caesarean section at the first birth.

Table 1. Baseline characteristics of first pregnancy

	First delivery by planned caesarean section *n* = 11 445	First delivery by emergency caesarean section *n* = 29 664	*P*
Maternal age*	30 (27–31) years	29 (27–32) years	<0.0001
White	10 559 (92%)	26 359 (89%)	<0.0001
Low socio-economic status	2247 (20%)	6682 (23%)	<0.0001
Gestational age delivery*	38 (37–39) weeks	40 (39–41) weeks	<0.0001
Macrosomia (>4500 g)	183 (2%)	1494 (5%)	<0.0001
Neonatal weight*	3280 (2970–3605) g	3600 (3230–3960) g	<0.0001
Small for gestational age (<5th percentile)	656 (6%)	1782 (6%)	0.289
Hypertensive disorders	1592 (14%)	4955 (17%)	<0.0001
Interdelivery interval*	28 (22–37) months	29 (22–38) months	<0.0001

*Median and interquartile range.

Neonatal complications consisted of neonatal mortality, stillbirth, preterm birth, low Apgar score, and birth trauma. Maternal complications consisted of uterine rupture, placental abruption, postpartum haemorrhage, and blood transfusion.

Neonatal mortality was defined as death within 28 days of birth. Stillbirth was defined as death of the fetus before or during delivery. Low Apgar scores were defined as 10-minute Apgar scores below or equal to seven (AS $\leq$ 7). Birth trauma included all traumata that were reported as being caused by delivery, such as fractures, brachial plexus damage, and subdural or cerebral haematomas. Preterm birth was defined as birth before 37 weeks of gestation.

Maternal mortality was defined as the death of a woman while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy, or its management, but not from accidental or incidental causes. Uterine rupture was defined as the complete separation of the uterine scar resulting in communication between the uterine and peritoneal cavities. Postpartum haemorrhage was defined as blood loss of more than 1000 ml during and after delivery.

We calculated crude odds ratios (ORs) and adjusted odds ratios (aORs) using univariate and multivariate logistic regression in SAS 9.2 (SAS Institute Inc, Cary, NC, USA). We corrected for gestational age at delivery, macrosomia (birth weight > 4500 g), spontaneous start of labour, mode of delivery, maternal age, ethnicity, hypertensive disorders, and low social economic status. We calculated the odds ratio of having a uterine rupture after a trial of labour.

To show the robustness of our findings, we additionally performed a sensitivity analysis comparing emergency caesarean section with planned caesarean section for breech presentation (planned caesarean section breech), as those are planned caesarean sections by maternal choice, and thus represent a relatively low-risk population.

Results

Figure 1 shows the flow diagram of our data extraction from the PRN. After the exclusion of preterm delivery (before 37 weeks of gestation) and multiple-gestation pregnancies in the first and/or second pregnancy, we divided the remaining women between those with a planned caesarean section (n = 11 445) and those that had an emergency caesarean section (n = 29 664).

The baseline characteristics for the planned caesarean section cohort and the emergency caesarean section cohort are summarized in Table 1. The characteristics of the two groups differed significantly. The median maternal age in the planned caesarean section group was higher than in the emergency caesarean section group, whereas gestational age at delivery was lower in the planned caesarean section group. Women that have a planned caesarean section are more often white and tend to have a higher socio-economic status. In the planned caesarean section group the large majority of caesareans were performed for malpresentation (75% for breech presentation and 3% for transverse position), whereas the other 22% were performed for various indications not specified in the database, including placenta praevia and maternal request.

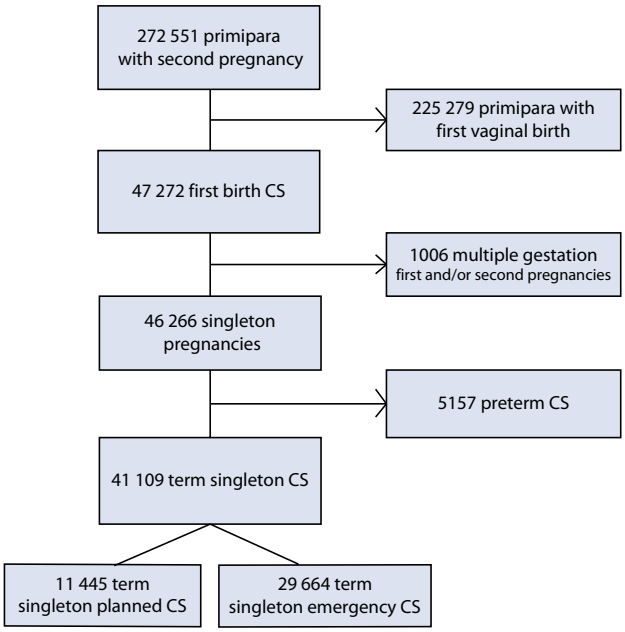

Figure 1. Flow diagram of data extraction.

Among our study cohort uterine rupture complicated 1.8 per 1000 deliveries at second births. Table 2 shows the risk of uterine rupture in the two groups. The rate of trial of labour differed significantly between the two groups. In the group with planned caesarean section for first birth, 75% of women had a trial of labour; in the group with emergency caesarean section for first birth, 71% of women had a trial of labour (OR 1.2, 95% CI 1.2–1.3, P < 0.0001).

Table 2. Uterine rupture in second delivery, stratified by trial of labour or planned caesarean section

Uterine rupture	First delivery by planned caesarean section		First delivery by emergency caesarean section	
	28 (0.24%)		46 (0.16%)	
Uterine rupture	**Trial of labour**	**Planned caesarean**	**Trial of labour**	**Planned caesarean**
	26 (0.30%)	2 (0.07%)	43 (0.20%)	3 (0.04%)

Figure 2 shows the mode of delivery in the subsequent pregnancy. In the planned caesarean section group 83% of women having a trial of labour had a successful vaginal birth after caesarean delivery (VBAC). In the emergency caesarean section group 66% of women having a trial of labour had a successful VBAC (OR 2.5, 95% CI 2.3–2.6, $P < 0.0001$).

In the planned caesarean section group 26 out of 8593 women (0.3%) undergoing a trial of labour experienced a uterine rupture, compared with 43 out of 29 664 (0.2%) women that had an emergency caesarean section for the first birth (OR 1.6, 95% CI 1.0–2.5, $P = 0.06$).

Table 3 shows the odds of adverse neonatal outcomes at second birth among women whose first birth was planned caesarean section, compared with emergency caesarean section. The incidence of stillbirth in a pregnancy following a prior caesarean delivery was 3.7 per 1000. Stillbirth occurred for 4.8 per 1000 deliveries in the planned caesarean section group and 3.2 per 1000 deliveries in the emergency caesarean section group (aOR 1.5, 95% CI 1.0–2.1, $P = 0.03$). Prematurity occurred in 43 per 1000 deliveries in the planned caesarean section group and in 38 per 1000 deliveries in the emergency caesarean section group (OR 1.1, 95% CI 1.0–1.3, $P = 0.03$). This difference was driven by the high prematurity rate among women with a planned caesarean section in the second pregnancy (planned caesarean section/trial of labour 3.6%, planned caesarean section/planned caesarean section 6.4%, emergency caesarean section/trial of labour 3.9%, emergency caesarean section/planned caesarean section 3.8%; Table S1). After correction for mode of delivery there was no significant difference between the two groups (aOR 1.1, 95% CI 0.4–2.6, $P = 0.9$).

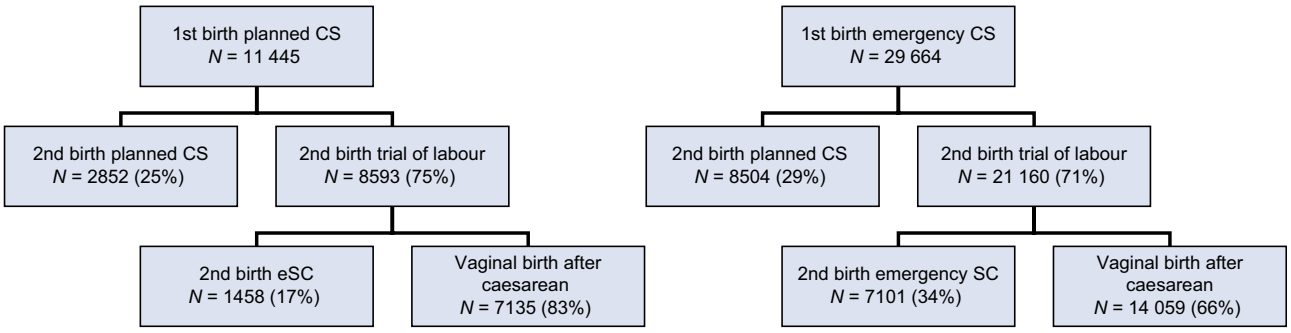

Figure 2. Flow diagram for mode of delivery in a subsequent pregnancy for the planned caesarean section and emergency caesarean section cohorts.

Table 3. Odds of adverse neonatal outcomes at second birth among women whose first birth was planned caesarean section, compared with emergency caesarean section

	First delivery by planned caesarean section (n = 11 445)		First delivery by emergency caesarean section (n = 29 664)		OR	95% CI	P	aOR*	95% CI	P
	n	%	n	%						
Birth trauma	32	0.3	63	0.2	1.1	0.7–1.7	0.6	1.1	0.7–1.7	0.7
Apgar score ≤ 7	311	2.7	880	3.0	0.9	0.8–1.0	0.2	0.9	0.8–1.0	0.1
Stillbirth	55	0.5	96	0.3	1.5	1.1–2.1	0.02	1.5	1.0–2.2	0.03
Neonatal death	39	0.3	78	0.3	1.3	0.9–1.9	0.2	1.4	1.0–1.3	0.01
Preterm birth	493	4.3	1140	3.8	1.1	1.0–1.3	0.03	1.1**	0.4–2.6	0.9
Composite neonatal outcome	754	6.6	1892	6.4	1.0	1.0–1.1	0.4	1.0	0.9–1.1	0.6

*Adjusted odds ratio, adjusted for gestational age at delivery, macrosomia (birthweight > 4500 g), spontaneous start of labour, mode of delivery, and low socio-economic status.

**Adjusted odds ratio, adjusted for macrosomia (birthweight > 4500 g), spontaneous start of labour, mode of delivery, and low socio-economic status.

Low Apgar score, neonatal mortality, and the composite of adverse neonatal outcome did not differ between both groups (Table 3).

Table 4 shows the odds of adverse maternal outcomes at second birth among women whose first delivery was a planned caesarean section, compared with emergency caesarean section. Postpartum haemorrhage was reported in 58 per 1000 deliveries in the planned caesarean section group and 50 per 1000 deliveries in the emergency caesarean section group. Postpartum haemorrhage occurred more often after a trial of labour in the second pregnancy, compared with planned caesarean section in second pregnancy (planned caesarean section/trial of labour 3.6%, planned caesarean section/planned caesarean section 3.7%, emergency caesarean section/trial of labour 5.5%, emergency caesarean section/planned caesarean section 3.8%; Table S2). After correction for mode of delivery there was still a significantly increased risk for women with a previous planned caesarean section (aOR 1.1, 95% CI 1.0–1.2, $P = 0.02$). There was no significant difference in the number of blood transfusions between the groups (OR 1.2, 95% CI 0.8–1.7, $P = 0.4$). Maternal mortality did not occur. The composite adverse maternal outcome was 6.0% in the planned caesarean section group, compared with 5.2% in the emergency caesarean section group (aOR 1.1, 95% CI 1.0–1.3, $P = 0.006$).

We performed a sensitivity analysis to verify the robustness of our findings when applied to a low-risk population of women with a planned caesarean section by choice. Breech presentation is the most frequent indication for caesarean section on request in the Netherlands. We performed subgroup analysis to compare this group with the emergency caesarean section at first birth group. The analysis shows that caesarean section by maternal choice for the first birth still yields a higher risk for haemorrhage and composite maternal outcome. The sensitivity analysis is represented in Tables S3 and S4.

In the sensitivity analysis there is still a trend towards an increased risk of stillbirth in the consecutive pregnancy after a planned caesarean section, although this did not reach statistical significance, probably because of a lack of power (aOR 1.3, 95% CI 0.8–1.9).

Discussion

Main findings

We studied the course and outcome of consecutive pregnancies in women with a history of planned caesarean section and emergency caesarean section in first births.

We found a moderately increased risk of postpartum haemorrhage and a small to moderately increased risk of uterine rupture and stillbirth as a long-term effect of prior planned caesarean delivery on second births.

Interpretation

The baseline characteristics of the women having either planned caesarean section or emergency caesarean section reflect common practice in the Netherlands. It is not surprising that hypertensive disorders are over-represented in the emergency caesarean section group, as induction of labour is the first choice of treatment when women suffer from hypertensive disorders. The lower overall birthweight in the planned caesarean section group can be explained by the lower gestational age at delivery. In the Netherlands we do not yet routinely estimate fetal weight by ultrasound, and we do not perform planned caesarean section on expected macrosomia. This is reflected in the fact that macrosomia is over-represented in the emergency caesarean

Table 4. Odds of adverse neonatal outcomes at second birth among women whose first birth was planned caesarean section, compared with emergency caesarean section

	First delivery by planned caesarean section (n = 11 445)		First delivery by emergency caesarean section (n = 29 664)		OR	95% CI	*P*	aOR*	95% CI	*P*
	n	%	*n*	%						
Uterine rupture	28	0.2	46	0.2	1.6	1.0–2.5	0.06	1.5	0.9–2.4	0.1
Placental abruption	8	0.07	12	0.04	1.7	0.7–4.2	0.2	1.9	0.8–4.7	0.2
Haemorrage > 1000 ml	660	5.8	1492	5.0	1.2	1.1–1.3	0.003	1.1	1.0–1.2	0.02
Blood transfusion	42	0.4	96	0.3	1.1	0.8–1.6	0.5	1.2	0.8–1.7	0.4
Composite outcome	692	6.0	1543	5.2	1.2	1.1–1.3	0.0007	1.1	1.0–1.3	0.006

*Adjusted odds ratio, adjusted for gestational age at delivery, macrosomia (birthweight > 4500 g), spontaneous start of labour, mode of delivery, and low socio-economic status.

section group, where eventually emergency caesarean section is performed for non-progressive labour or fetal distress.

Women with a planned caesarean section for the first birth had a significantly increased risk of stillbirth (aOR 1.5, 95% CI 1.0–2.1). After sensitivity analysis comparing the low-risk planned caesarean section breech group with the emergency caesarean section group, we found the same effect but because of a lack of power this did not reach statistical significance.

The increase of stillbirth after a prior caesarean section has been reported in the literature before. In our study the incidence of stillbirth in a pregnancy following a prior caesarean delivery was 3.7 per 1000. Stillbirth occurred in 4.8 per 1000 deliveries in the planned caesarean section group and in 3.2 per 1000 deliveries in the emergency caesarean section group. Smith et al.[7] reported an absolute risk of stillbirth of 1.1 per 1000 women who had had a prior caesarean section, and 0.5 per 1000 in those without a history of caesarean section. Gray et al.[8] reported an absolute risk of stillbirth of 4.6 per 1000 women who had had a prior caesarean section, and 3.5 per 1000 women in those without prior caesarean section. Salihu et al.[9] found a disparity in the risks for stillbirth after caesarean section in black and white women. The stillbirth rate was 9.3 per 1000 black women and 6.8 per 1000 white women. Our results are in line with these prior studies. We can add our result, that women with a prior indication for planned caesarean section have a higher risk of stillbirth in a consecutive pregnancy, compared with women with a prior emergency caesarean section, to these findings.

We found that postpartum blood loss was significantly higher in the planned caesarean section group, although it did not result in a higher frequency of blood transfusions. We found that the reported postpartum haemorrhage is higher in women having a trial of labour than having a planned repeat caesarean section. Our results are consistent with the results of Holm et al.,[10] who described that after a previous caesarean section the risk of blood transfusion was significantly lower in the planned caesarean section group, compared with an intended vaginal delivery.

Women with a history of a planned caesarean section for the first birth had an increased risk for uterine rupture, compared with women with a history of emergency caesarean section, which was on the margin of statistical significance (OR 1.6, 95% CI 1.0–2.5).

In 2008 Algert et al.[11] reported that labour before a prior caesarean delivery can decrease the risk of uterine rupture: according to their data having a planned caesarean section was associated with a higher risk of uterine rupture in a subsequent trial of labour. Jastrow et al.[12] showed that having labour before a prior caesarean section results in a thicker lower uterine segment in a subsequent pregnancy. It seems plausible that the absence of labour influences the localisation of the uterine scar and healing of the lower uterine segment.[12] In our study the risk of uterine rupture shows a trend towards higher risk in the planned caesarean section group. Although we investigated a large number of deliveries after caesarean section in the first birth, the reported number of uterine ruptures is low.

Strength

To our knowledge we are the first to investigate the hypothesis that the absence of labour before performing a caesarean section can influence the maternal and neonatal outcomes in a consecutive pregnancy. The strength of our study is that we were able to investigate our hypothesis in a large cohort of women. Because of the high rate of trial of labour after prior caesarean section in the Netherlands, we were also able to investigate the risks of uterine rupture stratified for trial of labour. Sensitivity analysis confirmed the robustness of our findings on maternal outcomes.

Limitations

One of the limitations of our study is the inability to adjust for unknown confounding factors. The maternal characteristics of the women that had a planned caesarean section for the first birth are different from the characteristics of women who have an emergency caesarean section. We could only adjust for the variables that are reported in our perinatal registry, whereas more detailed data such as the method of closure or experience of the surgeon were not available in our database.

A second limitation is the testing for multiple neonatal and maternal outcomes. Testing for multiple outcomes increases the chance of type-I errors. We decided not to use the Bonferroni adjustment, as type-I errors cannot decrease without inflating type-II errors.[13]

In our hypothesis we mention the absence of labour as a risk factor. We know that some women go into labour before their planned caesarean section. These women might be misclassified. If women are indeed misclassified they will most likely be classified as planned caesarean section, although they have gone into labour spontaneously, and we cannot correct for these misclassifications. However, in our opinion and considering our current findings it is highly plausible that correction for these women would only make the association that we found stronger and not weaker.

Sensitivity analysis confirmed our findings on maternal adverse outcomes. However, it also suggests that the increased risks of neonatal adverse outcomes are applicable mostly for a subgroup of women: women having planned caesarean section for indications other than malpresentation. This is a subgroup that has a higher risk profile in the first, but also in the second, pregnancy compared with

the planned caesarean section for breech presentation population and the emergency caesarean section population.

Conclusion

We want to emphasise once again that there is an important task for obstetricians to reduce the number of caesarean sections in first births. Although the same applies for emergency caesarean section in first births, reducing the number of emergency caesarean sections will be more difficult because of the obstetric indications involved. Considering the revision of the UK National Institute for Clinical Excellence (NICE) guidelines for 2011, stating that women without a medical reason who do not want a vaginal birth should be offered a caesarean section, we feel that the risks in a following pregnancy for both mother and unborn child should be a more prominent topic in the counselling of women when requesting a planned caesarean section.

Practical recommendations

Our study demonstrates that going into labour before a caesarean section seems to lower the risk of adverse maternal outcomes such as uterine rupture and postpartum haemorrhage in a consecutive pregnancy. Our findings support the hypothesis that a caesarean section with a thick uterus leads to more problems in subsequent deliveries than a caesarean section with a thin laboured uterus. To improve maternal and neonatal outcome in a subsequent pregnancy, it is of the utmost importance to encourage women to have a vaginal delivery or at least a trial of labour with contractions in their first pregnancy.

Daytime planning of caesarean sections may sometimes benefit mother and child in cases of high obstetric risk; however, although planned delivery absolutely has logistical advantages, it will mainly benefit the obstetrician and operating team, but subsequently will have an undesirable impact on consecutive pregnancies.

Research recommendation

Because our database provides information that is wide but not deep, there are still a lot of questions that remain unanswered. It would be very informative to investigate the effects of timing of the caesarean section in more detail. For example, are there differences between emergency caesarean section performed in the first or second stage of labour and risks in a consecutive pregnancy? Or what influence does uterine closure technique have upon the risks?

The adverse effects of a prior caesarean section are becoming more evident now that they are being properly investigated. The mechanisms behind the adverse effects and the changes in doctor and patient behaviour that are necessary to decrease the number of caesarean sections for first births remain to be discovered.

Disclosure of interests

None to declare.

Contribution to authorship

NK wrote the article under the supervision of BWJM and EP. Both NK and BK performed the analyses. LR helped writing and reviewing the article. The linked data were provided by MH and AR.

Details of ethics approval

Permission to analyse anonymised patient data was granted by the Foundation of the Netherlands Perinatal Registry.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Table S1. Neonatal outcomes in a second pregnancy, stratified by trial of labour or planned caesarean section.

Table S2. Maternal outcomes in a second pregnancy, stratified by trial of labour or planned caesarean section.

Table S3. Sensitivity analysis of adverse neonatal outcomes in a second birth among women whose first delivery was planned caesarean section for breech presentation, compared with emergency caesarean section.

Table S4. Sensitivity analysis of adverse maternal outcomes in a second birth among women whose first delivery was planned caesarean section for breech presentation, compared with emergency caesarean section. ■

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BJOG ON THE CASE

BJOG PERSPECTIVES

Consent for vaginal birth after caesarean: changing horses in midstream

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Rates of caesarean section worldwide remained stable at under 10% until the 1980s when they started to rise, reaching 30% of births in many developed countries in the last decade. It is predicted that by 2020 the caesarean delivery rates in the USA could be higher than 50% (Solheim et al. *J Matern Fetal Neonatal Med* 2011;**24:**1341–6). A similar but even more marked trend is also seen in many low-income countries. Because of an increase in the incidence of placenta praevia and placenta accreta, with the associated maternal morbidity and mortality, high caesarean birth rates have become a matter of concern to international public health authorities. In an attempt to mitigate the rapid increase in caesarean delivery and related costs, many clinics and hospitals around the world are now offering antenatal classes to promote vaginal birth after caesarean delivery (VBAC).

The main risk of VBAC is uterine rupture during labour, and professional societies recommend that VBAC should be conducted in hospitals where staff can provide emergency care (Scott *Obstet Gynecol* 2011;**118:**342–50). In Schreiber versus Physicians Insurance Company of Wisconsin (Supreme Court of Wisconsin, no. 96–3676, January 1999), a patient with two previous caesareans, one for failure of labour progress and another elective, was consented for VBAC. Four hours after the start of spontaneous labour, she told her obstetrician that she had changed her mind, wanted to abandon the VBAC and instead have another caesarean delivery. Despite the mother experiencing severe abdominal pain and requesting a caesarean, the obstetrician continued to pursue VBAC. About 12 hours after admission, the fetal heart rate pattern became abnormal and at emergency caesarean the uterus was found to have ruptured. The child was born alive but was later diagnosed with cerebral palsy (spastic quadriplegia). The court concluded firstly that the obstetrician had violated the mother's right to informed consent by refusing to follow her clearly communicated choice of treatment during labour, and secondly that the plaintiff was entitled to damages because of the doctor's failure to conduct a new informed consent discussion.

The consent procedure for caesarean section is well established and many professional societies publish guidance and printable documents that can be used to obtain properly informed consent, including a detailed description of the serious and frequent risks associated with caesarean delivery. However, similar documents are not available for VBAC. The risk of operative complications associated with an elective caesarean section will depend on the indication for the procedure. For example, placenta praevia carries a higher risk of peripartum complications than breech presentation. Similarly, in VBAC, the risk of rupture may vary with the indication for the initial caesarean delivery, and will also change depending on the progress of labour and the use of uterotonics (prostaglandins, oxytocin). This highlights the need for national and international guidelines on informed consent for VBAC, including the possibility of patient withdrawal of consent during labour.

Disclosure of interests

See Eric Jauniaux's profile on www.BJOG.org. ■