

Type of Labour in the First Pregnancy and Cumulative Perinatal Morbidity

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Abstract

Objective: To estimate cumulative perinatal morbidity among infants delivered at term, according to the type of labour in the first pregnancy, when the first pregnancy was low risk.

Methods: In a 26-year population-based cohort study (1988–2013) using the Nova Scotia Atlee Perinatal Database, we identified the type of labour in successive pregnancies in low-risk, nulliparous women at term in their first pregnancy (who had at least one subsequent pregnancy), and also identified perinatal outcomes in subsequent deliveries according to the type of labour in the first pregnancy.

Results: A total of 37 756 pregnancies satisfied inclusion and exclusion criteria; of these, 1382 (3.7%) had a Caesarean section without labour in the first pregnancy. Rates of most adverse perinatal outcomes were low ($\leq 1\%$). The risks for stillbirth were low in subsequent deliveries, including those that followed CS without labour in the first pregnancy, and the risks for the overall severe perinatal morbidity outcome were less than 10% for all subsequent deliveries.

Conclusion: The absolute risks for severe perinatal morbidity outcomes in a population of low-risk women (with up to four additional pregnancies) were small, regardless of type of labour in the first pregnancy. This finding provides important information on perinatal outcomes in subsequent pregnancies when considering type of labour in the first pregnancy.

Résumé

Objectif : Estimer la morbidité périnatale cumulative chez les nouveau-nés à terme selon le type de travail à la première grossesse si celle-ci était à faible risque.

Méthodologie : Dans le cadre d'une étude examinant une cohorte représentative de la population sur une période de 26 ans (de 1988 à 2013) et utilisant la base de données périnatales Atlee de la Nouvelle-Écosse, nous avons déterminé le type de travail de grossesses successives à faible risque chez des femmes nullipares

à terme (ayant connu au moins une grossesse subséquente), ainsi que les résultats périnataux des accouchements suivants en fonction du type de travail de la première grossesse.

Résultats : En tout, 37 756 grossesses correspondaient aux critères d'inclusion de l'étude; 1382 femmes (3,7 %) avaient subi une césarienne sans travail à leur première grossesse. L'incidence de la plupart des issues périnatales défavorables était faible ($\leq 1\%$). Le risque de mortinaissance était faible pour les accouchements subséquents, y compris ceux suivant un premier accouchement par césarienne sans travail. Le risque de morbidité périnatale grave était de moins de 10 % pour l'ensemble des grossesses subséquentes.

Conclusion : Le risque absolu de morbidité périnatale grave était faible chez une population de femmes à faible risque (ayant connu jusqu'à quatre grossesses subséquentes), peu importe le type de travail à la première grossesse. Notre étude fournit des renseignements importants sur les issues périnatales de grossesses subséquentes en fonction du type de travail de la première grossesse.

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J Obstet Gynaecol Can 2016;38(9):804–810

INTRODUCTION

Studies evaluating the perinatal consequences associated with Caesarean section (CS) have focused on maternal and perinatal outcomes for the first pregnancy or following elective repeat CS or trial of labour with two or more pregnancies.^{1–6} Adverse perinatal outcomes, such as respiratory morbidity or hypoxic-ischemic encephalopathy in the infant, have been attributed to gestational age at delivery for elective repeat CS or to uterine rupture during a trial of labour. As awareness of and requests for elective CS (without labour) in the first pregnancy increase,⁵ the implications of the type of labour in the first pregnancy for cumulative perinatal risks in subsequent pregnancies become increasingly relevant.

Key Words: Perinatal morbidity, caesarean section, labour

Competing Interests: None declared.

Received on March 26, 2016

Accepted on May 18, 2016

<http://dx.doi.org/10.1016/j.jogc.2016.06.011>

The incidence of cumulative severe maternal morbidity in a similar population has been previously reported; the risks of abnormal placentation were low in subsequent pregnancies, including following CS without labour in the first pregnancy, and the risks of the overall severe maternal morbidity outcome were less than 10% for all subsequent deliveries.⁷ The current study was designed to estimate cumulative severe perinatal morbidity and mortality in subsequent deliveries related to the type of labour in the first pregnancy, using comprehensive obstetrical data from the Nova Scotia Atlee Perinatal Database.

METHODS

We used data derived from the Nova Scotia Atlee Perinatal Database (NSAPD) for the years 1988-2013 in this population-based cohort study. The NSAPD is a provincial, population-based, clinically oriented database. It is known to be accurate and reliable.^{8,9} Since 1988, maternal and newborn data (such as demographic variables, procedures, maternal and newborn diagnoses, and morbidity and mortality information) have been available for births ≥ 500 g or ≥ 20 weeks' gestation in residents of Nova Scotia. Health records personnel abstract the information using NSAPD coding definitions from standardized prenatal forms and hospital patient care records across Nova Scotia, and all information is entered into the database soon after the time of collection. Intrapartum care in Nova Scotia is provided by obstetricians, family physicians, and midwives. Obstetricians attend all operative vaginal deliveries and CSs and are assisted by post-graduate obstetrics trainees or family physicians. Midwives have practised obstetrical care in Nova Scotia since 2009.

The low-risk obstetrical population used in this study was defined by inclusion and exclusion criteria. Pregnancies were included if, in the first pregnancy, there was a live singleton delivery at term (37 to 42 weeks) in a nulliparous woman, who then had at least one subsequent delivery in the NSAPD at 37 weeks' gestational age or more. Pregnancies were excluded if in the first pregnancy there was a major fetal anomaly, if there was a non-vertex presentation with spontaneous or induced labour, or if there was pre-existing hypertension or diabetes, antepartum hemorrhage of any cause, or a small for gestational age neonate (birth weight < 10 th percentile for gestational age, based on a Canadian fetal growth reference¹⁰).

Maternal summary characteristics included maternal age, smoking status, pre-pregnancy weight, and gestational age

at delivery. Neonatal summary characteristics included birth weight, sex, and year of birth.

Severe neonatal morbidity outcomes included Apgar score ≤ 3 at one minute or < 7 at five minutes, delay in initiating and maintaining respirations after birth (requiring resuscitation by mask and/or endotracheal tube for ≥ 3 minutes), depression at birth (delay in initiating and maintaining respirations after birth, 5 minute Apgar score ≤ 3 , or neonatal seizures due to hypoxic-ischemic encephalopathy [Sarnat Score > 1]),¹¹ transient tachypnea of the newborn, all categories of respiratory distress syndrome (mild, moderate, and severe), and bronchopulmonary dysplasia. The study also considered the outcome variables of periventricular leukomalacia, intraventricular hemorrhage (grade 3 or 4), necrotizing enterocolitis, severe neonatal trauma (depressed skull fracture, intracranial hemorrhage, brachial plexus palsy, phrenic nerve palsy, facial nerve palsy, spinal cord trauma), all neonatal seizures, sepsis (systemic infection, septicemia, positive blood culture, meningitis, pneumonia, urinary tract infection), and admission to NICU for a duration of more than 24 hours. In addition, multi-system involvement following depression at birth was defined as any one of post-asphyctic convulsions, central nervous system excitation, CNS depression, increased intracranial pressure, anoxic subarachnoid hemorrhage, congestive heart failure, acute tubular necrosis, or post-asphyctic brain, liver, adrenal, and kidney necrosis. A composite severe perinatal morbidity outcome variable included any of the outcome variables of Apgar ≤ 3 at five minutes, delay in respirations after birth, multisystem involvement following depression at birth, moderate to severe respiratory distress syndrome, severe neonatal trauma, or neonatal sepsis. The study also considered rates of stillbirth (in the second and third deliveries) and neonatal mortality in the first and subsequent deliveries.

Continuous variables between groups were compared using ANOVA. Categorical data were compared using chi-square and Fisher exact tests, where appropriate. Statistical significance was set at $P < 0.05$. Statistical analyses were performed using OpenEpi version 3.03a. Tabulated cell sizes of < 5 were suppressed in compliance with data access and ethics approval obtained from the Reproductive Care Program of Nova Scotia, which manages the NSAPD, and the Research Ethics Board at the IWK Health Centre.

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