

# Is planned cesarean childbirth a safe alternative?

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Cesarean birth rates have risen dramatically during the past decade, reaching more than 50% in some regions of the world, despite a lack of evidence of any increase in obstetric emergencies.<sup>1,2</sup> The marked increase in primary elective cesarean delivery, particularly among women without an established medical indication, has stimulated debate in the medical community and heightened interest and publicity. This trend is owing, in part, to some evidence that suggests that planned cesarean birth may reduce the risk of maternal pelvic disorders, such as urinary and fecal incontinence and pelvic organ prolapse, and may decrease the risk of unexplained stillbirth and neonatal morbidity associated with cord prolapse, chorioamnionitis, fetal heart rate abnormalities and breech presentation when compared with vaginal delivery.<sup>3,4</sup> Avoidance of anxiety and the pain of labour, reduced parental concern about the baby's health, and the convenience of a scheduled delivery are other perceived benefits of planned cesarean birth. However, concern about the effect of rising global cesarean birth rates on maternal, fetal and neonatal morbidity and mortality has motivated researchers as well as regional, national and international organizations to evaluate the determinants and consequences of this trend more closely.<sup>5,6</sup>

In Canada, the rate of cesarean births has increased from 5.2% in 1969 to 25.6% in 2003.<sup>7,8</sup> The temporal trends and regional variations have been quantified in national and provincial database reports that have highlighted the complex interplay of obstetric and nonobstetric factors contributing to these trends.<sup>5,9,10</sup> After a transient decline in the cesarean birth rate in the late 1980s and mid-1990s that was related to an increased use and success of vaginal birth after a prior cesarean, the cesarean birth rate has increased steadily from 18.0% in 1994/95 to 22.1% in 2000/01.<sup>5</sup> Wide interprovincial variations in cesarean birth rates have been observed, with the highest rate occurring in Prince Edward Island (33.5%) and the lowest in Nunavut (9.9%).<sup>8</sup>

Several Canadian retrospective cohort studies have provided relevant and very timely information about cesarean-related maternal morbidity and mortality.<sup>11-13</sup> In this issue of *CMAJ*, Liu and the Maternal Health Study Group of the Canadian Perinatal Surveillance System report on a population-based cohort study of all women in Canada (excluding Quebec and Manitoba) who gave birth between April 1991 and March 2005, inclusive.<sup>14</sup> Using the Discharge Abstract Database of the Canadian Institute of Health Information, the investigators selected a cohort of healthy women who underwent a primary cesarean section for breech presentation ( $n = 46\ 766$ ) to form a surrogate group for low-risk planned cesarean delivery, to be compared with a similar low-risk planned vaginal delivery group ( $n = 2\ 292\ 420$ ). The selection involved the exclusion of women with a prior cesarean birth,

multiple pregnancy, preterm labour, medical risk factors and obstetrical complications.

In the planned cesarean group, the overall risk of severe maternal morbidity was 3.1 times that in the planned vaginal delivery group, including increased risks of postpartum cardiac arrest, wound hematoma, hysterectomy, major puerperal infection, anesthetic complications, venous thromboembolism and hemorrhage requiring hysterectomy. The absolute increases in severe maternal morbidity rates with planned cesarean birth, however, were small. Women in the planned vaginal birth group who had spontaneous or instrumental vaginal delivery were less likely to experience death or serious morbidity than were those who delivered by emer-

## Women contemplating elective cesarean birth need to know its potential perinatal, as well as maternal, risks.

gency cesarean birth. Emergency cesarean delivery was associated with the highest in-hospital mortality and most severe maternal morbidity rates. The study was limited by the fact that an unknown proportion of women with planned cesarean birth might have undergone labour that was not recorded in the database. The inability to link maternal and neonatal records resulted in some missing information. The lengthy period of observation (14 years) makes it difficult to draw conclusions relevant to current Canadian obstetric practice about the maternal consequences of planned cesarean delivery. Some of the outcomes classified as severe morbidity (e.g., wound hematoma, major puerperal infection, anesthetic complications) may not constitute what many obstetricians consider severe. Cesarean delivery for breech presentation is often more difficult than that for cephalic presentation and may increase the risk of maternal problems; the results of this study may therefore not apply to low-risk pregnancies having normal presentation. Since the focus of this paper was on maternal mortality and severe morbidity, information on neonatal outcomes is absent.

This study provides additional support to a growing body of evidence suggesting that primary elective cesarean birth may place both mother and newborn at greater risk for ad-

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verse outcomes than planned vaginal birth.<sup>3,11-13</sup> In Nova Scotia, cesarean delivery without labour was found to be associated with an increased risk of puerperal infection compared with spontaneous onset of labour, whereas early postpartum hemorrhage and composite maternal morbidity were found to be decreased when cesarean births without labour were compared with vaginal births with induced labour.<sup>11,12</sup> Other Canadian observational reports have linked cesarean birth to higher rates of severe maternal morbidity,<sup>13</sup> including hemorrhage requiring transfusion, hysterectomy and uterine rupture; intensive care admission; postpartum readmission to hospital;<sup>15</sup> problems with subsequent births (e.g., reduced fertility, ectopic pregnancy, miscarriage, placenta previa); complications of repeat cesarean birth; and increased cumulative costs.<sup>16</sup> However, many studies lack relevance to planned cesarean childbirth because of comparisons of outcomes by actual, not planned, routes of delivery and study design limitations that have included inappropriate control groups, inappropriate use of proxies, underpowered (i.e., statistically inadequate) sample sizes and confounding by indication.<sup>3</sup> The largest randomized controlled trial of planned cesarean versus planned vaginal birth for breech presentation<sup>4</sup> found no significant differences in maternal mortality or severe morbidity.

Women contemplating elective planned cesarean birth need to know the potential risks of the procedure, but this information must be considered in the context of perinatal risk. In pregnancies complicated by fetal malpresentation, excessive fetal growth, multiple gestation, fetal structural anomalies, cord prolapse, placental abruption and maternal viral infections (e.g., HIV or active herpes), cesarean delivery can be a life-saving intervention for the fetus. However, planned cesarean birth has also been associated with increased risks of fetal and neonatal mortality and neonatal morbidity, compared with spontaneous vaginal delivery.<sup>17,18</sup> Adverse neonatal outcomes reported in association with prelabour cesarean delivery at term have included neonatal respiratory problems, persistent pulmonary hypertension, asphyxia, delayed neurologic adaptation, neonatal intensive care admission, lacerations and delayed establishment of breastfeeding.<sup>3,19</sup> Primary cesarean birth has also been associated with increased risks in subsequent pregnancies of preterm delivery, low birth weight, stillbirth and neonatal death.<sup>20</sup> These risks have major implications for health care service delivery and cost, and raise important questions about the fetal and neonatal safety of elective cesarean birth.

As more women choose childbirth by cesarean, obstetricians and prenatal care providers must be aware of the maternal and perinatal risks and benefits of this option. Since no randomized trial of planned vaginal versus planned cesarean birth in low-risk women has been conducted, counselling must be informed by well-designed cohort studies such as the one reported in this issue. The unique and profound limitations inherent in knowledge based on indirect evidence from proxies and retrospective observational studies should nevertheless be acknowledged. Given the current uncertainty about the optimal mode of delivery, women who elect to have a

planned cesarean birth without any medical indication accept the possibility of adverse consequences for themselves and their babies in order to avoid the uncertainty and potential complications of planned vaginal birth. Fortunately, maternal and perinatal mortality and severe morbidity associated with childbirth in Canada are uncommon.

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