Canadian Journal of Rural Medicine | Journal canadien de la médecine rurale

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Review of cesarean sections at a rural British Columbian hospital: Is there room for improvement?

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CJRM 2000;5(4):201-7.

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Objective: To compare the cesarean section (C section) rate at a rural northern British Columbian community hospital with the provincial average and to determine how this rate might be improved, by reviewing the practice patterns of delivery at the hospital.
Design: Retrospective chart audit of modes of delivery.
Setting: A 33-bed community hospital staffed by family physicians.
Patients: For the calculation of the C section rate, all 1123 women who delivered at the study hospital between June 1, 1990, and May 31, 1997; for the chart audit, all 158 women who delivered at that hospital or were transferred from that hospital to a higher level of care, in 1997.
Outcome measurements: The average of C section rates for the study hospital and for BC from 1990 to 1997; mode of delivery and indications for C section in 1997; number of multiparous women who were eligible and ineligible for vaginal birth after cesarean (VBAC) in 1997 according to Society of Obstetricians and Gynaecologists of Canada (SOGC) criteria; and number of women diagnosed with dystocia in 1997 who did not fulfil the SOGC criteria for diagnosis.
Results: The average C section rate at the study hospital was 17.0% and was not significantly different from the provincial average of 20.7%. In 1997, there were 148 deliveries at the study hospital, with 114 (77.0%) spontaneous, 26 (17.6%) cesarean, 7 assisted (4.7%) and 1 (0.7%) breech. Ten women were transferred to a higher level of care and delivered elsewhere. There was more than 1 stated indication for C section in 9 deliveries, with the top 3 being dystocia (38%), repeat (35%) and fetal distress (27%). Fifteen (63%) of the 24 women eligible for VBAC underwent a trial of labour and achieved a success rate of 60%. Only 1 (10%) of 10 women diagnosed with dystocia did not fulfil the SOGC criteria.

Conclusions: The rate of C section at the study hospital was similar to that of the province. Offering VBAC to women with more than one lower uterine scar and no other contraindication to labour would be the easiest way to lower the rate at the hospital. Development of hospital protocols for the management of dystocia and VBAC could help to decrease the C section rate.

Objectif : Comparer le taux de césariennes dans un hôpital communautaire rural du nord de la Colombie-Britannique à la moyenne provinciale et déterminer comment on pourrait améliorer ce taux en examinant la pratique des accouchements à l'hôpital.
Conception : Étude rétrospective des dossiers pour vérification du mode d'accouchement.
Contexte : Hôpital communautaire de 33 lits auquel travaillent des médecins de famille.
Patients : Pour le calcul du taux de césarienne, les 1123 femmes qui ont accouché à l'hôpital observé entre juin 1990 et mai 1997; pour la vérification des dossiers, les 158 femmes qui ont accouché à cet hôpital ou qui ont été transférées de cet hôpital à un établissement de soins de plus haut niveau, en 1997.
Mesures des résultats : Moyenne des taux de césariennes pour l'hôpital observé et pour la C.-B. de 1990 à 1997; mode d'accouchement et indications de césariennes en 1997; nombre de femmes multipares se prêtant ou non à une naissance vaginale après une césarienne (NVAC) en 1997 selon les critères de la Société des obstétriciens et gynécologues du Canada (SOGC); nombre de femmes ayant reçu un diagnostic de dystocie en 1997 qui ne répondaient pas aux critères de diagnostic de la SOGC.
Résultats : À l'hôpital observé, le taux moyen de césarienne s'élevait à 17,0 % et n'était pas significativement différent de la moyenne provinciale (20,7 %). En 1997, il y a eu 148 accouchements à l'hôpital observé, dont 114 (77,0 %) accouchements spontanés, 26 (17,6 %) césariennes, sept accouchements assistés (4,7 %) et un (0,7 %) siège. Dix femmes ont été transférées dans un service de soins de plus haut niveau et ont accouché ailleurs. Dans neuf accouchements, il y a eu plus d'une indication désignée pour une césarienne, les trois principales étant une dystocie (38 %), une répétition (35 %) et une détresse fœtale (27 %). Quinze (63 %) des 24 femmes admissibles à une NVAC ont accouché avec succès, après une période de travail, dans une proportion de 60 %. Une femme seulement (10 %) des 10 ayant reçu un diagnostic de dystocie ne répondait pas aux critères de la SOGC.
Conclusions : Le taux de césarienne à l'hôpital observé a été semblable à celui de la province. Pour réduire ce taux à l'hôpital, le plus facile serait d'offrir la possibilité d'une NVAC aux femmes qui présentent plus d'une cicatrice utérine basse sans autres contre-indications au travail. L'élaboration de protocoles hospitaliers pour le traitement de la dystocie et la gestion des NVAC pourraient aider à diminuer le taux de césariennes.

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Introduction

In the western world, the rates and indications for cesarean sections (C sections) have generated much interest since the rate began to climb precipitously in the 70s and 80s. Canada did not escape this trend. In British Columbia the rate increased from 6.1% in 1969 to a high of 22.9% in 1989/90.1 The rate has since fallen slightly and stabilized at approximately 20%.2

The increase has been attributed to a number of factors, including more frequent use of C section for dystocia, fetal distress and breech delivery, and an increased rate of repeat C section. Other factors include changed demographics of pregnant women that may predispose them to complicated labour,2 increased use of continuous electronic fetal monitoring,3 the perceived relative safety of the procedure1,4 and fear of litigation.1–4

Spurred by the alarming increase in the rate of C sections, the National Consensus Conference on Aspects of Caesarean Births was formed in 1985. The panel published evidence-based guidelines for the management of women with a breech presentation, a history of previous C section and the diagnosis of dystocia.5 These guidelines were updated in SOGC policy statements.6–8

The guidelines seem to have had an impact: the rate of C section has declined modestly in Canada, almost entirely due to the increase in vaginal birth after cesarean section (VBAC).6 At least one Canadian rural community9 and one US10 hospital dramatically cut their abdominal delivery rate by instituting strict criteria for the common indications of C section.

In light of this evidence, we became interested in how the rate of cesarean deliveries at St. John Hospital (SJH) in Vanderhoof, a rural community hospital in northern British Columbia, compared with provincial averages, and how we could improve this rate. We examined hospital and provincial data to calculate an 8-year average of C section rates. We then performed a retrospective chart review of the practice patterns of obstetrics at SJH in 1997, paying particular attention to the indications for C section.

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Methods

Study site

Saint John Hospital is a 33-bed hospital located in Vanderhoof, BC. It serves a local population of approximately 10 000 people. During 1997, of the 6 full-time and 1 half-time physicians, 6 practised obstetrics, 3 were trained in surgery including C sections and 2 were trained in anesthesia. They provide 24-hour, nearly year-round coverage, including surgical deliveries for a small number of women referred from neighbouring towns. High-risk deliveries are referred to Prince George Regional Hospital, 100 km to the east, or BC Women's Hospital, Vancouver.

Approximately 160 babies are born at SJH each year.

Vanderhoof is defined as "rural" by at least 2 measurements. It is "rural remote" based on the Rural Committee of the Canadian Association of Emergency Physicians' definition of "communities about 80–400 km or about one to four hours transport in good weather from a major regional hospital."11 It is also "rural" based on Leduc's 6-point General Practice Rurality Index (GPRI), [The GPRI uses 6 weighted variables to predict the difficulty in accessing medical care and the practice profile of rural physicians. It is a 100-point scale: the higher the number, the more rural the community. A score of 10 has been proposed as the threshold for rurality.] rating a score of 60.12 (See Appendix 1 for the GPRI and calculations for Vanderhoof and Appendix 2 for a definition of the terms.)

Study population

Charts were identified retrospectively by SJH's medical records keeper for all women who gave birth at SJH (Group 1) and for all women transferred from SJH for an obstetrical reason (Group 2), between Jan. 1 and Dec. 31, 1997.

In Group 1, the complete records of admission, including prenatal and birth records, admission histories, operative reports, progress notes, partograms and physician's order records, were systematically reviewed. Women who had transferred from a neighbouring community to SJH were identified. Data were tabulated by primary investigators according to unit number, age, parity, gestational age, maternal height, maternal weight in first trimester, fetal weight at birth, prenatal attendance to 36 weeks, pregnancy risk to 36 weeks, antepartum complications, intrapartum complications, whether labour was spontaneous, induced, or augmented, whether an epidural was used and whether delivery was vertex, breech, assisted or cesarean. The indications for cesarean deliveries were ascertained as well as whether they were repeat, emergent or VBAC (vaginal birth after cesarean).

In Group 2, the charts were reviewed and data tabulated according to whether the patient had originally been transferred from a neighbouring community hospital to SJH before being transferred from SJH, their unit number, age, parity, gestational age, final reason for transfer to SJH and where they were subsequently transferred to when they left SJH. It was not known whether these women delivered during the transfer to a larger centre, but an attempt was made to determine if these women were subsequently returned to SJH for delivery.

For both Groups 1 and 2, for vaginal and cesarean births, averages for age, gestational age and parity were calculated. An average for birth weights was also calculated for both vaginal and cesarean births in Group 1. Paired, 2-sample t-tests were used to compare between cesarean and vaginal birth groups in Group 1, between Group 1's cesarean births and Group 2, and between Group 1's vaginal births and Group 2. P values were calculated, and a level of $p < 0.05$ was considered statistically significant.

Calculation of the cesarean section rate

An 8-year average for the total, primary and secondary C section rates at SJH was calculated using data collected by the director of medical records for June 1, 1990, through to May 31, 1997. These were compared to the 8-year BC provincial averages 1990–97 using a paired, 2-sample t-test. (British Columbia Vital Statistics Agency. Annual reports 1990–1997. The Agency. Available from the Information and Resource Management Branch.) A level of $p < 0.05$ was considered significant.

Active phase of labour: SOGC definition

The latent phase of labour is defined by the SOGC7 as "the phase of uterine activity associated with progressive cervical effacement immediately preceding the active phase." Studies to ascertain the normal length of the latent phase have had highly variable results, likely due to the difficulty in determining its beginning. Furthermore, there is a high degree of variability in duration among women.3 Thus it is not certain what, if anything, defines a prolonged latent phase.

Although many C sections and other treatments are initiated for prolonged latent phase, studies that compared conservative treatment to intervention in early labour have not shown a benefit for early intervention.7 Therefore, in 1995 the Society recommended that dystocia not be diagnosed until the active phase of labour has been established. The active phase was precisely defined7 as:

> ...the presence of strong regular contractions which result in progressive and rapid cervical dilatation. It extends from the end of the latent phase until full dilatation. The cervix has reached approximately three to four centimetres and 80 to 90 percent effaced in a primaparous woman, and three to five centimetres and 70 to 90 percent effaced in multiparous women.

We used this definition to determine if those cesarean deliveries judged to be for dystocia were performed for true dystocia.

VBAC: SOGC eligibility criteria

Eligibility criteria for VBAC were based on the latest SOGC guidelines.6 With respect to dystocia, induction of labour, augmentation, twins, breech presentation and the presence of more than 1 lower-segment scar, the policy is unchanged from the 1993 statement.13 The SOGC recommends6 that a trial of labour be offered to all women with a history of previous C section, with a lower uterine scar unless the following contraindications are present:

- previous classical, inverted T incision or unknown incision scar;
- previous hysterotomy;
- previous myomectomy involving entry of the uterine cavity or extensive myometrial dissection;
- previous uterine rupture;

- presence of placenta praevia, transverse lie or any other contraindications to labour.

The delivery should take place in a hospital that can provide emergency operative deliveries. Previous C section for dystocia is not a contraindication. Induction or augmentation with oxytocin is not excluded but is associated with higher rates of complication. Prostaglandin gel for induction has not been studied adequately. Twin, breech presentation and suspected fetal macrosomia are also not contraindicated, although careful assessment is required.

The presence of more than 1 lower-segment scar is not a contraindication. The risk of scar dehiscence (the opening of the uterine scar without maternal or fetal compromise) is less than 4%. Although this is greater than for 1 previous scar (0.5%), the risk of uterine rupture with serious maternal and fetal compromise is small (0.1%) for all comers. Thus, VBAC after more than 1 previous C section is deemed acceptable, but each case should be assessed carefully.

Based on these guidelines, we presumed that all women without the above contraindications and regardless of the number of lower-segment scars were eligible for VBAC unless another contraindication to labour was stated.

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Study population

In 1997, there were 148 deliveries, with 114 (77.0%) spontaneous, 26 (17.6%) cesarean, 7 assisted (4.7%) and 1 (0.7%) breech (Table 1). Four women were transferred from another hospital, of which 3 delivered vaginally. Ten women were transferred to a higher level of care in the antepartum period and in labour. Reasons for transfer included pre-eclampsia (3), premature rupture of membranes (3), premature labour (2), antepartum hemorrhage (1) and previous C section with no anesthetist available (1). There was 1 twin birth, which included the only vaginal breech delivery.

On average, the women in the cesarean group were older than those in the vaginal delivery group ($p = 0.042$), but there was no significant difference between these groups and the 4 women who were transferred from another hospital. There was no statistical difference in gestational age between cesarean and vaginal deliveries. However, women who were transferred to a higher level of care were at an earlier period of gestation than those who delivered at SJH ($p < 0.001$). Parity was similar between all groups ($p = 0.55$). Birth weights were not significantly different ($p = 0.64$) for neonates born vaginally or by C section.

Other characteristics of the births in Group 1 are summarized in Table 1.

C section rate and indications

There were 1123 deliveries at SJH between June 1, 1990, and May 31, 1997. On average, 17.0% of deliveries were C sections. This rate was not significantly different from the provincial rate over a similar period ($p = 0.18$) (Table 2). The primary rate was less than the provincial average ($p = 0.03$), but the repeat rate was not ($p = 0.054$).

There was more than one indication for operative delivery in 9 cases (Table 3). The most common indications were dystocia (38%), repeat (35%) and fetal distress (27%). Of the 10 judged to be for dystocia, 1 was made prior to the onset of labour as defined by the SOGC. Of these 10, 6 received oxytocin augmentation, 1 woman refused and the rest were not given oxytocin. The latter included the 1 woman who did not meet the criteria for dystocia.

VBAC

In 1997, 58% of women who underwent a C section had previously had the procedure. Of the 24 who met the SOGC eligibility criteria for VBAC, 3 declined and 1 was advised against it because of cephalo-pelvic disproportion (CPD) (Table 4). In her previous delivery she was unable to deliver vaginally despite oxytocin augmentation. Because prior history of CPD is not a contraindication to VBAC, she was included in the eligible group. Four other women had 2 previous scars and 1 other woman had 3 previous abdominal deliveries. It was not known whether these 5 women declined or were not offered a trial of labour. Although we were unable to determine the type of scar in these women, they were included because another contraindication was not given.

The overall success rate of the 15 women who attempted labour was 60%. Only 1 woman who tried labour received an epidural.

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Discussion

Results of the data collected in 1997 indicate that low-risk and moderately complicated deliveries are managed at SJH. High-risk pregnancies and those with complications in the pre-term period are transferred to a hospital with a greater ability to deal with potential neonatal complications.

C section rates were similar to those of the whole province, although there was a trend to lower rates. The provincial rate includes high-risk deliveries, whereas only low- to moderate-risk

deliveries are performed at SJH. Several studies have shown that rates in community hospitals may not be comparable to tertiary care facilities because the latter serve higher risk patients.14,15 Thus, it may be expected that the rate at SJH should be lower than the provincial average.

Indications were similar to those in other studies,3,4,10,14,16 where dystocia, fetal distress and repeat ranking were among the top 3 reasons for cesarean delivery. There was more than 1 indication in many of the births; some were nontraditional (e.g., maternal distress or exhaustion). The type of distress (i.e., emotional or physical) was unclear, and a consensus could not be reached as to whether maternal exhaustion constitutes dystocia. A suitable definition for these nontraditional conditions could not be found. Therefore, in our analysis they were included in the "Other" category. It is interesting to note that the 3 women who had a diagnosis of maternal distress also had a diagnosis of dystocia.

Our study shows that only 1 C section may have been avoided because of the improper diagnosis of dystocia. Thus, it is unlikely that a change, in the form of more careful diagnoses, would result in a substantial impact on the rate. Only half the women with dystocia were given oxytocin. The SOGC concedes that there are inadequate data on which to base criteria for diagnosing dystocia. It recommends that "women who are in the active phase ... who experience arrest of dilatation evaluated over a two-hour period, or dilate at less than 0.5 centimetres per hour evaluated over a four-hour period, require special attention." Although not yet proven effective, the use of oxytocin to correct dystocia in the absence of fetal compromise and after attention to comfort, hydration and amniotomy is promising and its increased use may have an impact.7

The VBAC success rate agreed with the 50%–80% range suggested by the SOGC,6 but was lower than the rate achieved in a rural Alberta hospital with a similar practice pattern.9 The authors of that study suggested that the availability of epidural analgesia was important in encouraging the acceptance of VBAC. In our study, only 1 woman who underwent a trial of labour and none of the multiparous women who went on to C section received an epidural. There may be an unwillingness among the patients or physicians to use this procedure for VBAC. The SOGC states that the use of an epidural is not contraindicated in VBAC and may prevent or treat dystocia.7 Possibly, the success rate could be improved with the use of this procedure.

Participation rates for trial of labour were quite low; none of the women who had more than 1 lower uterine scar attempted VBAC. It is not clear whether these women refused, were not offered, or had a contraindication to VBAC. A reduction in the cesarean rate at SJH could be achieved if the physicians and patients became more comfortable with this alternative. The recent reduction in Canada of the C section rate has been entirely attributed to the increased use of a trial of labour.6

In 2 studies, 1 in a tertiary care centre10 and another in a community hospital with similar demographics to SJH,9 a reduction in overall C section rate was achieved without compromising patient health. These hospitals achieved success by applying clinical practice guidelines. Another

study showed that only nulliparity influenced the rate of cesarean delivery more than physician practice style.17 It can be argued that guidelines serve to partially mitigate against this variation. Recognition must be given to local variations in resources and needs of the patients and caregivers, particularly in rural communities.18 Perhaps the best way to ensure the lowest rate possible is to develop a set of guidelines based on SOGC models that will serve SJH and its patients.

There were a number of limitations to this study. It was a retrospective chart audit, and data were not recorded as to whether there were contraindications to VBAC in the women who did not undergo a trial of labour. A very small population was reviewed, in a single year. Small variations in the number of women who undergo C section and VBAC or receive a diagnosis of dystocia would have a large impact on outcomes. Furthermore, 1997 may not have been a representative year. Finally, when comparing C section rates, the beginning and end of the year were different between the hospital and provincial data. This may have introduced a systematic error.

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Conclusion

The rate of C sections at SJH was similar to the provincial average. In the great majority of cesarean deliveries for dystocia, the diagnosis was not made before the active phase of labour. No multiparous women who underwent more than 1 C section had undergone a trial of labour. Offering VBAC to these women may be the easiest way to lower the rate at SJH. Development of hospital protocols for the management of dystocia and VBAC, perhaps based on the SOGC's clinical practice guidelines, could help decrease the C section rate.

Competing interests: None declared.

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This article has been peer reviewed.

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