A Description of the Management and Outcomes of Vaginal Birth After Cesarean Birth in the Homebirth Setting

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Our objective was to describe the outcomes of intended home birth among 57 women with a previous cesarean birth. Data were drawn from a larger prospective study of intended homebirth in nurse-midwifery practice. Available data included demographics, perinatal risk information, and outcomes of prenatal, intrapartum, postpartum, and neonatal care. The hospital course was reviewed for those transferred to the hospital setting. Fifty-three of 57 women (93%) had a spontaneous vaginal birth, 1 had a vacuum-assisted birth, and 3 (5.3%) had a repeat cesarean birth. Thirty-one of 32 (97%) women who had a previous vaginal birth after cesarean birth (VBAC) had a successful VBAC; 22 of 25 (88%) women without a history of VBAC successfully delivered vaginally. Fifty (87.7%) of these women delivered in the home setting, whereas 7 (12.3%) delivered in the hospital setting. None of the women experienced uterine rupture or dehiscence. One infant was stillborn. This event was attributed to a postdates pregnancy with meconium. Certified nurse-midwives with homebirth practices must be knowledgeable about the risks for mother and baby, screen clientele appropriately, and be able to counsel patients with regard to potential adverse outcomes. Given what is presently known, VBAC is not recommended in the homebirth setting. It is imperative in the light of current evidence and practice climate to advocate for the availability of certified nurse-midwife services and woman-centered care in the hospital setting. J Midwifery Womens Health 2005; 50:386–391 © 2005 by the American College of Nurse-Midwives.

keywords: vaginal birth after cesarean birth, homebirth, certified nurse-midwives

INTRODUCTION

Homebirth has remained a choice for a small but committed number of women and their families in the United States. The proportion of intended homebirths has remained at a relatively stable 0.6% per year over several years.[1–6] Observational studies suggest that given a qualified provider and an organized, collaborative system that allows for transfer and referral when necessary, homebirth can be accomplished with good outcomes that are comparable with the outcomes of low-risk women in the hospital setting. A 1998 study[7] reported the results of a prospective study of 1404 women intending homebirth in various nurse-midwifery practices throughout the United States. Some of these women had previously delivered by cesarean birth. Outcomes specific to this particular subset of women electing vaginal birth after cesarean (VBAC) have not previously been reported. The purpose of this article is to describe the outcomes for these women and babies and to explore how this information may be relevant in today's climate of controversy over trial of labor after cesarean delivery versus scheduled repeat cesarean delivery.

THE HOMEBIRTH STUDY

A complete description of the study sample, methods, and results was previously reported.[7] In brief, 1404 women from 29 nurse-midwifery homebirth practices were enrolled in the study between December 1994 and December 1995. The practices varied in regional location, practice volume, and number of staff midwives. Data collection included demographic and perinatal risk information, as well as outcomes of prenatal, intrapartum, and postpartum care. Referrals and transfers were documented. Hospital records were reviewed for those patients who began labor with the intention of delivering at home but were transferred to the hospital setting for intrapartum, postpartum, or neonatal care.

Antenatal screening practices determined the eligibility of women for homebirth and excluded women for conditions generally designated as "high risk" status, such as multiple gestation and gestational diabetes. Nearly three quarters (73%) of these homebirth practices accepted women for homebirth if they had had a previous cesarean delivery; in most cases, a previous successful VBAC was also required to confer eligibility for homebirth.

In the original study, 1221 women remained eligible for homebirth at the time of labor onset. This report will summarize the outcomes of the 57 women in this group who had a history of previous cesarean birth. More than half (56.1%) of these 57 women had a previous VBAC, and 31.6% had a previous homebirth.

RESULTS

Information regarding the practice locations and the numbers of women from each practice is summarized in Table 1. There were eight practice areas, with the largest propor-

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Table 1. Participating Nurse-Midwifery Practices in the Study of Intended Homebirth That Accepted Women With a Previous Cesarean Birth for Care

Practice Region	N (%)*
California	7 (12.3)
Pennsylvania	21 (36.8)
DC/Maryland/Virginia area	3 (5.3)
Texas	2 (3.5)
Florida	7 (12.3)
Chicago area	8 (14)
New York City area	8 (14)
Washington State	1 (1.8)
Total	57 (100)

*Number of women from practice with a previous cesarean birth who intended homebirth at onset of labor (% of all women with previous cesarean birth).

tion of women (n=21 [36.8%]) receiving care from nurse-midwifery practices in Pennsylvania (serving primarily Amish and Mennonite communities).

The demographic characteristics of the 57 women intending a VBAC at home were similar to the larger sample and represent a group highly selected for low perinatal risk. By far, the majority of these women were white (94.7%), married (100%), and homemakers (71.6%). None of the women in this group reported behavioral risk factors of cigarette, alcohol, or drug use. Thirty-four percent (34%) had less than a high school education, and 41% were of lower socioeconomic status (as derived from payment source, income, occupation of patient and partner, and an estimate by the attending nurse-midwife). More than one third of these women were from Amish and Mennonite communities, which contributes in large measure to the educational and socioeconomic profile of the sample. The average age was 30.5 years. Most women entered prenatal care prior to 23 weeks, had 7 or more prenatal visits, and were of parity 3 or greater. The demographics of this subset of women were consistent with the overall study sample (data on file).

Intrapartum Management

Midwifery management of these 57 women was essentially the same as the management of those women who had not previously delivered by cesarean birth. Ten of the 57 women (17.5%) were reported to have had labor induced or augmented. However, only one of these women had labor induced with a pharmaceutical preparation (prostaglandin); this occurred within the hospital setting. Induction methods used by the other 9 women included nipple stimulation, castor oil, rupture of the amniotic membranes, and/or herbal/homeopathic methods. The reported indications for these inductions/augmentations were postdates, rupture of membranes, or other "elective" reasons; indications for induction/augmentation were missing for 6 of the 10 women.

Midwifery labor management of women with a previous cesarean birth intending to deliver at home is described in Table 2.

Table 2. Midwifery Management of Labor for Women With Previous Cesarean Birth Intending to Deliver at Home

Labor Management	N (%)
Maternal mobility in first stage	
Ambulatory or frequent position change	53 (93)
Recumbent by choice	3 (5.3)
Fetal heart rate monitoring	
Intermittent auscultation	52 (91.2)
None	5 (8.8)
Primary method of pain management listed	
None	10 (17.5)
Paced breathing	13 (22.8)
Relaxation techniques	10 (17.5)
Hydrotherapy (shower, tub, etc.)	15 (26.3)
Massage	4 (7)
Nubain	1 (1.8)
Other	4 (7)
Maternal intake in labor	
Nothing	3 (5.3)
Clear liquids only	28 (49.1)
Full or clear liquids	9 (15.8)
Light solids and liquids	12 (21.1)
Regular/select diet	3 (5.3)
Method of membrane rupture	
Spontaneous	42 (73.7)
Artificial	14 (24.6)
Maternal mobility in second stage	
Ambulatory/frequent position change	29 (51)
Recumbent by choice	15 (26.3)
Recumbent by provider recommendation	2 (3.5)
Hands and knees	1 (1.8)
Squatting	1 (1.8)
Missing	9 (15.8)
Maternal birth position	
Semi-sitting	16 (28)
Hands and knees	7 (12.3)
Side-lying	3 (5.3)
Squatting	8 (14)
Water birth	2 (3.5)
Lithotomy/stirrups	1 (1.8)
Stool/birth chair	4 (7)
Sitting on edge of chair/sofa	1 (1.8)
Flat on back	1 (1.8)
Cesarean birth	2 (3.5)
McRoberts	1 (1.8)
Missing	11 (19.3)

Individual categories may not sum to 100% due to missing data for that variable, usually related to transferred patients for which some hospital-based information may not have been available.

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Fifty of the 57 women (87.7%) remained at home for the entire first and second stages of labor. Table 3 provides a listing of the reported intrapartum conditions for all 57 women regardless of birth site. Meconium staining of the amniotic fluid was noted for one third (33.3%) of the women. The degree of meconium staining was described as trace/light amounts for all except three; two of moderate amount and one with thick, "pea soup" meconium.

The average duration of the first stage of labor was 9.1 hours, with a minimum of 1.3 hours and a maximum of 41 hours. The average duration of the second stage of labor was 41 minutes (median = 25 minutes), with a minimum of 1 minute and a maximum of 3.7 hours. The average length of time between rupture of the membranes and delivery was 5.9 hours, with a minimum of zero and a maximum of 90.8 hours. There were no reported cases of intrapartum infections or fever.

Seven women were transported to a hospital prior to delivery. One transfer was reported as an emergency transport for fetal heart rate abnormalities; this resulted in vacuum-assisted delivery on arrival to the hospital. The infant was discharged in good condition. In all other cases of maternal intrapartum transport, the status of mother and fetus was reported to be good/stable on arrival to the hospital. Table 4 provides a listing of the primary indications for maternal transport prior to delivery.

Fifty-three of the 57 women (93%) had a spontaneous vaginal birth, 1 (1.8%) had a vacuum-assisted birth, and 3 (5.3%) had a repeat cesarean birth. Thirty-one of 32 women with a previous VBAC (97%) had a successful VBAC; 22 of 25 (88%) women without a history of VBAC delivered vaginally.

The episiotomy rate of the total cohort was 5.3%, whereas lacerations requiring sutures occurred in 30% of the women. The median estimated blood loss among women delivering vaginally was 300 mL. There was one occurrence of a maternal transport during the postpartum period. This was for a postpartum hemorrhage estimated at 900 mL.

Table 3. Conditions and Complications of Labor Reported Among 57 Women With Previous Cesarean Birth Intending to Deliver at Home

Intrapartum Condition	N
Prolonged latent phase of labor	8
Lack of progress in first stage	7
Prolonged ROM	4
Maternal coping difficulty	2
Second-stage FHR abnormalities	3
Lack of progress in second stage	2
Shoulder dystocia	6
PPH	6
Meconium staining*	19
Light/trace	12
Moderate	2
Thick "pea soup"	1

ROM = rupture of membranes; FHR = fetal heart rate; PPH = postpartum hemorrhage.
*Four records had missing data on the type of meconium.

Table 4. Indications for Intrapartum Maternal Transport Among Women With Previous Cesarean Birth Intending to Deliver at Home

Indication for Maternal Transport	N
FHR abnormalities	1
Arrest of labor	1
Prolonged labor	2
Prolonged ROM	1
Need for analgesia/anesthesia	1
Thick anterior lip remaining	1

FHR = fetal heart rate; ROM = rupture of membranes.

Newborn Conditions and Transports

The average birth weight of the 57 newborns was 3826 g (range 2523–5274 g). There was one stillborn infant (weight = 4195 g) delivered in the home at 42 weeks of gestation. This stillbirth was attributed in the larger study to a postdates gestation with meconium. There was no evidence of uterine rupture or other contributing factor related to the previous cesarean birth.

One liveborn infant was transferred to the hospital after birth for respiratory problems. The infant was later discharged in good condition.

Postpartum Course

Fifty-six women returned for postpartum care with their primary nurse-midwife and reported all subsequent events occurring since the immediate birth period. One mother reported being admitted to the hospital for bleeding/retained placenta/endometritis following an uncomplicated birth at home.

One newborn was admitted to the hospital after the initial neonatal period for respiratory distress and was subsequently released in good condition. Four infants were evaluated and treated by other health care providers for various congenital anomalies, including one with a cardiac defect. One infant was treated for fever and had no adverse sequelae.

Fifty-five of the mothers returning for postpartum care reported that their infants were breastfeeding. Furthermore, 53 (94.6%) mothers reported that their infants' conditions were "good," whereas 2 reported that their infants' conditions were "fair." The 2 infants reported in "fair" condition had congenital anomalies: one with a cardiac anomaly and one with hydronephrosis. Both infants were birthed at home without complications.

Outcome Summary

The study sample for the prospective study of homebirth included 57 women with previous cesarean births who

intended to deliver at home. None of the women experienced "high-risk" medical conditions, such as hypertension, diabetes mellitus, or renal/kidney disease, and were, therefore, eligible for homebirth according to practice guidelines. Fifty (87.7%) of these women delivered in the home setting, whereas 7 (12.3%) delivered in the hospital setting. All 57 women delivered between 37 and 42 weeks of gestation, with a mean gestational age of 39.7 weeks. All were singleton gestations, with the vertex presenting. None of the women experienced uterine rupture or dehiscence during the labor or delivery event. One infant was stillborn. This event was not attributable to complications of VBAC.

DISCUSSION

Both VBAC and birth in out-of-hospital birth settings will continue to be the choice of some women.[8,9] Current evidence that documents the outcomes, safety, and efficacy of VBAC[10–12] supports the prevailing opinion that VBAC is a safe option for women, under certain circumstances, in the hospital setting. Birth in birth centers and in the home has also been documented to have good outcomes for women who meet select criteria, are attended by qualified providers, and when there is the availability of appropriate referral and transport.[7,13,14] The safety of VBAC in out-of-hospital birth settings is less well documented. Midwifery management and associated outcomes of women experiencing VBAC in any birth setting are also infrequently fully reported. The major risk for VBAC (i.e., the potentially catastrophic occurrence of uterine rupture without immediate recourse to surgical intervention) and the resulting possibility of perinatal damage or loss are the priority concern.

Lieberman et al. recently reported findings from a 10-year (1990–2000) prospective study of VBACs in birth centers.[15] They compared their data to outcomes of women who elected VBAC in a variety of tertiary care and community hospital settings,[16,17] primarily because comparison data from VBAC in out-of-hospital settings, including the homebirth setting, are not widely available. In their study, a cesarean-scarred uterus was associated with an increase in complications that required hospital management. More specifically, a history of more than one prior cesarean delivery and a gestational age of at least 42 weeks were both important predictors of serious adverse outcomes: more than 50% of uterine ruptures and 57% of perinatal deaths involved the 10% of women with these risk factors. Among the 90% of participants with neither of these factors, the rate of uterine rupture and the rate of perinatal mortality were each 0.2%.[15]

The current study sheds some light on the outcomes for a very small sample of 57 women who chose to have VBAC at home. These data were collected during the same time period as the recently published birth center study,[15] during a time when the policy environment and positions of professional organizations were supportive of VBAC. There was no climate of opposition to trials of labor for women with previous cesarean births or to births in freestanding birth centers.

The occurrence of uterine rupture is quite rare, estimated to involve 1 in 17,000 to 20,000 deliveries overall.[18,19] Previous studies have estimated the incidence between 0.2% and 0.02% of women with a uterine scar.[15,20–24]. The most recently published study,[25] with almost 18,000 women who attempted VBAC in a hospital setting, found an incidence of symptomatic uterine rupture of 0.7%. Although this risk is low, if uterine rupture occurs, it can be devastating for both mother and infant. Some of the published literature indicate that the risk for VBAC increases in association with certain interventions, such as cervical ripening and induction, as well as with specific conditions such as having had more than one previous cesarean birth or previous postpartum endometritis.[21,26–33] Homebirth practices typically use screening criteria that often disqualify women for birth in an out-of-hospital setting if there is a history of conditions associated with a higher risk for cesarean delivery, such as more than one previous cesarean birth, never having had a previous vaginal birth, need for induction, and postdates. Certified nurse-midwives and certified midwives (CNM/CMs) typically perform a thorough review of the previous cesarean birth experiences of each woman who requests a trial of labor at home and provide intensive counseling regarding risk of VBAC, in addition to offering suggestions for reducing the chance of cesarean birth. Moreover, midwifery management typically includes fewer interventions, allows for the laboring woman's freedom of movement, and the ability to have nourishment, as needed. It can be speculated that these practices contribute to shorter, easier labors, which may in turn, reduce the risk of complications. This management style is consistent with the labor management patterns described in the present study.

A retrospective study[34] of 649 women who intended VBAC in the hospital setting with CNMs reported an overall success rate of 73% and outcomes consistent with similar studies.[35,36] Furthermore, there were no reports of uterine rupture or dehiscence. These results are similar to the findings in our brief report. However, it would require larger numbers of women who attempt VBAC to thoroughly evaluate the outcomes for women and their babies in homebirth settings. The published literature to date offers little information about the outcomes of VBAC at home. Thus, aggregate analyses are not possible. In 40 studies of planned homebirth published since 1975, only 5 studies[37–41] report the outcomes of VBAC explicitly, only 46 births are represented, and outcomes for most of these are not reported separately from the larger study.

There was one stillborn infant with an undetermined cause of death (apparently unrelated to VBAC) in this

small homebirth study. It is unclear if a planned hospital birth would have resulted in a live birth in this case. No instances of uterine ruptures or other adverse outcomes were noted. However, with only 57 cases, it cannot be determined if the outcomes are a reflection of the birth setting, labor management, health conditions of the population, coincidence, or other factors, such as postdates pregnancy. Of note, in both the larger homebirth study[7] and the recently published analysis of VBACs in the birth center setting,[15] adverse events occurred more often among women who had reached a gestational age of 42 weeks. This could be interpreted as adding support to already well-documented observations of greater risk in postdates pregnancies. Lieberman and colleagues[15] also found a higher risk of adverse events among women with more than one previous cesarean birth. These two risk factors certainly appear to confer added risk and should be carefully evaluated in all women, irrespective of place of intended birth.

The documented risks of VBAC prompted the American College of Obstetricians and Gynecologists to publish a practice bulletin in 2002,[42] which advises the immediate availability of a physician with surgical abilities whenever VBAC is anticipated. The bulletin further advised that VBAC should occur within an institution that can provide emergency surgical delivery. These are the same recommendations recently issued by the Clinical Practice Obstetrics Committee of the Society of Obstetricians and Gynaecologists of Canada.[43] The American College of Nurse-Midwives Clinical Practice Bulletin[44] on VBAC strongly supports the practice of VBAC for "appropriately selected, counseled, and managed" women. Lieberman and colleagues recommend, on the basis of findings from their study of VBAC in birth centers, that women with prior cesarean deliveries should be advised against attempting VBACs in any nonhospital setting.[15] These various statements would contradict the practice of homebirth for women who desire VBAC.

Nonetheless, it must be recognized that VBAC at home does occur and will continue to occur, for those who (for various reasons) refuse to birth in the hospital setting. CNMs with homebirth practices must be knowledgeable about the risks for mother and baby,[45] screen clientele appropriately, and be able to counsel patients with regard to potential adverse outcomes. Consultative and collaborative relationships with physicians are also essential to safe practice. Ideally, CNMs with homebirth practices would be aware of facilities in their communities that provide woman-centered care and be able to refer clients appropriately if homebirth is not an option. It is imperative in the light of current evidence and practice climate to advocate for the availability of CNM services in the hospital setting. In this way, women will have the option of a CNM-attended birth in the most appropriate setting.

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