MODE OF DELIVERY IN WOMEN WITH ANTEPARTUM FETAL DEATH AND PRIOR CESAREAN DELIVERY

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Abstract

We describe obstetric outcomes in a group of patients with prior cesarean delivery (CD) presenting with an intrauterine fetal demise (IUFD). A secondary analysis of an observational study of women with prior CD was performed. All antepartum singleton pregnancies with a prior CD and IUFD ≥ 20 weeks' gestation or 500 grams were evaluated. Two hundred nine patients met inclusion criteria for analysis. The mean gestational age ± standard deviation at delivery was 31.3 ± 6.5 weeks. The trial of labor rate was 75.6% (158/209), and the vaginal birth after cesarean (VBAC) success rate was 86.7%. Labor induction or augmentation occurred in 83.3% of attempted VBAC. Uterine rupture occurred in five women (2.4%), and in 3.4% of those being induced but none of these required hysterectomy. Women with a history of previous CD and an IUFD often undergo trial of labor with a high VBAC success rate. Uterine rupture complicates 2.4% of such cases.

Keywords

vaginal birth after cesarean; fetal demise; induction of labor

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INTRODUCTION

The clinical management of intrauterine fetal demise in women with a previous cesarean delivery presents a quandary for the obstetrician. With the current reluctance of obstetricians to perform vaginal birth after cesarean (VBAC) and the paucity of data to counsel women regarding maternal risks, management options are limited by physician clinical experience and bias. With the rising rate of cesarean delivery now reaching 31.1% and fetal demise occurring in 0.6% of deliveries, the occurrence of a fetal demise in a patient with a prior cesarean delivery is becoming more prevalent.[1, 2]

In the setting of fetal demise, maternal safety becomes the primary concern. However, limited information exists concerning outcomes associated with induction of labor utilizing oxytocin and prostaglandin in the scenario of prior cesarean delivery for these women. Medicolegal pressures may prevent physicians from attempting a trial of labor in this situation. We have previously reported maternal and perinatal outcomes in a prospective, observational study of 45,988 women with a singleton gestation (including those with fetal demise) and prior cesarean delivery.[3] The purpose of this study was to characterize management and outcomes specifically in those women with an antepartum fetal demise and a previous cesarean delivery.

MATERIALS AND METHODS

A secondary analysis of a prospective cesarean delivery registry at 19 academic institutions performed by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network from 1999 to 2002 was performed. Details of the cohort have been previously published.[3] Included in this analysis were all singleton pregnancies with a prior cesarean delivery and an antepartum intrauterine fetal demise of equal or greater than 20 weeks of gestation or 500 grams. Maternal demographic data, obstetrical history, methods of induction, mode of delivery, length of hospitalization and maternal complications such as uterine rupture, blood transfusions, hysterectomy, endometritis, and admission to intensive care unit were analyzed. Uterine rupture was defined as a disruption or tear of the uterine muscle and visceral peritoneum or a separation of the uterine muscle with extension to the bladder or broad ligament. Postpartum endometritis was defined as a clinical diagnosis of puerperal infection in the absence of findings suggesting a nonuterine source of infection.

Continuous variables were compared with the use of the Wilcoxon rank sum test. Nominal two-sided p values are reported with statistical significance defined as a $p < 0.05$. No adjustments were made for multiple comparisons. SAS software (SAS Institute, Cary, NC), was used for the analysis.

RESULTS

Among the 45,988 women who had a singleton gestation and a history of cesarean delivery, 209 (0.45%) were identified with a singleton antepartum intrauterine fetal demise of equal to or greater than 20 weeks of gestation or 500 grams. Demographic characteristics are presented in Table 1. Previous successful VBAC was present in 19.4% and previous vaginal delivery in 37.0%. Preexisting maternal disease was present in 27.8% (58/209) including diabetes, asthma, thyroid disease, seizure disorder, chronic hypertension, renal disease and connective tissue disease.

The methods of delivery are shown in Figure 1. Indications for a repeat cesarean delivery included 37.3% (n=19) elective, and 62.7% (n=32) either indicated or in labor. The coded indications for repeat cesarean included placental previa, prior classical, vertical, "inverted

T" or J incisions in the uterus, abruptio placenta, malpresentation without version attempt, suspected macrosomia, prior myomectomy, and preeclampsia or hypertension. The majority of women (75.6%) attempted a trial of labor, with most (86.7%) achieving a successful VBAC. Induction of labor was required in 74.4% and augmentation in 9.0%. The women who attempted a trial of labor had an average gestational age of 30.2 ± 6.6 weeks. Augmentation of labor was achieved in all cases with oxytocin. In contrast, induction of labor was achieved most commonly with oxytocin in combination with artificial rupture of membranes, various prostaglandin agents, laminaria, or Foley catheter. Prostaglandins were the only inducing agent in 21.6% of cases (Figure 1). Although a higher mean dose of oxytocin (29.1 ± 62.2 versus 16.3 ± 12.8 mIU) and longer mean duration of labor (21.8 ± 22.9 versus 14.0 ± 6.0 hours) were noted with induction compared with augmentation of labor, this was not statistically significant ($p = 0.15$ and $p = 0.73$, respectively).

Uterine rupture occurred in five women (2.4%) including four who underwent labor induction. The uterine rupture rate with an induction of labor was 3.4% (4/116). In the rupture cases, four of the previous cesarean delivery uterine incisions were low transverse and the fifth was a classical. Four of these women had one previous cesarean delivery. None of the four women with a previous low segment transverse uterine incision had a previous vaginal delivery. The women with uterine rupture had an average gestational age of 32.8 ± 7.1 weeks and birth weight of 2196 ± 1584 grams. Of the four women with a uterine rupture who underwent an induction of labor, all received oxytocin, with two also receiving prostaglandin (one dinoprostone vaginal insert and the other dinoprostone cervical gel). The fifth patient with a prior classical uterine incision did not experience labor and underwent a repeat cesarean section. The average duration of labor for the four patients with uterine rupture was 54.4 ± 35.9 hours (Table 2).

The rate of intrapartum and postpartum blood transfusion was 7.7% (16/209). In 56.3% (9/16) of the women transfused, abruptio placenta was noted. A total of seven women (3.3%) required intensive care unit (ICU) care for the following indications: need for ventilatory support, management of coagulopathy, pulmonary edema, central line placement, radial artery line, uncontrolled hypertension, hemodynamic monitoring, preeclampsia and maternal sepsis. None of the women with uterine rupture required blood transfusion, hysterectomy, or ICU admission. One woman in the repeat cesarean group underwent a cesarean hysterectomy secondary to uterine atony. Postpartum endometritis was diagnosed in 5.7% (12/209) of the patients. The mean hospital stay was significantly different according to delivery route (median 3 days, range 1 to 16 for repeat cesarean delivery and median 2 days, range 0 to 16 for trial of labor, $p = 0.006$). There were no maternal deaths in this cohort of patients.

Discussion

In this large prospective, multicenter cohort of women with previous cesarean delivery and an antepartum stillbirth, our data indicate that a trial of labor is the most frequent mode of delivery attempted with a high rate of VBAC success. This was accomplished with a high proportion of labor inductions and an overall increased risk of uterine rupture overall (24/1,000) and after labor induction (34/1000) compared with trial of labor for a live fetus (7/1000).[3] However, none of the women with uterine rupture required hysterectomy, blood transfusion, or admission to the ICU. This cohort of women is at high risk of ICU admission for complications of the condition leading to fetal death (e.g. preeclampsia, placental abruption) and hemorrhage.

In recent years, the proportion of women who undergo a trial of labor with previous cesarean delivery has declined.[1] The factors contributing to this decline are multifactorial,

with the risk of perinatal death and morbidity secondary to uterine rupture a great consideration.[4] When encountering stillbirth, the focus shifts to maternal morbidity. Repeat cesarean delivery, in women who plan future pregnancies, may increase the risk of uterine rupture, placenta accreta, and morbidity related to multiple abdominal surgeries.[5] Very little is known about the long-term psychological impact on women having to undergo a repeat cesarean delivery for a stillbirth. Women who successfully deliver vaginally generally have less postpartum discomfort, shorter hospital stays, and shorter periods of disability than women who undergo repeated cesarean delivery.[4] However, the current study did not address either the patient's or physician's rationale for choosing a particular mode of delivery. Patient satisfaction or psychological outcome was not addressed as well. Given the complexity of emotional factors associated to fetal loss, it is unlikely that a randomized trial could be performed to eliminate selection bias and address this concern.

In the current study, the majority of women underwent induction of labor, with many receiving prostaglandin agents. This observational study was completed prior to the recommendation of The American College of Obstetricians and Gynecologists discouraging the use of prostaglandins for induction of labor in women attempting VBAC.[6] Although induction of labor in the present study was associated with an increased risk of uterine rupture, it did not appear to be related to the specific agent utilized; however, the number of cases in the present study is small. We found similar rates of uterine rupture among various induction agents in the larger cohort from which this secondary analysis was conducted.[3] The majority of stillbirths occur prior to 28 weeks estimated gestational age.[2] Oxytocin is less effective for the induction of labor, remote from term.[7] Therefore, prostaglandins may be valuable in this clinical situation. Prostaglandins have been shown to be safe and effective in termination of pregnancies prior to 28 weeks gestation in women with prior cesarean deliveries, without resulting uterine rupture or hysterectomy.[8] A recent meta-analysis of 16 observational trials reported a low uterine rupture rate of 0.28% in women receiving misoprostol for second-trimester ternimation.[9]

The current study may aid in counseling women regarding the mode of delivery with an intrauterine fetal demise and a prior cesarean delivery. The frequency of uterine rupture in this cohort of subjects ranges between the reported rates for women with previous cesarean delivery and induction of labor in the medical literature.[10, 11] As our study population is from tertiary care centers and may include women with other risk factors for poor outcomes, comparison to other settings must be done with caution. However, it is not anticipated that labor outcomes will be better at a center with fewer available resources for the care of these women. Uterine rupture may be associated with catastrophic morbidity. If induction is to be undertaken for fetal death after a prior cesarean delivery, care must be taken to ensure the needed resources for urgent surgical intervention, including surgical, anesthesiological, nursing and ancillary personnel as well as blood product that may be needed. Overall, our data suggest that induction of labor in women with an intrauterine fetal demise and previous cesarean section is associated with a high success rate and shorter hospital stay and should be considered an alternative to repeat cesarean delivery.

Acknowledgments

In addition to the authors, other members of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network are as follows:

The University of Texas Health Science Center at Houston — S. Ramin, L. Gilstrap, M. Day, M. Kerr, E. Gildersleeve

University of Texas Southwestern Medical Center — S. Bloom, J. Gold, D. Bradford

University of Utah — M. Belfort (Utah Valley Regional Medical Center), F. Porter (Intermountain Healthcare), B. Oshiro (McKay-Dee Hospital Center), K. Anderson (University of Utah Health Sciences Center), A. Guzman (McKay-Dee Hospital Center)

University of Pittsburgh — K. Lain, M. Cotroneo, D. Fischer, M. Luce

Wake Forest University Health Sciences — M. Harper, M. Swain, C. Moorefield, K. Lanier, L. Steele

The Ohio State University — J. Iams, F. Johnson, S. Meadows, H. Walker

Thomas Jefferson University — A. Sciscione, M. DiVito, M. Talucci, M. Pollock

Wayne State University — M. Dombrowski, G. Norman, A. Millinder, C. Sudz, B. Steffy

University of Cincinnati — T. Siddiqi, H. How, N. Elder

Columbia University — F. Malone, M. D'Alton, V. Pemberton, V. Carmona, H. Husami

Brown University — H. Silver, J. Tillinghast, D. Catlow, D. Allard

University of Alabama at Birmingham — D. Rouse, A. Northen, S. Tate

Northwestern University — M. Socol, D. Gradishar, G. Mallett

University of Miami — G. Burkett, J. Gilles, J. Potter, F. Doyle, S. Chandler

University of Tennessee — W. Mabie, R. Ramsey

University of Texas at San Antonio — D. Conway, S. Barker, M. Rodriguez

University of North Carolina — K. Moise, K. Dorman, S. Brody, J. Mitchell

University of Chicago — A. Moawad, J. Hibbard, P. Jones, M. Ramos-Brinson, M. Moran, D. Scott

Case Western Reserve University — P. Catalano, C. Milluzzi, B. Slivers, C. Santori

The George Washington University Biostatistics Center — E. Thom, H. Juliussen-Stevenson, M. Fischer, L. Leuchtenburg

Eunice Kennedy Shriver National Institute of Child Health and Human Development — D. McNellis, K. Howell, S. Tolivaisa

MFMU Steering Committee Chair *(Vanderbilt University Medical Center)* — S. Gabbe

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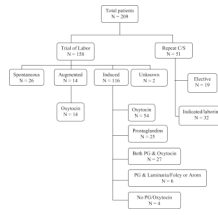
FIGURE 1. ANTEPARTUM FETAL DEATH AND PRIOR CESAREAN DELIVERY
C/S - cesarean section; PG -prostaglandins; Arom – artificial rupture of membranes

TABLE 1

MATERNAL DEMOGRAPHICS

Maternal age (years)		29.2 ± 5.9
Race		
Black	92	(44.0%)
White	61	(29.2%)
Hispanic	45	(21.5%)
Other/unknown	11	(5.3%)
Married	99	(47.4%)
Private insurance	75	(35.9%)
Prior vaginal delivery	77	(37.0%)
Prior VBAC	38	(19.4%)
Previous Cesarean Section		
1	150	(71.8%)
2	46	(22.0%)
3	10	(4.8%)
4	3	(1.4%)
Gestational age at delivery (week's)		31.3 ± 6.5
Maternal diseases [*]	58	(27.8%)

Data presented as n (%) or mean ± standard deviation; VBAC- vaginal birth after cesarean;

[*] Includes diabetes, asthma, thyroid disease, seizure disorder, chronic hypertension, renal disease and connective tissue disease

TABLE 2

Labor and Delivery Characteristics of the Five Cases of Uterine Rupture

No. of Previous C/S	Parity	Induction/Augmentation Agent	Duration of Labor (h)	Gestational Age (wk, d)	Birth Weight (g)
1	1	Laminaria, PG, oxytocin	43.0	36, 4	4120
1	2	None	None	33, 6	2100
2	2	PG, oxytocin	50.1	40, 1	3390
1	1	Oxytocin	104.6	21, 2	272
1	1	Oxytocin	19.8	32, 1	1100

C/S, cesarean delivery; PG, prostaglandins.