

Association of patient characteristics with successful vaginal birth after cesarean delivery: a single center study

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- Our primary aim was to determine which maternal characteristics were associated with successful vaginal birth after cesarean delivery (VBAC) in a single-center cohort.
- We hypothesized that certain risk factors – such as BMI, parity, and prior cesarean indication – would be associated with higher VBAC success.

Methods

- Patients who had live-born deliveries at our hospital from January 1, 2023 to December 31, 2023 were included in the study.
- Patients who attempted VBAC and had complete body mass index (BMI) data were included in the final analysis.
- A bivariate analysis was performed between patients who had successful and unsuccessful VBAC.
- A multivariate logistic regression designed to predict successful VBAC was performed with variables of interest.

Results

- There were 2969 deliveries during the study period. 491 patients had a history of prior CD and 140 patients attempted VBAC.
- One patient was excluded from the final analysis due to missing BMI data.
- 107 (77%) patients who attempted VBAC had a vaginal delivery.
- Patients who had a successful VBAC were taller, had a lower BMI, higher parity, and were less likely to have had a medically indicated induction of labor.
- A multivariate logistic regression designed to predict successful VBAC found that a five-unit increase in BMI (aOR 0.72; 95% CI 0.54-0.96; p=0.02) was independently associated with successful VBAC.
- The c-statistic for this multivariate model was 0.76.

Table 2. Multivariate logistic regression to predict whether a VBAC was successful

Variable	Units	Odds ratio	95% Confidence intervals		P value
Body mass index	5 kg/m ²	0.72	0.54	0.96	0.02
Parity	1	1.54	0.96	2.46	0.08
Failed induction of labor (prior cesarean delivery)	Yes	0.31	0.07	1.43	0.13
Fetal heart rate abnormalities (prior cesarean delivery)	Yes	0.54	0.21	1.39	0.20
Medically indicated induction of labor	Yes	0.45	0.19	1.08	0.07
Labor epidural analgesia	Yes	0.33	0.04	2.74	0.31

Table 1. Demographic, physical, and clinical characteristics of the cohorts

Variable	Successful VBAC (N=107)	Unsuccessful VBAC (N=32)	P value
Race			0.36
American Indian or Alaskan Native	1 (1%)	0	
Asian	2 (2%)	1 (3%)	
Biracial	4 (4%)	0	
Black or African American only	19 (18%)	8 (25%)	
Hispanic	37 (35%)	15 (47%)	
Native Hawaiian or Other Pacific Islander	2 (2%)	1 (3%)	
White or Caucasian only	42 (39%)	7 (22%)	
Age (years) (median (IQR))	30 (26-34)	30 (26-34)	0.96
Height (cm) (median (IQR))	161.5 (157.5-167.6)	158.8 (152.4-165.0)	0.08
Weight (kg) (mean (SD))	90.7 ± 19.3	98.9 ± 22.5	0.07
Body mass index (kg/m ²) (mean (SD))	34.5 ± 6.8	38.7 ± 8.5	0.02
Gravidity (median (IQR))	3 (3-5)	3 (2-4)	0.06
Parity (median (IQR))	2 (1-3)	1 (1-2)	0.01
Gestational age (weeks) (median (IQR))	39.0 (37.6-39.6)	38.6 (37.2-40.0)	0.95
Multiple gestation (yes)	2 (2%)	1 (3%)	0.55
Number of prior cesarean deliveries (median (IQR))	1 (1-1)	1 (1-1)	0.53
Indication for last cesarean delivery			
Failed induction of labor	5 (5%)	5 (16%)	0.04
Arrest of the active phase	12 (11%)	3 (9%)	1.00
Arrest of descent/prolonged second stage	13 (12%)	2 (6%)	0.52
Fetal heart rate abnormality	27 (25%)	13 (41%)	0.09
Cord prolapse	1 (1%)	0	1.0
Placenta accreta spectrum	2 (2%)	1 (3%)	0.55
Malpresentation	20 (19%)	5 (16%)	0.69
Maternal preference	1 (1%)	0	1.00
Medically indicated induction (yes)	34 (32%)	17 (53%)	0.04
Ruptured membranes at time of admission (yes)	17 (16%)	7 (22%)	0.43
Hypertensive disorder (yes)	29 (27%)	12 (38%)	0.26
Diabetes of any kind (yes)	18 (17%)	4 (12%)	0.78
Labor epidural analgesia (yes)	92 (86%)	31 (97%)	0.12

Conclusions

- A five-unit increase in BMI was associated with a 28% reduction in the chance of successful VBAC.
- Race was not associated with successful VBAC in our bivariate analysis and this variable was not included in our multivariate logistic regression.
- Patients who had unsuccessful VBAC had a higher rate of labor epidural analgesia that was not statistically significant.
- Additionally, labor epidural analgesia was not independently associated with successful VBAC.
- Our c-statistic of 0.76 for our multivariate logistic regression indicates good predictability.
- These findings may assist in counseling and clinical decision-making for patients considering VBAC at our hospital.