

INTRODUCTION

Neonatal seizures are more prevalent among preterm infants. Little is known on the risk factors for seizures after late preterm births. Utilizing a population cohort, we aim to investigate antenatal risk factors for neonatal seizures among preterm births.

METHODS

This is a case control study which included late preterm births in the United States without any anomaly born between 2016 and 2018 from the U.S. Natality database. Cases were defined as infants with neonatal seizures, while the controls consisted of infants without neonatal seizures. Maternal and pregnancy characteristics were compared between the cases and controls. Multivariable logistic regression was performed to investigate risk factors for neonatal seizure.

TABLE 1: MATERNAL AND NEONATAL CHARACTERISTICS

Characteristics	Neonatal Seizures N = 512	No Neonatal Seizures N = 943, 068	p
Maternal characteristics			
Maternal age (years)	29 (24-34)	29 (24-34)	0.569
Paternal age (years)	32 (27-38)	32 (27-36)	0.523
Parity	2 (1-4)	2 (1-4)	0.81
Interval from last birth (months)	92 (33-888)	70 (27-888)	0.002
Number of prenatal visits	9 (6-12)	10 (8-12)	< 0.001
Month of pregnancy prenatal care began	3 (2-4)	3 (2-3)	0.869
Private insurance	197 (43.1)	412,959 (47.7)	0.049
Smoking	116 (23.3)	103,421 (11.0)	< 0.001
Body mass index (kg/m ²)	26.9 (22.7-32.0)	26.2 (22.3-31.2)	0.034
Weight gain in pregnancy (lbs.)	26 (15-37)	27 (18-38)	0.021
Maternal history			
History of pre-gestational diabetes	19 (3.7)	18,769 (2)	0.01
History of gestational diabetes	57 (11.2)	81,113 (8.6)	0.048
History of chronic hypertension	27 (5.3)	35,200 (3.7)	0.078
History of gestational hypertension	70 (13.7)	124,611 (13.2)	0.744
Eclampsia	5 (0.1)	7,158 (0.8)	0.447
History of preterm birth	50 (9.8)	73,527 (7.8)	0.098
History of previous cesarean birth	89 (17.5)	173,339 (18.4)	0.607
L&D characteristics			
Received Betamethasone	78 (15.3)	129,469 (13.7)	0.304
Chorioamnionitis	16 (3.1)	8,711 (0.9)	< 0.001
Breech presentation	45 (9.1)	81,119 (8.8)	0.750
Cesarean birth	320 (62.5)	412,842 (43.8)	< 0.001
Maternal transferred	14 (2.7)	13,598 (1.4)	0.023
Neonatal characteristics			
Neonatal male sex	274 (53.5)	501,161 (53.1)	0.894
Birthweight (grams)	2637 (2270-3020)	2722 (2368-3119)	< 0.001
Gestational age at birthweight	35 (35-36)	36 (35-36)	0.002

TABLE 2: ANTENATAL FACTORS FOR NEONATAL SEIZURES

Factors	Neonatal Seizures	No Neonatal Seizures	Crude Odds ratio	Adjusted Odds Ratio*
Interval since last birth (months)	92 (33-888)	70 (27-888)	1.00 [1.00-1.00]	1.00 [1.00-1.00]
Number of prenatal visits	9 (6-12)	10 (8-12)	0.94 [0.92-0.96]	0.94 [0.92-0.97]
Smoking	116 (23.3)	103,421 (11.0)	2.45 [1.99-3.02]	2.21 [1.76-2.79]
Body mass index (kg/m ²)	26.9 (22.7-32.0)	26.2 (22.3-31.2)	1.01 [1.00-1.02]	1.00 [0.99-1.01]
Weight gain in pregnancy (lbs.)	26 (15-37)	27 (18-38)	0.99 [0.99-1.00]	0.99 [0.99-1.00]
Pre-gestational diabetes	19 (3.7)	18,769 (2)	1.90 [1.20-3.01]	1.98 [1.22-3.21]
Gestational diabetes	57 (11.2)	81,113 (8.6)	1.34 [1.01-1.76]	1.30 [0.96-1.78]
Chorioamnionitis	16 (3.1)	8,711 (0.9)	3.47 [2.11-5.70]	3.95 [2.39-6.54]
Cesarean birth	320 (62.5)	412,842 (43.8)	2.14 [1.79-2.56]	2.33 [1.91-2.85]
Birthweight (grams)	2637 (2270-3020)	2722 (2368-3119)	1.00 [1.00-1.00]	1.00 [1.00-1.00]
Gestational age at birth (weeks)	35 (35-36)	36 (35-36)	0.86 [0.77-0.95]	0.95 [0.84-1.08]

RESULTS

Of the 943,580 late preterm births, 512 (0.05%) developed neonatal seizures. Univariate analyses between groups are presented on Table 1. From multivariable logistic regression, significant risk factors associated with neonatal seizures among late preterm infants included smoking history (aOR 2.21, [1.76-2.79]), pre-gestational diabetes (aOR 1.98, [1.22-3.21]), chorioamnionitis (aOR 3.95, [2.39-6.54]), and cesarean birth (aOR 2.33, [1.91-2.85]) (Table 2).

CONCLUSIONS

History of smoking, pregestational diabetes, chorioamnionitis, and cesarean birth are risk factors for neonatal seizures at late preterm. Obstetricians should communicate these risk factors to pediatricians at birth.