Internal Versus External Intrapartum Monitoring and Birthing Persons Perception of Control During Childbirth

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INTRODUCTION

Perception of control over labor and birth has been demonstrated to significantly affect a birthing person's experience and potentially impact postpartum wellbeing.[1-4] Internal monitors (i.e., fetal scalp electrode (FSE) and intrauterine pressure catheter (IUPC) with/without amnioinfusion (AI)) are invasive monitors used for management of labor complications including non-reassuring fetal status.[5] There has been no published research which explores how the presence or absence of internal monitors affects birthing persons' perception of control during childbirth. In this study, we investigated the association of internal compared to external intrapartum monitors with birthing person's perception of control during childbirth.

METHODS

We performed a secondary analysis of a cross-sectional survey of 149 nulliparous birthing persons who were pregnant at ≥ 37 weeks with singleton gestations and admitted to a large academic medical center in July–August 2021.[1] Birthing persons were ineligible in the primary study if scheduled for cesarean birth, had a contraindication to trial of labor, or were non-English speaking.[1] Birthing persons were identified for inclusion via chart review and all were approached during their postpartum hospital stay during the study period. Following delivery, birthing persons completed the LAS, a validated tool to assess perceived control over childbirth in which lower scores represent lower perceived control or agentry.[1,3] A post-hoc sample size calculation based on median LAS score from prior literature determined that 120 patients would provide 80% power (with two sided type I error of 5%) to detect a difference of 16 points on LAS.

Demographics, perinatal outcomes, and LAS scores were compared between birthing persons with internal (i.e. FSE, IUPC, AI) and external monitors intrapartum. LAS scores were stratified by specific internal monitor utilized and compared to only external monitoring. Multivariable linear regression for LAS scores by internal versus external monitors were calculated, controlling for mode of delivery, length of labor, and medical comorbidities based on bivariate analysis. The study was approved by the Institutional Review Board (IRB) before study enrollment #1691795, March 30, 2021.

RESULTS

Of the 160 participants from the primary study, 49 (30.6%) had internal monitors during their labor course. There were no differences in maternal age, race, gestational age at delivery, or select perinatal outcomes between those who had internal versus external monitors. Birthing persons who had internal monitors were more likely to have a medical comorbidity (44.9% vs 25.7%, p-value 0.02) and to deliver by cesarean section (57.1% vs 16.8%, p-value <0.001) compared to those with external monitors. Bivariate analysis of LAS scores revealed lower scores among those requiring internal monitors compared to external monitors (median [interquartile range/IQR] 146 [135–162] versus (162 [145–181]), p-value <0.001) **Table 1**. However, after controlling for mode of delivery, length of labor, and medical comorbidities, no significant difference in LAS scores were identified between those monitored internally versus externally (165 versus 162, p-value 0.42).

When analyzed by specific internal monitor, birthing persons who required IUPC had lower LAS scores (n= 47; 145 [132–158]) while FSE (n=18; 155 [144–177]) and AI (n=14; 152 [141–166]) demonstrated no differences in LAS scores compared to birthing persons with external monitors respectively.

DISCUSSION

Among birthing persons who required the use of internal monitors (e.g. FSE, IUPC with or without AI), lower perceived control over labor was associated with labor ending in cesarean delivery, not the presence of internal monitors alone. Despite no difference in perceived control of childbirth overall, there were differences in birthing persons perceived control over labor by specific monitor (i.e. n=47 IUPC 146 [132-158] and n= 18 FSE 155 [144–177) but not with amnioinfusion alone (i.e. n=14 AI 152 [141–166]). These data add new understanding to the perceptions that birthing people experience during labor and childbirth communications

Table 1. Perinatal outcomes by intrapartum monitoring method and patients' perception of control

	External monitors N=111	Internal monitors† N=49	p–value
Labour Agentry Scale score, median (IQR)	162 (145–181)	146 (135–162)	<0.001
Maternal age, median (IQR)	29 (25–32)	28 (24–32)	0.44
Gestational age, median (IQR)	39.7 (38.9–40.6)	39.7 (38.7–41)	0.39
Self-reported race/ethnicity			
White	82 (72.6)	30 (61.2)	0.20
Black	7 (6.2)	2 (4.1)	0.72
Latina	20 (17.7)	14 (28.6)	0.14
Indigenous	3 (2.7)	2 (4.1)	0.64
Asian/Pacific Islander	1 (0.9)	1 (2.0)	0.52
Primary insurance			0.89
Public	31 (29.5)	14 (32.6)	
Private	73 (69.5)	29 (67.4)	
Self-pay	1 (1.0)	0	
Highest level of education			0.06
High School/GED or less	29 (27.5)	19 (44.2)	
Above High School	75 (72.4)	24 (55.8)	
Maternal comorbidities§	29 (25.7)	22 (44.9)	0.02
Chronic hypertension	6 (5.7)	11 (25.6)	0.001
Hypertensive disorders of pregnancy	7 (6.7)	15 (34.9)	<0.001
Pregestational diabetes	1 (1.0)	1 (2.3)	0.50
Gestational diabetes	6 (5.7)	4 (9.3)	0.48
Thyroid disease	6 (5.7)	3 (7.0)	0.72
SARS-CoV-2 infection	2 (1.9)	4 (9.3)	0.05
Mode of delivery			<0.001
Spontaneous vaginal delivery	87 (77.0)	19 (38.8)	
Operative vaginal delivery	7 (6.2)	2 (4.1)	
Cesarean delivery	19 (16.8)	28 (57.1)	
Method of anesthesia			
Neuraxial	95 (90.5)	42 (97.7)	0.18
Nitrous oxide	3 (2.9)	2 (4.7)	0.63
Intravenous	5 (4.8)	0	0.32
Local	7 (6.7)	1 (2.3)	0.44
Birthweight grams, median [interquartile]	3360 [3028–3695]	3415 [3010–3679]	0.75
NICU Admission	8 (7.2)	7 (14.3)	0.24
Neonatal therapy*	16 (14.2)	8 (16.3)	0.81

Data are N(%) unless otherwise stated. Significance at p<0.05.

Fisher's exact and Wilcoxon Ranksum tests used for analysis.

IQR = interquartile range, NICU = NICU

†Fetal scalp electrode, intrauterine pressure catheter, and/or amnioinfusion

‡Adjusted for maternal comorbidities, length of labor, and cesarean delivery

§Maternal medical comorbidities include: chronic hypertension, hypertensive disorders of pregnancy, pregestational diabetes and gestational diabetes, thyroid disease and SARS-CoV-2 infection.

*Neonatal therapy = need for supplemental oxygen, phototherapy for jaundice, neonatal antibiotics

with their obstetric providers.[1,6-11] Provider concerns for labor ending in cesarean delivery should be communicated as early as possible during intrapartum care to improve patients' perception of control.

The association between a birthing persons experience in childbirth and their perinatal mental health is particularly relevant as the American College of Obstetricians and Gynecologist report that perinatal mental health conditions affect more than one in five birthing people and are among the most common complications during the first year after childbirth.[6-12] Future studies should examine if perinatal interventions designed to improve LAS will reduced traumatic childbirth and potentially subsequent perinatal mental health disorders.

LIMITATIONS

These results must be interpreted within the limitations of our secondary analysis as it is a single institution, observational data, and predominantly white birthing people. These data do not represent a comprehensive and diverse patient population which is important from a health equity and for provider-birthing person communication. Additionally, there were only 1/3 of the primary study cohort who required internal monitors which limits the interpretation of LAS scores by specific internal monitoring.

CONCLUSION

Among birthing persons who required the use of internal monitors, lower perceived control over labor was driven predominantly by cesarean delivery, not the presence of internal monitors. Future studies should focus on how to improve a birthing person's perception of control during childbirth when labor may result in cesarean delivery.

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Conflict of Interest

The authors report no conflict of interest.

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