

Adverse Neonatal Outcomes and Definitions of Hypotension after Elective Cesarean Delivery under Spinal Anesthesia in Morbid Obesity

Jack Wang, Jason Hoang, Yun Xia, Blair Hayes, Marilly Palettas, Tianna Xia, Marco E Villalobos, Alberto Uribe, Ling-Qun Hu

INTRODUCTION

- Complications after spinal anesthesia (SAB) can lead to a drop in blood pressure (BP), potentially causing Neonatal Intensive Care Unit (NICU) admission.¹
- NICU incidence is higher in elective cesarean delivery (14.1%) (CD) than vaginal delivery (6.5%)², and highest in women with hypertensive disorders of pregnancy (HDP) (25.6%)³.
- Detecting maternal hypotension is essential for preventing NICU admission, however BP measurements on the arm may not reflect uterine perfusion pressure if the gravid uterus impedes flow.
- We are investigating the relationship between adverse neonatal outcomes and BP between two sites after spinal anesthesia in elective cesarean delivery.

METHODS

- **Design:** Single-center, prospective, cohort observational study
- **Population:** singleton birth, age ≥ 18 , BMI ≥ 35 , term, elective CD
- **BP measurements:** arm and left ankle at three time points on flat & 15° tilt positions (2 sits, 3 points, and 2 positions)
- **Time points:** before-after SAB, after delivery
- **Null hypothesis:** Poor neonatal outcomes are not associated with maternal hypotension
- **Primary outcome:** incidence of maternal hypotension, and FAAAN*
- **Secondary outcomes:**
Maternal: arm comfort, nausea/vomiting, shivering, delayed cord clamp

*FAAAN: A composite parameter includes (F)etal heart rates, 1 min (A)pgar and 5 min (A)pgar scores, (A)irway support, and (N)ICU admission

Table 1: Hypotension and CD Delivery Time by Poor Composite Fetal/Neonatal Outcomes

Variable	Normal outcome (n=58)	Abnormal outcomes (n=25)	Total (n=83)	P-value
Hypotension after SAB at arm in supine position	12 (21%)	14 (56%)	26 (31%)	0.022
Hypotension after SAB at ankle in supine position	10 (17%)	9 (36%)	19 (23%)	0.011
Delivery Time (minutes, Median [IQR])	➡ 32 [26, 49]	➡ 30 [26, 36]		0.538

Table 2: Differences between the HDP and the non HDP

Variable	Non-HDP (n=55)	HDP (n=28)	Total (n=83)	P-value
NICU Admission	3 (5%)	➡ 9 (32%)	12 (14%)	0.002
FAAAN	13 (24%)	➡ 12 (43%)	25 (30%)	0.071
Hypotension after SAB at arm in supine position	15 (27%)	11 (39%)	26 (31%)	0.288
Hypotension after SAB at ankle in supine position	10 (18%)	9 (32%)	19 (23%)	0.166

FAAAN: A composite parameter includes (F)etal heart rates, 1 min (A)pgar and 5 min (A)pgar scores, (A)irway support, and (N)ICU admission

RESULTS

- **Demographics** of 83 patients
 - Averaged 31±5 yo
 - 38wd3±1.3 gestational age
 - BMI 44±7.8
 - 33.7% HTN
 - Fetal weight 3715.7±565.8 g
- There was no difference in delivery minutes after SAB between patients with and without FAAAN.
 - However higher incidence of FAAAN existed in both groups.
- NICU admission for non-HDP patients was 3 out of 55 (5%) while HDP patients was 9 out of 28 (32%)
- FAAAN for the Non-HDP was 3 out of 55 (24%) while HDP patients was 12 out of 28 (43%)

FAAAN: A composite parameter includes (F)etal heart rates, 1 min (A)pgar and 5 min (A)pgar scores, (A)irway support, and (N)ICU admission

FUTURE STEPS

- Data collection is completed
- Analyze the entire sample of 100 patients
- Evaluate the association between BP measurement at the upper and lower extremity on neonatal outcomes
- Evaluate timing of position changes related to BP and focal flow changes
- Evaluate the relationship between the length from SAB to delivery and poor neonatal outcomes

REFERENCES:

1. Obes Res Clin Pract. Nov-Dec 2021;15(6):536-545
2. Acta Anaesthesiol Scand 2010: 54, 8, 909-921
3. ACOG 2008:111,4, 823-828