Incidence of maternal and fetal/neonatal outcomes in morbidly obese parturients undergoing spinal anesthesia (SAB) for elective cesarean delivery (CD) at term

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INTRODUCTION

- Most CD are performed under neuraxial anesthesia in LUD
- BP measurements taken on the arm may not reflect uterine perfusion pressure
- Risk factors for poor fetal/neonatal outcomes in otherwise healthy fetuses may include maternal obesity and HTN[1] but need further investigation
- It is valuable to the field of OB anesthesia to determine the relationship between incidence of poor maternal and fetal/neonatal outcomes and average BP after SAB

METHODS

- **Design:** Single-center, prospective, cohort study
- **Population:** Age ≥18, BMI ≥35, ASA II-III, elective CD
- **Aim:** Characterizing BP at the left ankle instead of upper arm
- **Null hypothesis:** BP measurements taken at the left ankle = BP measurements taken on the arm
- **Primary outcome:** Incidence of maternal hypotension
- **Secondary outcomes:**
  - Maternal: arm comfort, nausea/vomiting, shivering
  - Neonatal: FHR, APGAR scores, airway support, NICU admission

Table 1. Incidence of maternal and fetal/neonatal outcomes

Primary Outcomes (n (%))

● **Hypotension after SAB at non-IV arm**		● **Hypotension after SAB at left ankle**	
➢ **In supine**	15 (31%)	➢ **In supine**	6 (12%)
➢ **In LUD**	18 (37%)	➢ **In LUD**	6 (12%)
➢ **In supine after newborn**	8 (16%)	➢ **In supine after newborn**	2 (4%)
➢ **In LUD after newborn**	8 (16%)	➢ **In LUD after newborn**	4 (8%)

Secondary Outcomes

● **Maternal:**		● **Fetal/Neonatal (n (%)):**	
○ **Nausea/vomiting (n (%))**	9 (18%)	○ **FHR ≤ 110 after spinal**	5 (10%)
○ **Shivering (n (%))**	9 (18%)	○ **Airway support (facemask, CPAP, O2, intubation)**	2 (4%)
○ **Pain Arm > Ankle during measuring (n (%))**	6 (12%)		
○ **Mean SBP before SAB (mmHg, mean (SD))**		○ **NICU admission**	7 (14%)
➢ **Arm in supine**	136 (19)	○ **Apgar Score at 1 min**	
➢ **Arm in LUD**	133 (18)	**≤ 3**	5 (10%)
➢ **Left ankle in supine**	153 (20)	**> 3 ~≤ 7**	5 (10%)
➢ **Left ankle in LUD**	159 (18)	**> 7**	39 (80%)
○ **Mean SBP after SAB (mmHg, mean (SD))**			
➢ **Arm in supine**	122 (20)	○ **Apgar Score at 5 min**	
➢ **Arm in LUD**	118 (22)	**≤ 3**	0 (0%)
➢ **Left ankle in supine**	143 (28)	**> 3 ~≤ 7**	3 (6%)
➢ **Left ankle in LUD**	141 (27)	**> 7**	46 (94%)
○ **Mean SBP after delivery (mmHg, mean (SD))**		○ **Composite fetal/neonatal outcome**	14 (29%)
➢ **Arm in supine**	121 (13)	**(either FHR ≤ 110, or Apgar ≤ 7 at 1 min, or 5 min, or airway support, or NICU admission)**	
➢ **Arm in LUD**	120(13)		
➢ **Left ankle in supine**	139 (22)		
➢ **Left ankle in LUD**	138 (23)		

RESULTS

- **Demographics**
  - 32±5 yo
  - 38w3d±1.3 GA
  - 82% ASA III
  - BMI 44±7.8
  - 31% HTN
- **Maternal hypotension after spinal**
  - LUD at arm: 37%
  - Supine at arm: 31%
  - LUD/supine at left ankle: 12%
- **Fetal & neonatal outcomes**
  - Composite: 29%
  - NICU admission rate: 14%
- LUD by tilting OR table 15 degrees is not realistic

FUTURE STEPS

- Investigate the relationship between poor neonatal outcomes and the current definition of maternal hypotension
- Correlate hypotensive BP readings with poor outcomes and identify the best BP measurement site for predicting prognoses
- Address relationship of timing of position changes as it relates to BP
- Evaluate the association between time 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