# A Randomized Controlled Trial Using PIEB with 0.15% vs. 0.075% Ropivacaine in Labor Epidural Analgesia

## - effect on analgesic requirement and obstetric outcomes

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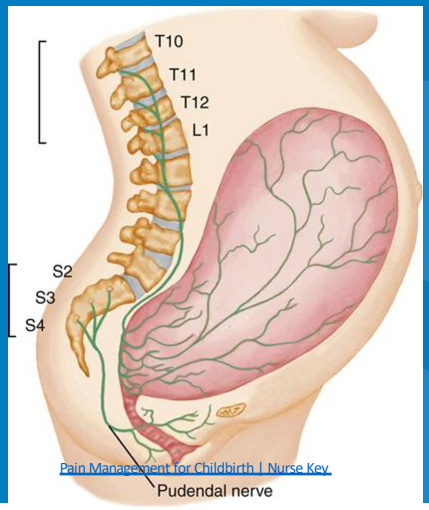
## INTRODUCTION

- ❑ Key recommendations from SOAP COE
  - Low-concentration LA + opioid:
    ≤0.1% bupivacaine
    ≤0.15% ropivacaine)
- ❑ Worldwide, NO standard techniques
- ❑ Is lower conc. LA better?

B Carvalho & J Mhyre. AA 2019; 128:844-846




## HYPOTHESIS

- ❑ T10-S2 (10 levels) for labor
- ❑ Low conc. of LA:
  better LA distribution ->
  improved analgesia ->

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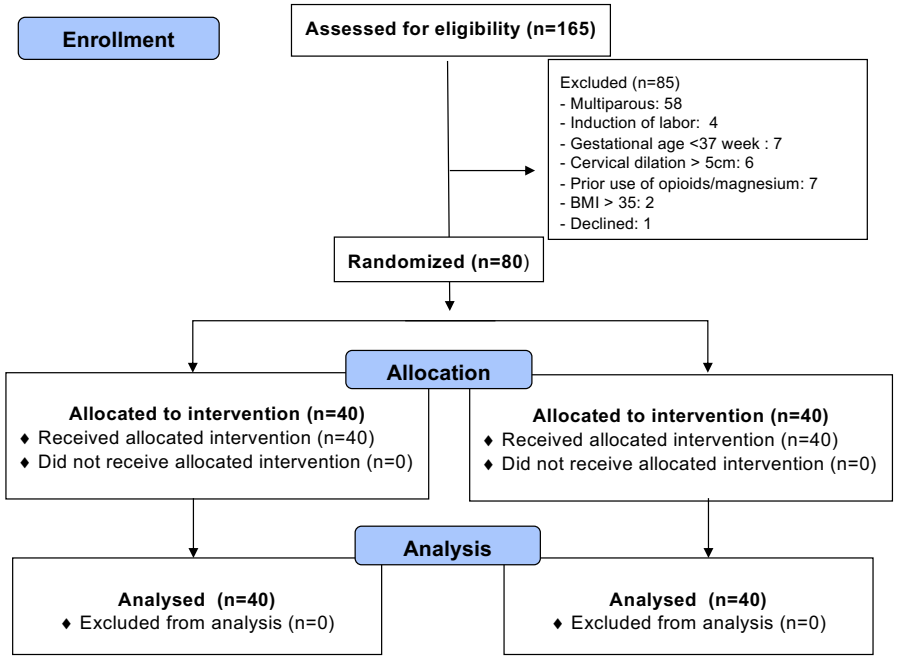
# METHOD

## CONSORT Flow Diagram




- ❑ Triple Blinded, Randomized, Controlled Trial
- ❑ Site: Hunan Maternity and Child Healthcare Hospital, China
- ❑ Single center, 15,000 deliveries/year

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# METHOD

Delivery: **Same** molecular mass / hr via
**Different** LA concentration and volume

## DESIGN

**PIEB + PCEA**

| High Concentration Low Volume | Low Concentration and High Volume |
|---|---|
| 0.15% Ropivacaine +<br>0.6 mcg/ml Sufentanil | 0.075% Ropivacaine +<br>0.3 mcg/ml Sufentanil |
| **Loading dose** - Physician bolus：<br>10 ml of 0.2% Ropivacaine + 10 mcg Sufentanil | |
| 10 min after loading dose, **start PIEB** and give the first epidural bolus | |
| PIEB: 5 ml q 40 min | PIEB 10 ml q 40 min |
| PCEA: 5 ml 15 min lock out | PCEA: 10 ml 15 min lock out |
| Hourly Maximum 20 ml | Hourly Maximum 40 ml |

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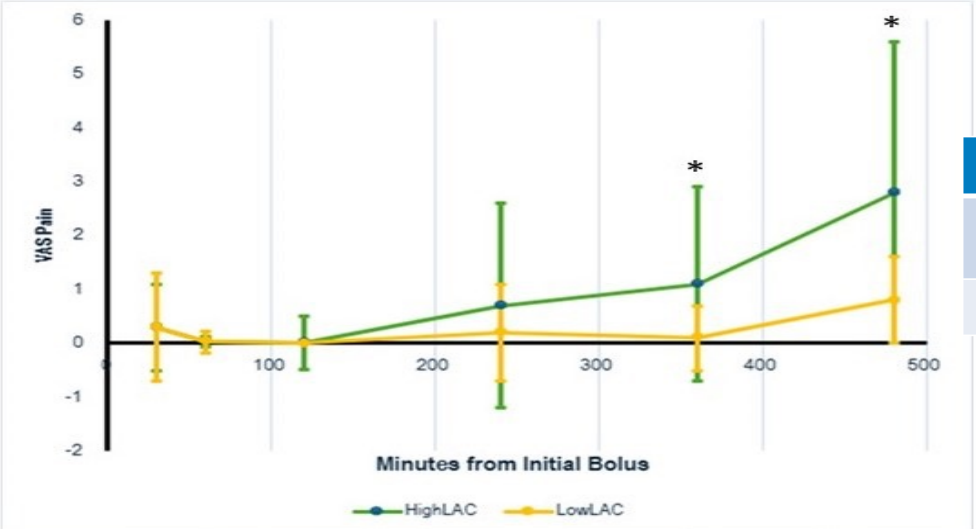
# RESULTS




| | 30 min | | 60 min | | 120 min | | 240 min | | 360 min | | 480 min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Patients** | | | | | | | | | | | |
| High LAC | 40 | | 40 | | 40 | | 40 | | 31 | | 20 |
| Low LAC | 40 | | 40 | | 40 | | 37 | | 33 | | 28 |
| **P-value** | 0.78 | | 0.9 | | 0.2 | | 0.13 | | **0.004** | | **0.004** |

**VAS Pain Scores after Epidural (mean$\pm SD$)**

| | 30 ' | 60’ | 120’ | 240’ | 360’ | 480’ |
|---|---|---|---|---|---|---|
| High LAC | 0.3±0.8 | 0.03±0.1 | 0.01±0.5 | 0.7±1.9 | 1.1±1.8 | 2.8±3.2 |
| Low LAC | 0.3±1.0 | 0.03±0.2 | 0±0 | 0.2±0.9 | 0.1±0.6 | 0.8±1.5 |

**Low LAC:**

Improved pain control with longer duration of analgesia

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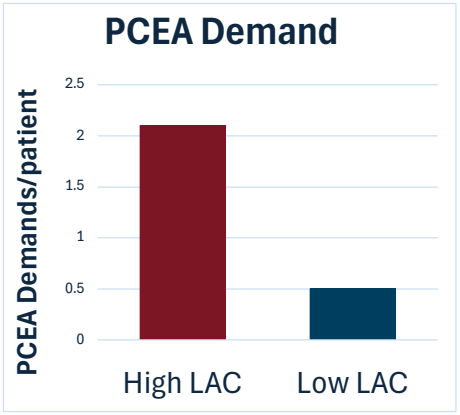
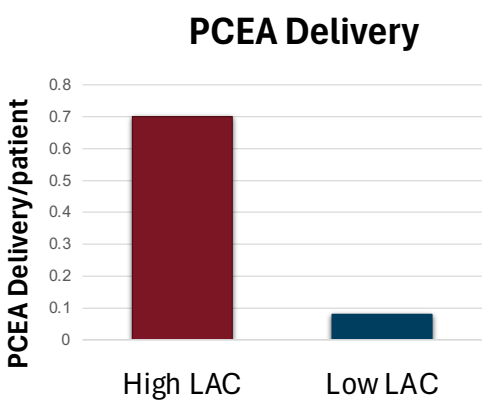
# RESULTS




**PCEA Demands and Delivery (mean$\pm SD$)**

| | PCEA Demand | PCEA Delivery |
|---|---|---|
| High LAC | 2.1±3.1 | 0.7±1.2 |
| Low LAC | 0.5±0.8 | 0.08±0.3 |
| *p* value | 0.002 | 0.001 |

**Low LAC:**

- ❑ Less PCEA demands
- ❑ More comfortable

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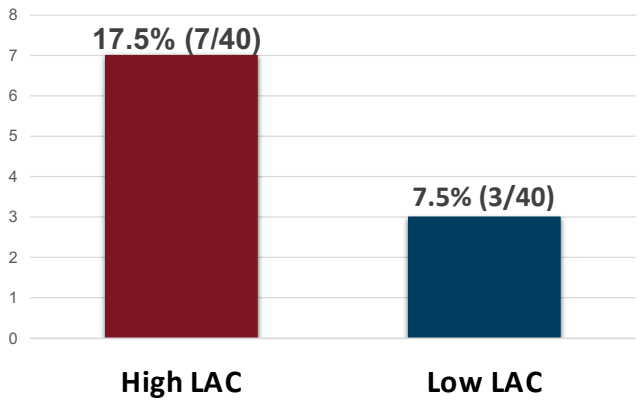
# RESULTS – Obstetric Outcomes




| | Bromage Scores at Full Dilation Median (Q1, Q3) | Forceps Delivery | Spontaneous Vaginal Delivery |
|---|---|---|---|
| High LAC | 4.2 (4, 4) n=33 | 17.5% (7/40) | 65% (26/40) |
| Low LAC | 4.6 (4, 5) n=37 | 2.5% (1/40) | 90% (36/40) |
| *p*- value | **0.02** | 0.56 | **0.014** |

**Low LAC:**

- ❑ Less motor block
- ❑ Improved SVD
- ❑ Low rates of forceps and CD, but underpowered


P Sultan et al. CJA 2013; 60:840-854

Y Ginosar et al. IJOA 2010; 19:171-178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# SUMMARY

- In this RCT trial, patients receiving the lower concentration and higher volume solution requested and received fewer PCEA requests.
- Labor epidural using a lower concentration of LA and higher volume produced less motor block and better analgesia over time.
- Less motor block reduced forceps use and improved spontaneous vaginal delivery.

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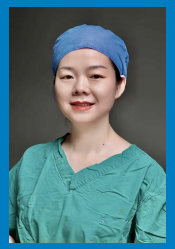

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# Acknowledgment

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