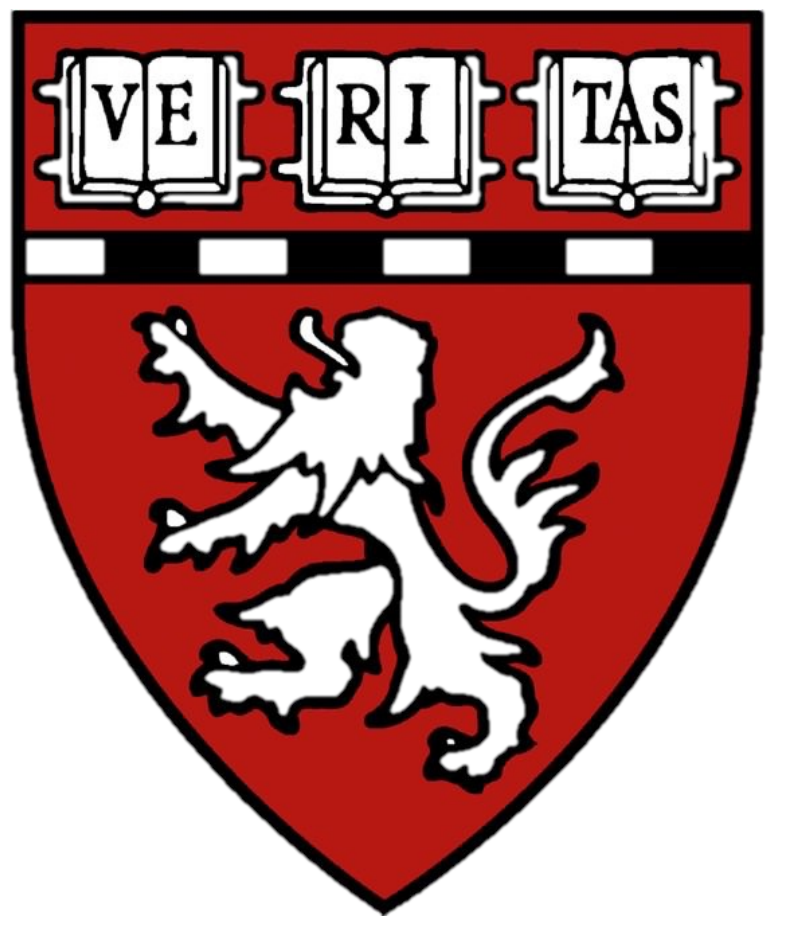




# A Trial to Determine the Optimal Dose of Bupivacaine for Labor Epidural Pain Relief



Diego Villela-Franyutti MD, Ayumi Maeda MD, Mario I. Lumberas-Marquez MD MMSc, Kara Fields MS, Samuel A. Justice PhD,  
Anarghya Murthy BS, Michaela K. Farber MD MS and Lawrence C. Tsen MD  
Brigham and Women's Hospital | Harvard Medical School, Boston, MA

## Dural Puncture Epidural (DPE)

- Faster onset, greater bilateral & sacral block compared to epidural technique (EPL)<sup>1,2</sup>
- Unknown if lower initial analgesic dose would provide similar outcomes.

## Methods

- Single-center RCT using an **up-down, biased-coin, sequential allocation method**<sup>3,4</sup>
- **Patients randomized to DPE or EPL group.**
- **Initial patient in each group received 25mg of Bupivacaine 0.25%**
  - NRS  $\geq 3$  at 30 minutes → Dose increased by 2.5mg for next patient in that group
  - NRS  $< 3$  at 30 minutes → Dose decreased by 2.5mg for next patient (10% chance) or maintained (90% chance)
- Primary outcome: **ED90** for each group by nonparametric method of isotonic regression
- Secondary outcomes: Maternal and fetal side effects, level of sensory and motor block

# Results

## Baseline Characteristics

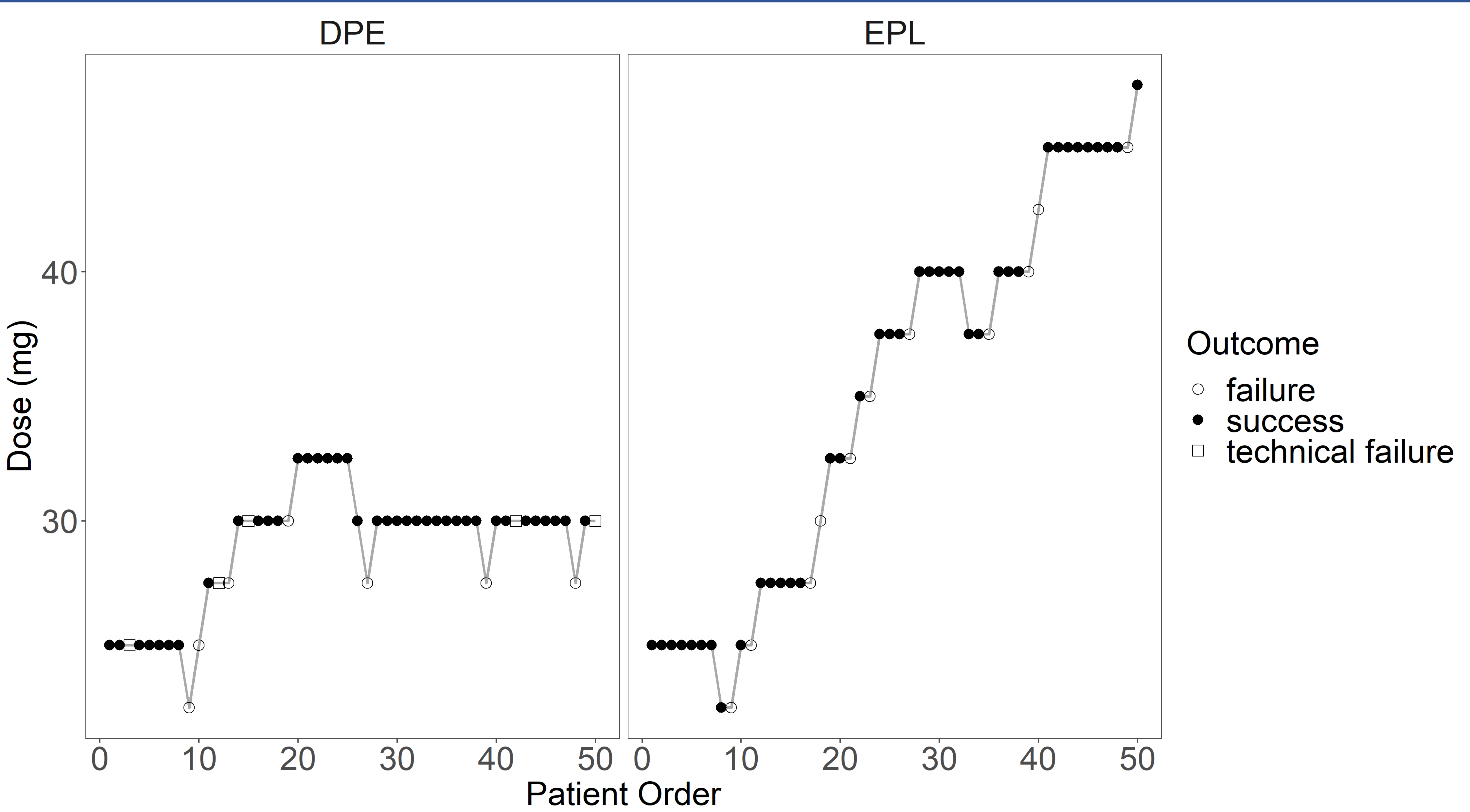
|                                         | DPE<br>n=45 | EPL<br>n=50 |
|-----------------------------------------|-------------|-------------|
| Age                                     | 32.8 (3.5)  | 33.4 (3.4)  |
| BMI                                     | 27.3 (4.1)  | 28.6 (3.2)  |
| Gestational age (weeks)                 | 39.7 (0.8)  | 39.7 (0.6)  |
| Primiparous                             | 27 (64.3)   | 22 (44.9)   |
| Induction of labor                      | 32 (72.7)   | 35 (70)     |
| Cervical dilation (cm)                  | 3.1 (1.1)   | 2.8 (1.0)   |
| Receiving oxytocin<br>before placement  | 32 (71.1)   | 39 (79.6)   |
| Oxytocin dose at<br>placement (mIU/min) | 8 (4.6)     | 6.9 (4.7)   |
| Initial NRS                             | 7.5 (1.8)   | 7.4(1.6)    |

mean (SD) or n (%)

### ED90

→ ED90 for DPE group: **29.56 mg** 95% CI (28.52 – 32.02)

→ ED90 for EPL group: **42.25mg** 95% CI (43.2 – 51.74)



## Key Points

First report of ED90 of bupivacaine with biased-coin sequential allocation.

- ED90: DPE 29.56 mg (28.52-32.02) vs. EPL 42.25 mg (43.2-51.74)  
→ *DPE may require less bupivacaine to achieve adequate analgesia.*
- No significant difference in maternal or fetal side effects, Apgar scores and delivery modes.

## Future implications

- Optimization of bupivacaine dose tailored to the technique used
- Further research is warranted to:
  - Assess ED90 with a lidocaine test dose
  - Directly compare ED90 between DPE and EPL with greater statistical power

## References

1. Anesth Analg 2017; 124:560-9
2. Anesth Analg, 2008. 107(5): p. 1646-51
3. Anesthesiology, 2007. 107(1): p. 144-52
4. Biometrics, 2002. 58(1): p. 171-7