Efficacy of Programmed Intermittent Epidural Boluses for Labor Analgesia

Keisha Joyce, SRNA

Dr. JoVanna Eisenbarth

UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

School of Nurse Anesthesia

Introduction

- Programmed intermittent epidural bolus (PIEB) is an automated method of administering epidural local analgesia with or without opioids
- Fixed boluses at scheduled intervals can be utilized as an alternative to a continuous epidural infusion (CEI) alone or as a background administration with a PCEA technique
- The purpose of this research project is to provide education regarding PIEB and investigate the benefits and challenges of implementing this new technique into practice

Figure 1

Extraneural concentration of local Anesthetic from PIEB

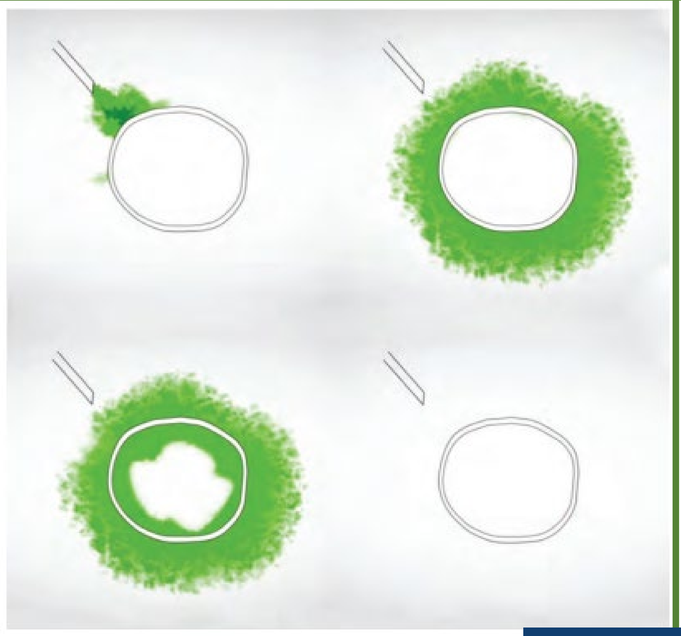
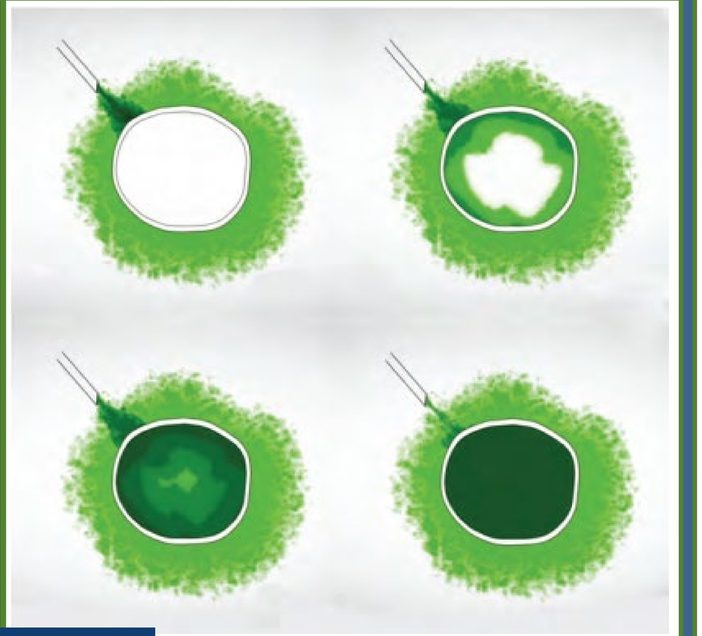


Figure 2

Extraneural concentration of local Anesthetic from CEI



Conclusion

- Analgesia should be tailored to the patient's labor, medical condition, preferences, and goals to provide a pleasant and memorable birthing experience
- **The ideal labor analgesia technique aims to provide:**
  - Rapid onset, bilateral sensory pain control without motor blockade, and maternal satisfaction
  - Reduced:
    - Cesarean deliveries, operative vaginal deliveries, duration of labor, and need for provider rescue boluses
- **Analgesia maintained by CEI results in:**
  - Greater drug use, a higher degree of motor blockade, and a higher incidence of operative vaginal delivery
- **PIEB is effective in providing safe and long-lasting labor analgesia**

Low concentrations of LA in intermittent boluses

→ **Extraneural concentration of LA is not persistently elevated**

→ **Total concentration inside the nerve is insufficient to produce motor blockade (Figure 1)**

Results

- **Large volumes of a less concentrated anesthetic solution provide better analgesia than smaller volumes of a more concentrated solution**
- Solutions injected into the epidural space spread more uniformly when injected as a high-pressure bolus. This results in optimal sensory blockade
- Maternal satisfaction and safety are the primary factors considered when choosing a method of labor analgesia
- Motor blockade seems to play a large role in maternal satisfaction, and therefore PIEB is the superior labor analgesic technique
- **PIEB has clinically significant advantages over CEI:**
  - Decreased total and/or hourly dose of local anesthetic
  - Decreased breakthrough pain and provider intervention
  - Increased duration of analgesia
  - Decreased motor blockade and increased sensory blockade
  - Shorter Duration of second stage of labor
  - Decreased incidence of operative vaginal delivery
  - Increased maternal satisfaction
- The optimal local anesthetic dose using PIEB has been determined to be 10 mL every 40 minutes. This creates optimal patient satisfaction and labor analgesia.

LA in Continuous Epidural Infusions

→ **Extraneural concentration of LA is persistently higher than that in the intraneural space**

→ **Total concentration inside the nerve is increased and may reach the threshold for motor blockade (Figure 2)**

Selected References

- Capogna, G., & Stirparo, S. (2013). Techniques for the maintenance of epidural labor analgesia. *Current Opinion in Anaesthesiology*, *26*(3), 261–267
- Carvalho, B., George, R. B., Cobb, B., McKenzie, C., & Riley, E. T. (2016). Implementation of programmed intermittent epidural bolus for the maintenance of labor analgesia. *Anesthesia & Analgesia*, *123*(4), 965–971
- McKenzie, C., Cobb, B., Riley, E., & Carvalho, B. (2016). Programmed intermittent epidural boluses for maintenance of labor analgesia: An impact study. *International Journal of Obstetric Anesthesia*, *26*, 32–38