Dartmouth Health

New! (ish) Techniques in Obstetric Anesthesia

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NNEPQIN

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Disclosures

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Objectives

1. Describe a few **recently developed techniques** in obstetric anesthesia
2. Understand the rationale behind their **purported benefits** and **potential limitations**
3. Assess the strength of the **current literature** in support of these techniques

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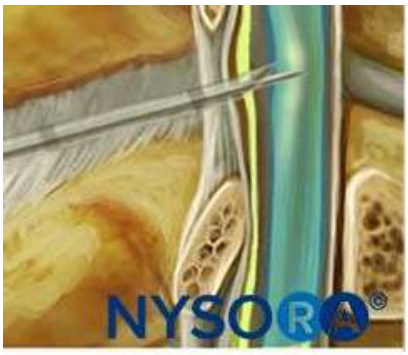
Dural Puncture Epidural

D P E



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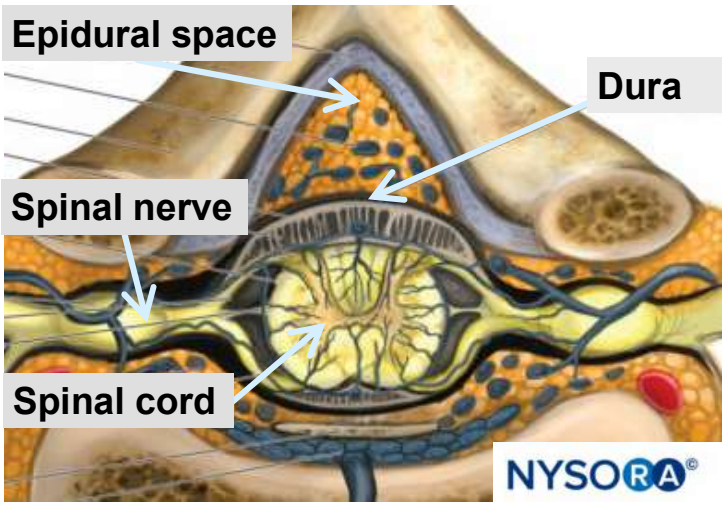
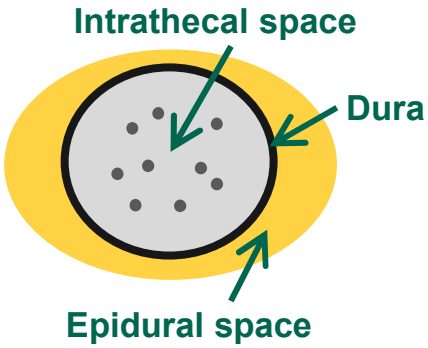
Some Anatomy





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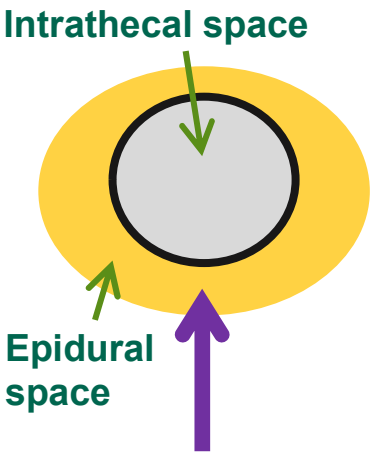
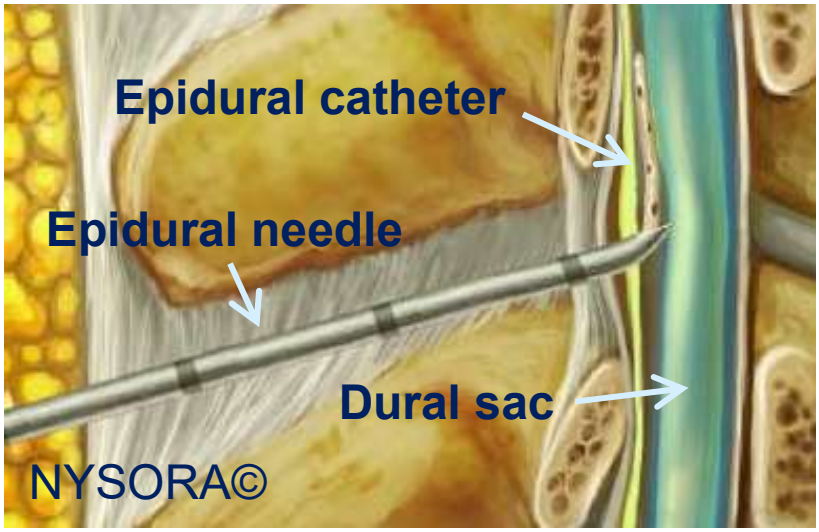
Conventional Epidural Placement





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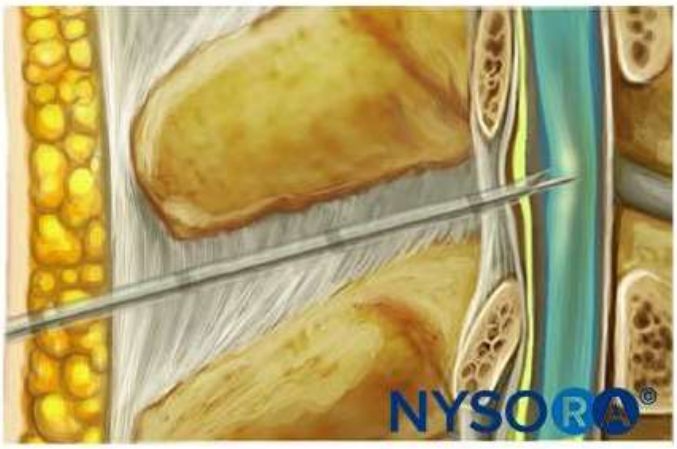
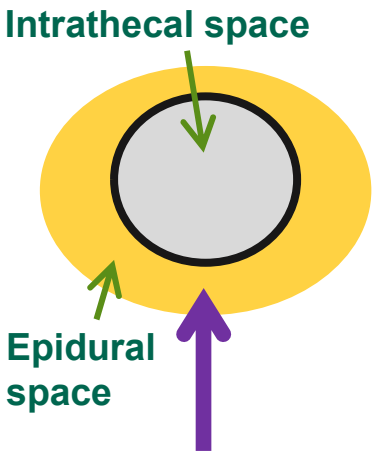
Combined Spinal Epidural (CSE)

Spinal needle *advanced through* epidural needle





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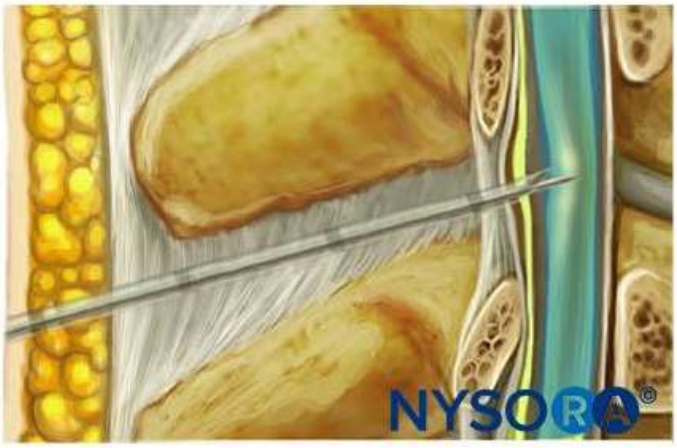

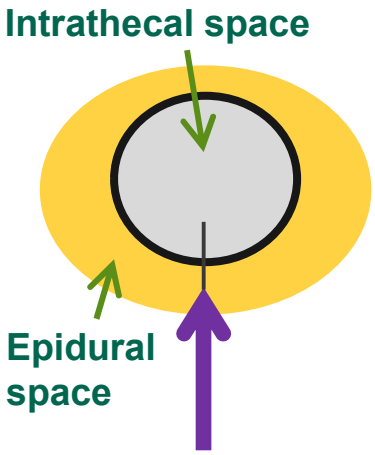

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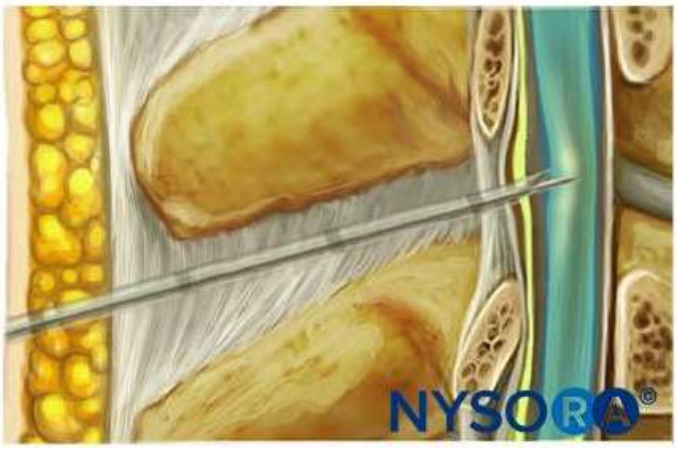

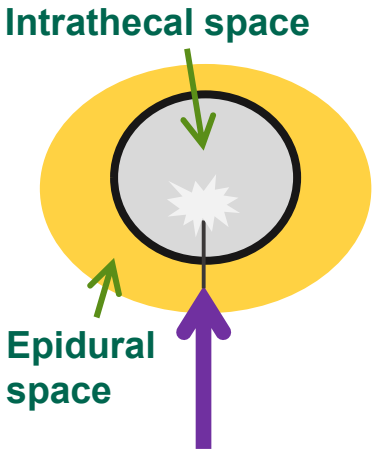

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CSE for Labor Analgesia

- **Advantages:**
  - Faster onset
  - More reliable block

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CSE for Labor Analgesia

- **Advantages:**
  - Faster onset
  - More reliable block
- **Disadvantages:**
  - Pruritis, hypotension
  - Uterine hypertonicity and fetal heart rate changes

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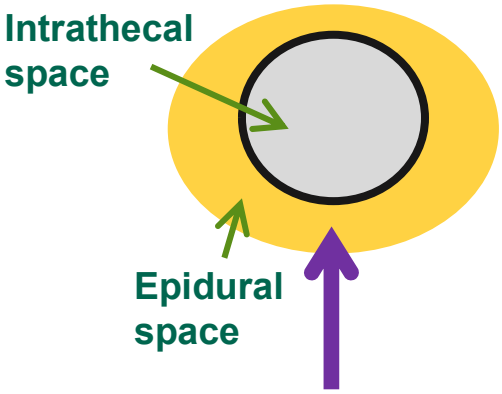
Dural Puncture Epidural (DPE)

Concept developed in late 1990s
No intrathecal meds given directly



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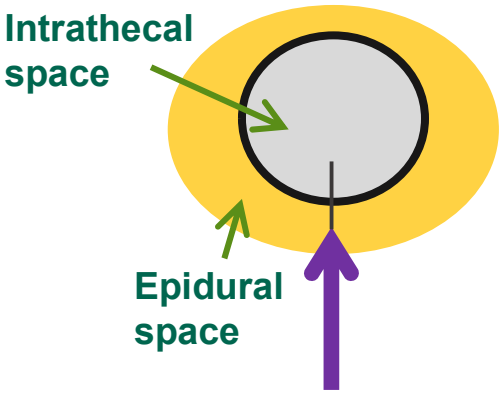

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Dural Puncture Epidural (DPE)

"Why would you ever do that?"

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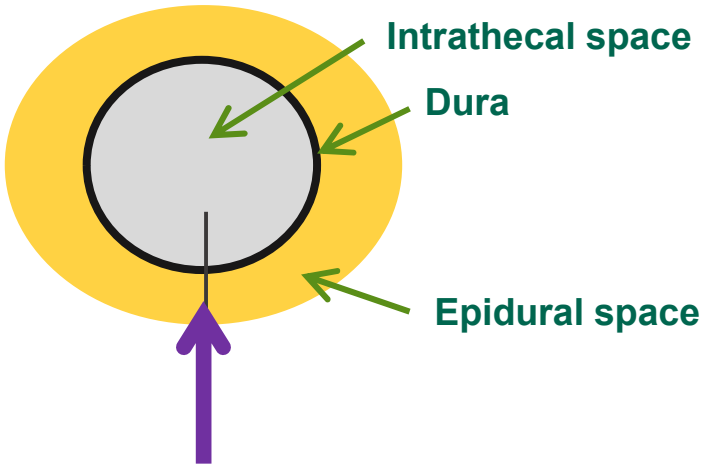
DPE to Confirm Midline Epidural Space



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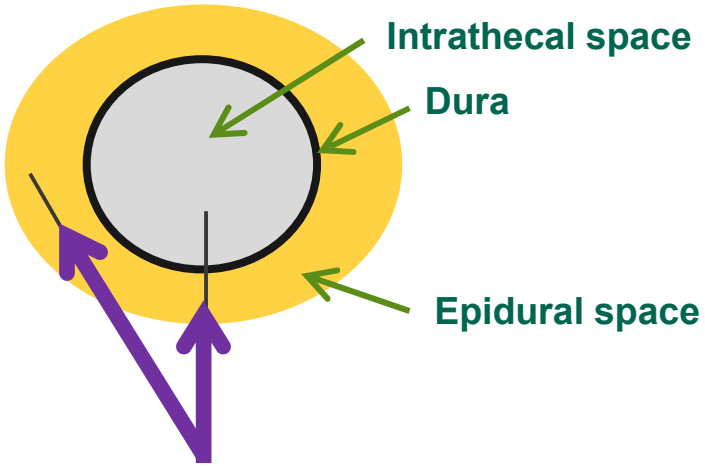
DPE to Confirm Midline Epidural Space



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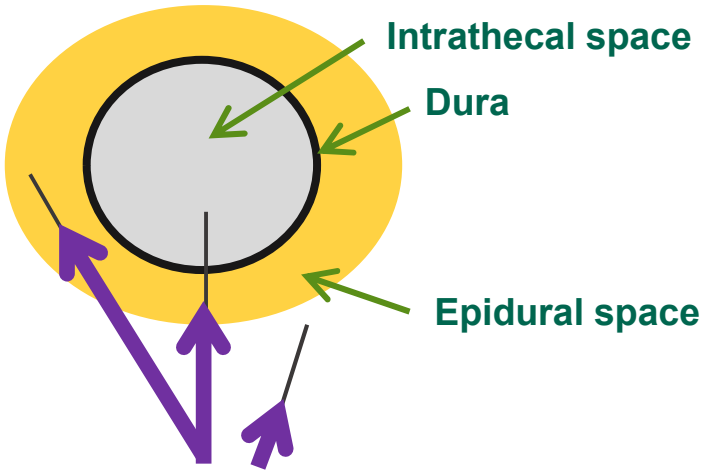

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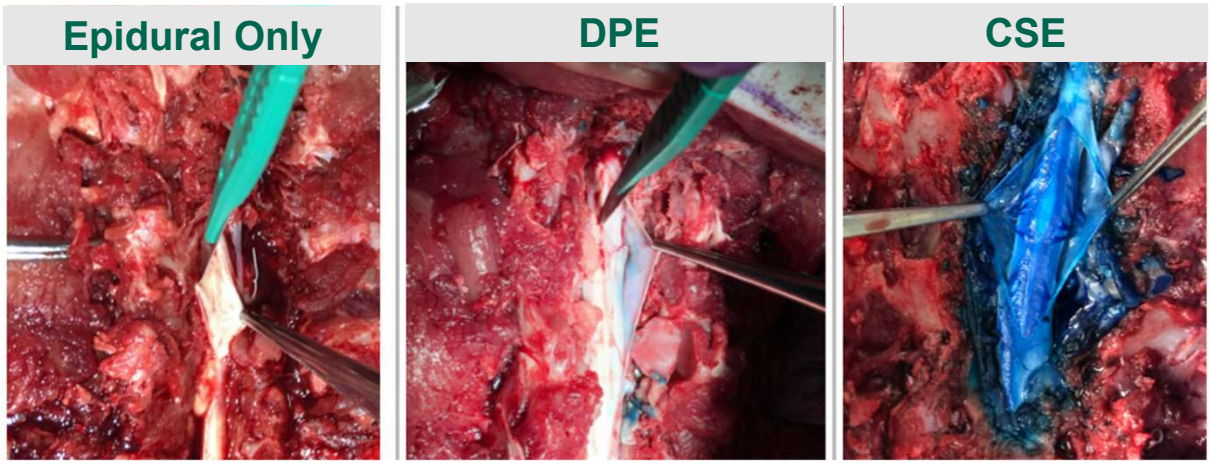
Intrathecal Spread to Improve Block



Intrathecal spread in porcine model – Richey 2020

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Outcomes: DPE Versus Conventional Epidural

2 Most Recent Meta-analyses	Shi 2023	Lin 2023
	12 RCTs	7 RCTs **with 25g spinal needle**
	1259 patients	761 patients
Time to adequate analgesia	Shorter by **4 min**	

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Quality of block*	No difference	Improved - **RR 0.7 for clinician bolus**
Catheter replacement	No difference	

*Need for clinician bolus, unilateral block, sacral sparing

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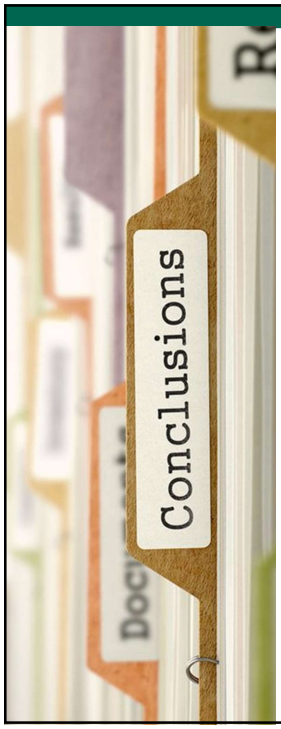
Catheter replacement	No difference	
PDPH rate	No difference	
Other adverse effects**	No difference	

*Need for clinician bolus, unilateral block, sacral sparing

**Such as pruritis, n/v, hypotension, fetal bradycardia



DPE Versus Conventional Epidural

- Confirmation of midline epidural space **can be very useful**
- **Faster onset** than conventional epidural
- Fewer side effects compared to CSE
- No clinically significant increase in risk of **post dural puncture headache**
- May be superior in other ways

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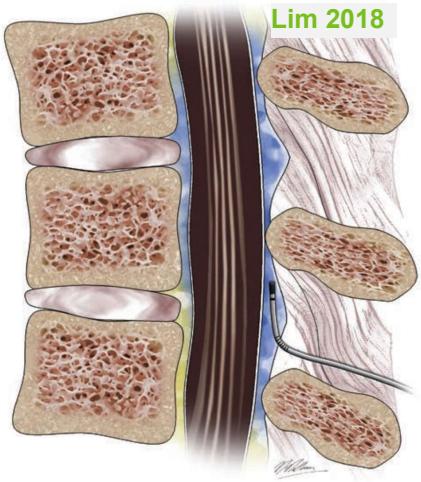
Programmed Intermittent Epidural Bolusing

P I E B



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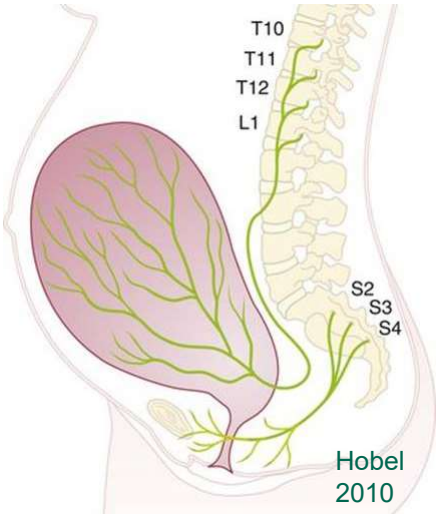
Basic Epidural Block Principals

Goals for labor analgesia:

- T10 to sacral dermatomes
- Minimize motor block and hypotension



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Basic Epidural Block Principals

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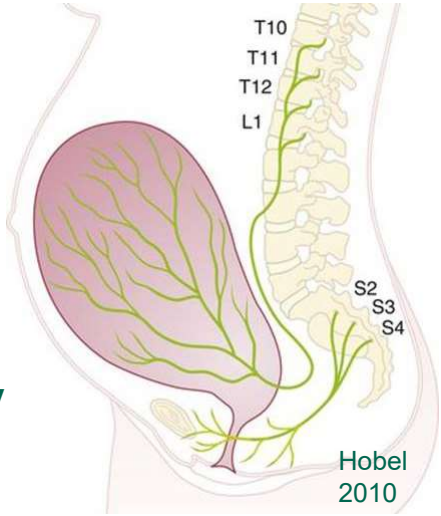
Higher Concentration ↑ Block Density

Volume + Pressure ↑ Spread



Hobel 2010

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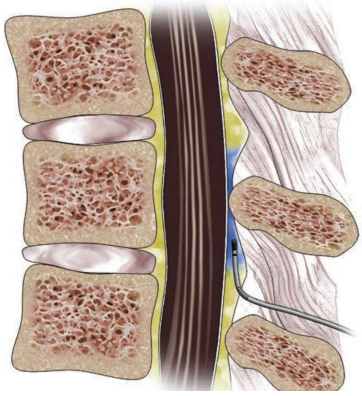
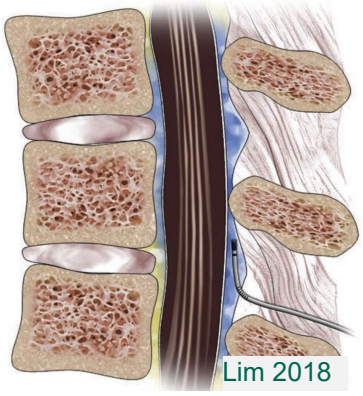
Continuous Versus Intermittent Bolus

First studies prior to 2010

Continuous infusion



Bolus Dose



Lim 2018

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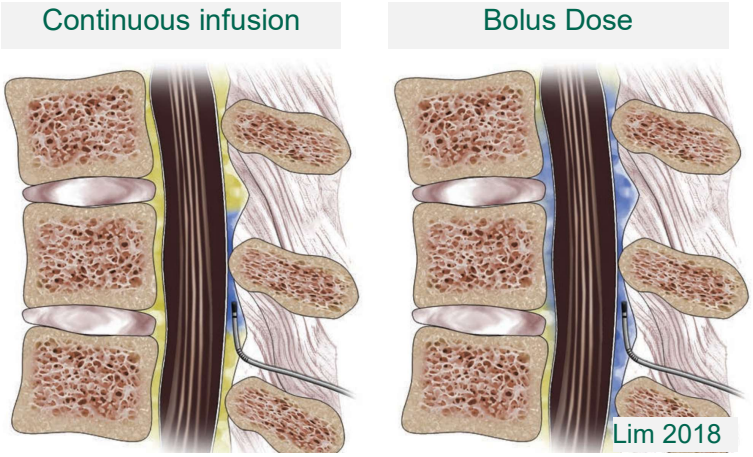
Continuous Versus Intermittent Bolus

First studies prior to 2010

- Improved spread
- Hypothesized benefits:
  - Improved analgesia
  - Decreased motor block



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PIEB Settings

Programmed Bolus + **Patient Controlled Bolus**

- Volume
- Frequency

1 Hour Limit

- Volume
- Lockout time

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Outcomes: PIEB Versus Continuous

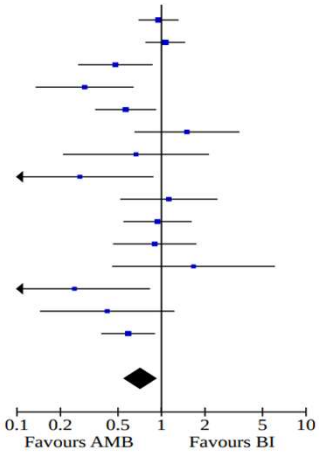
Cochrane Library

Tan 2023
Meta-analysis of 18 studies (4590 patients)

Statistically significant:

- Lower incidence of **breakthrough pain** (RR 0.7, 95% CI 0.6 – 0.9)
- Lower hourly **local anesthetic consumption**

Breakthrough Pain
Risk Ratio



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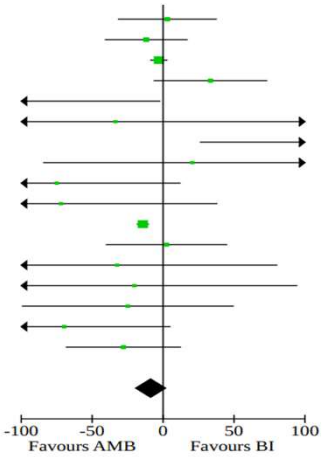
Outcomes: PIEB Versus Continuous

Cochrane Library

- **Labor outcomes:** No statistical significance though trend towards PIEB superiority
  - Duration of labor analgesia
  - Incidence of cesarean delivery or instrumental delivery
- **Maternal satisfaction:** Increased in 8 studies, No difference in 6



Duration of Labor Analgesia
Mean Difference (min)

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A Note on Scapular Pain

- Typically **worsening with boluses**
- Unknown frequency (**probably 1-5%**)

- Etiology: compression of thoracic spinal canal (Klumpner 2016)
  - **High volumes of epidural solution**
  - Unknown patient factors
  - No reports of neurological deficits or unresolved pain
- Management: **reduction of volume** in epidural space

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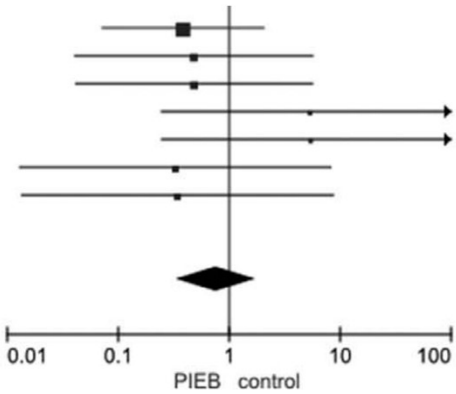
Other adverse effects of PIEB?

Wang 2022: meta-analysis of RCTs

No statistical differences in:

- Hypotension (9 studies, 952 patients)
- Pruritis
- Shivering
- Nausea / vomiting



Incidence of Hypotension
Odds Ratio

Outcomes: PIEB Versus Continuous

- PIEB + PCEA is **overall superior** to CEI + PCEA
- The superiority is **likely modest**
- New pumps are expensive
- **Ideal settings** remain unknown
- Beware of upper thoracic back pain

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Intraperitoneal Chloroprocaine

During Cesarean

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Intraperitoneal Chloroprocaine

Werntz 2018:

- Case series of **32 patients** undergoing cesarean
- Given for breakthrough pain **after delivery**
- 17 patients had pain scores before and after – all **dramatically improved**
- 56% did not require additional analgesia in subsequent **15 min**

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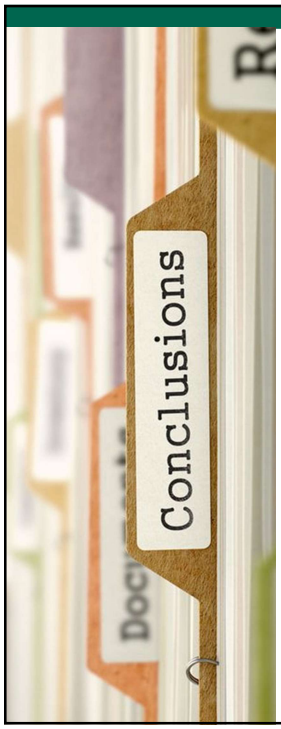
Intraperitoneal Chloroprocaine

Tokioka 2022:

- Prospective cohort of **15 patients** undergoing scheduled cesarean
- Administered after fetal extraction (**up to 40 cc of 3%**)
- Peak plasma concentration around 5 min
- **Half life 5.3 min**
- Max plasma concentrations **more than an order of magnitude below predefined safe level**



Intraperitoneal Chloroprocaine

- Intraperitoneal chloroprocaine is a **valuable rescue adjunct** for breakthrough pain during cesarean
- Most appropriate for insufficient block that starts **after hysterotomy closure**
- Up to **40 mL of 3% chloroprocaine** is very safe
- Lasts about **20 min**

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