

## CELEBRATING THE 33<sup>RD</sup> ANNIVERSARY OF THE SAOA

*“OBSTETRIC ANAESTHESIA IN SWITZERLAND:  
WHERE WE COME FROM, WHERE WE ARE, WHERE WE GO”*

# INITIATION OF LABOR ANALGESIA

Epidural

CSE

DPE

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March 16th 2024



Service d'Anesthésiologie / Secteur Maternité



Failure or inadequate analgesia during labour is the most common adverse effect of epidural anesthesia.

The research agenda is not closed regarding neuraxial anesthesia techniques and modes, whether for initiating or maintaining analgesia.

The ideal neuraxial anesthesia technique does not exist...

# Failure of epidural anesthesia during labour

Failure rates **up to 23%** but there is important heterogeneity in failure definition and techniques used.

2004, Pan PH, IJOA; 2009, Agaram, IJOA; 2013, Thangamuthu, IJOA.

Currently, around **10-15%** with a need for **re-siting in 1-9%** of patients.

2018, Sng BL, IJOA; 2022, Berger AA, IJOA.



	Priority Ranking (N = 105)	Relative Value Score (N = 105)
Achieving desired pain relief	1 (1 - 3)	30 (18 - 50)
Overall satisfaction with the pain management	4 (2 - 5)	10 (0 - 20)
Experiencing a short duration of labor	5 (3 - 7)	5 (0 - 20)
Experiencing a short time to achieve pain relief	5 (3 - 7)	5 (0 - 10)
Avoiding complications such as low blood pressure	6 (3 - 7)	3 (0 - 10)
Avoiding nausea and/or vomiting as a side effect	6 (4 - 8)	1 (0 - 10)
Receiving the smallest effective dose of pain medication	6 (3 - 9)	3 (0 - 10)
Avoiding anxiety related to labor pain	7 (4 - 9)	1 (0 - 10)
Avoiding leg weakness as a side effect	7 (6 - 9)	0 (0 - 5)
Avoiding itching as a side effect	9 (8 - 10)	0 (0 - 2)

**TABLE 3: Priority ranking and relative value scoring in the antenatal cohort for the labor epidural analgesia (LEA) outcomes evaluated**

Data are presented as median (x (25%) to y (75%)). Rank: 1 to 10 from the highest priority (1) to the least (10). Relative value: dollar value patients would pay out of \$100 to achieve an outcome.

Harding A. Cureus. 2022 Feb; 14(2): e22599.

# Epidural failure: why?

Loss of resistance technique (LOR): sensitivity 99%, specificity 27%; **false LOR 9-63%**. 2001, Liu SS, RAPM.

There are gaps in ligaments traversed by the Tuohy needle.

2004, Lirk P, Anesth Analg; 2005, Lirk P, BJA; 2021, Lawrence S, RAPM.

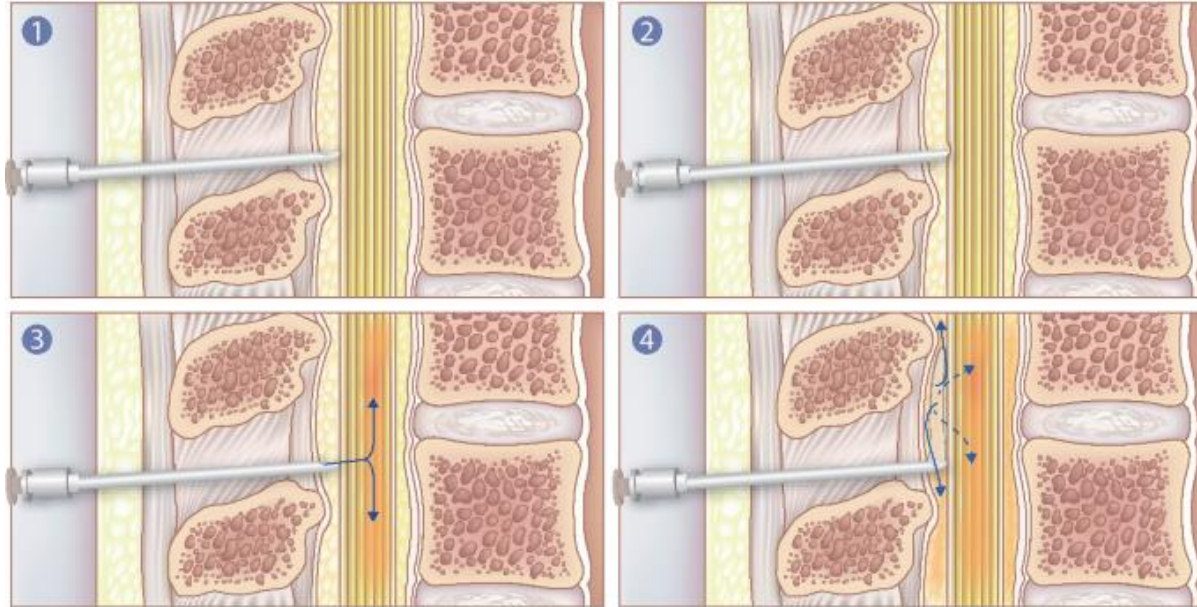
**Sacral nerves** are more difficult to block. 1975, Galindo A, BJA; 1996, Hogan Q, Anesthesiology; 2019, Malik T, IJOA.

Epidural catheter can **move** with changes in the patient's position. 1997, Hamilton CL, Anesthesiology.

Pain in obstetrics is **multifactorial**. 2018, Bonapace J, JOGC.



# Combined Spinal Epidural



Eltzschig HK et al. N Engl J Med 2003; 348:319-332.

[Combined Spinal-Epidural Anesthesia - NYSORA](#)  
[NYSORA](#)

# CSE vs epidural

Faster onset: **2 min** [0.5-6].

Better spreading to **sacral nerves**, less lateralized block.

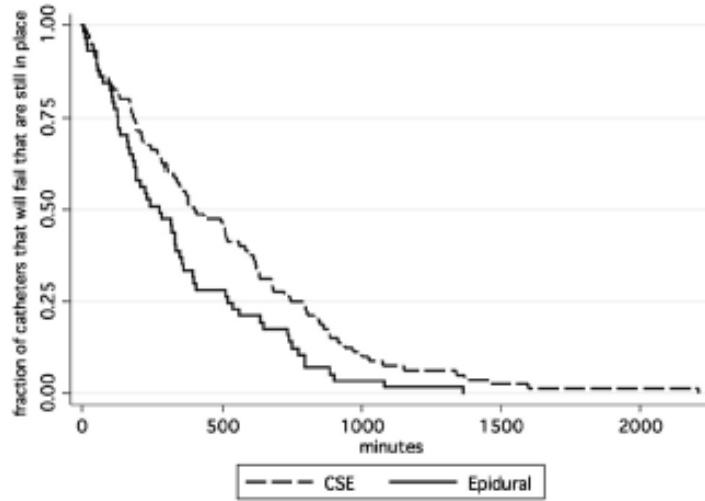
Less motor block?

Reduction in local anesthetics consumption and need for top-ups?

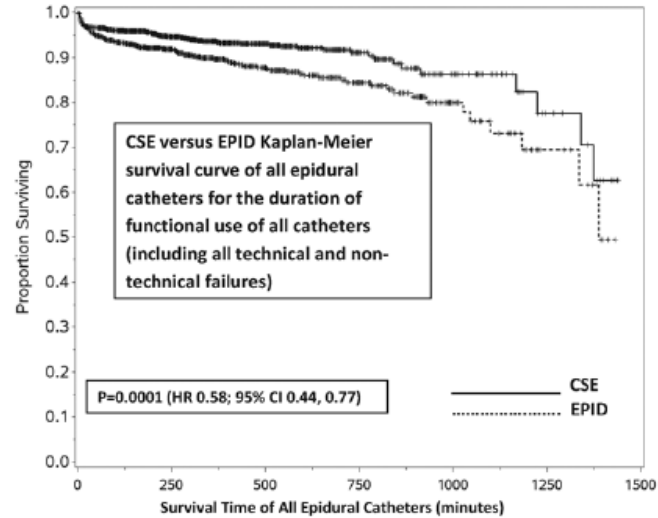
**Decrease in failure rate** and longer duration until failure.

Reduced inadequate anesthesia during cesarean section.

2012, Simmons SW, Cochrane Database Syst Rev; 2013, Gambling DR, Anesth Analg; 2014, Heesen M, Anaesthesia; 2016, Booth JM, Anesthesiology; 2016, Groden J, IJOA; 2020, Guasch E, Curr Opin Anesthesiol; 2022, Patel R, Anaesthesia.



**Fig. 1** Survival curves of catheters placed via epidural and combined spinal-epidural. CSE: combined spinal-epidural



**Fig. 1.** Kaplan–Meier survival analysis of all epidural catheters placed with combined spinal epidural technique (CSE, n = 1,440) versus traditional epidural technique (EPID, n = 955) in a univariate model. HR = hazard ratio; survival time = duration of catheter remained failure free or until end of functional usage.

Groden J et al. International Journal of Obstetric Anesthesia (2016) 26, 4–7.

Booth JM et al. Anesthesiology 2016; 125:516-24.







## Combined spinal-epidural versus epidural analgesia in labour (Review)

Simmons SW, Taghizadeh N, Dennis AT, Hughes D, Cyna AM

### Authors' conclusions

There appears to be little basis for offering CSE over epidurals in labour, with no difference in overall maternal satisfaction despite a slightly faster onset with CSE and conversely less pruritus with low-dose epidurals. There was no difference in ability to mobilise, maternal hypotension, rate of caesarean birth or neonatal outcome. However, the significantly higher incidence of urinary retention, rescue interventions and instrumental deliveries with traditional techniques would favour the use of low-dose epidurals. It is not possible to draw any meaningful conclusions regarding rare complications such as nerve injury and meningitis.

# Drawbacks and side effects

Untested epidural catheter.

Onset of epidural block after resolution of spinal block.

Risk of **spinal cord injury**.

**Abnormal CTG tracings** (risk factors PROM, cervical dilatation >7 cm).

2022, Yamamoto, Int J Gynaecol Obstet.

No increase in risk of meningitis, **no difference** in **post-dural puncture headache** incidence.



ELSEVIER  
[www.obstetnesthesia.com](http://www.obstetnesthesia.com)



REVIEW ARTICLE

## Adverse side effects and route of administration of opioids in combined spinal-epidural analgesia for labour: a meta-analysis of randomised trials

L. Grangier,<sup>a</sup> B. Martinez de Tejada,<sup>a,b</sup> G.L. Savoldelli,<sup>b,c</sup> O. Irion,<sup>a,b</sup> G. Haller<sup>c,d</sup>

<sup>a</sup>Department of Paediatrics, Gynaecology & Obstetrics, Geneva University Hospitals, Switzerland

<sup>b</sup>Faculty of Medicine, University of Geneva, Switzerland

<sup>c</sup>Department of Anaesthesia, Pharmacology and Intensive Care, Geneva University Hospitals, Switzerland

<sup>d</sup>Division of Clinical Epidemiology, Geneva University Hospitals, University of Geneva, Switzerland

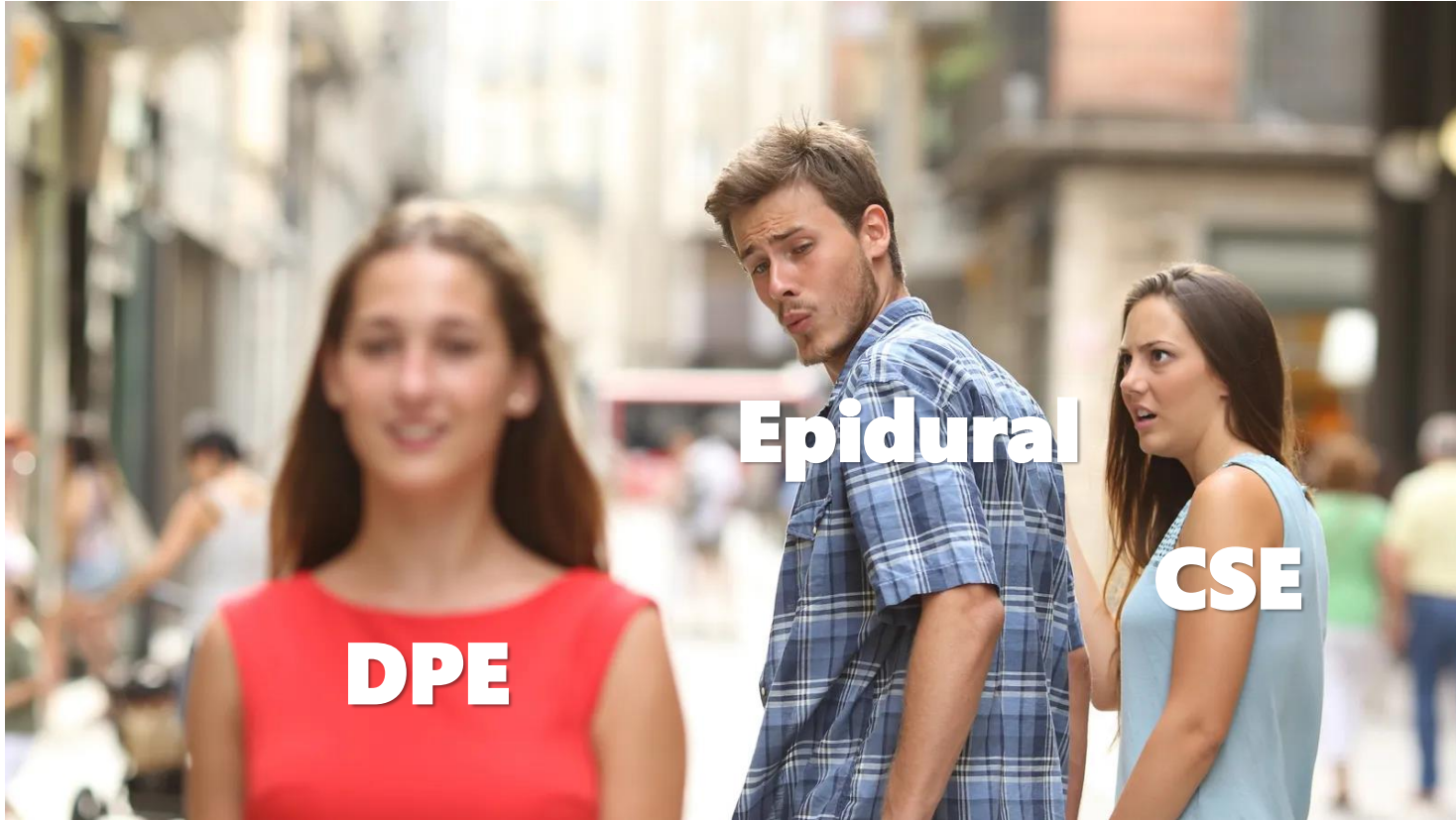
Maternal hypotension (dose/administration route dependent)  
**RR 1.54** (CI 1.22 to 1.93)

Nausea/vomiting **RR 1.31** (CI 1.0 to 1.72)

Pruritus **RR 4.26** (CI 2.59 to 7.0)

**Foetal bradycardia RR 2.38** (CI 1.57 to 3.62)

# New Kid in Town



Adapted from Antonio Guillem / Shutterstock

# Dural Puncture Epidural

Passage of anesthetic agents through the hole created.

1988, Leach A, Anaesthesia; 1994, Bernards CM, Anesthesiology; 2020, Taha B, Anesthesiology Annual Meeting.

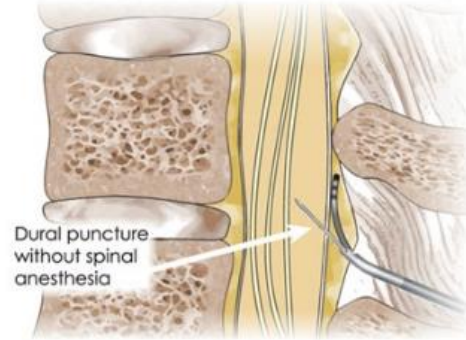
**25G > 26G > 27G.**

Optimal length of spinal needle relative to Tuohy:  
**+ 10-20 mm**

Inability to obtain CSF with spinal needle is a **risk factor for epidural failure.**

2005, Thomas JA, Anesthesiology; 2018, Lee JSE, BMC Anesthesiol.

Dural Puncture  
Epidural (DPE)





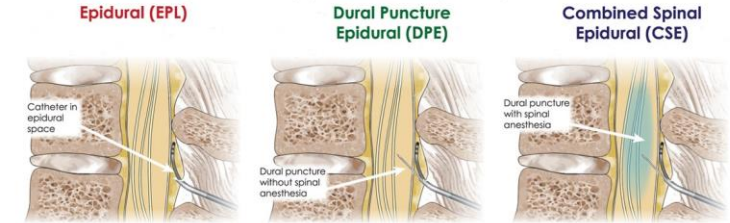
# Dural Puncture Epidural Technique Improves Labor Analgesia Quality With Fewer Side Effects Compared With Epidural and Combined Spinal Epidural Techniques: A Randomized Clinical Trial

Anthony Chau, MD, MMSc, FRCPC,\*†‡ Carolina Bibbo, MD,§ Chuan-Chin Huang, ScD,†  
 Kelly G. Elterman, MD,|| Eric C. Cappiello, MD,†‡ Julian N. Robinson, MD,‡§ and Lawrence C. Tsen, MD†‡

	EPL (n = 40)	DPE (n = 40)	CSE (n = 40)
<b>Sacral sensory block</b>			
Bilateral S2 at 0.5 min	0 (0)	3 (7.5)	11 (27.5)
Bilateral S2 at 10 min	15 (37.5)	32 (80)	38 (95)
Bilateral S2 at 20 min	25 (62.5)	40 (100)	40 (100)
Bilateral S2 at 30 min	34 (85)	40 (100)	40 (100)
No S2 block entire duration	2 (5)	0 (0)	0 (0)
<b>Asymmetric blocks</b>			
First 30 min	23 (57.5)	16 (40)	8 (20)
After 30 min	21 (52.5)	4 (10)	4 (10)
<b>Number of physician top-up interventions</b>			
None	20 (50)	31 (77.5)	20 (50)
One or more	20 (50)	9 (22.5)	20 (50)
Time to first physician top-up (min)	207 (133)	250 (163)	132 (85)
<b>Intervention</b>			
Catheter adjustment	4 (10)	2 (5)	3 (7.5)
Catheter replacement	0 (0)	0 (0)	0 (0)
<b>Motor block</b>			
Bromage score, median [range]	0 [0-3]	0 [0-2]	0 [0-3]
Presence of motor block	15 (37.5)	6 (15)	3 (7.5)

## A Hole Lot Better: The Dural Puncture Epidural Technique

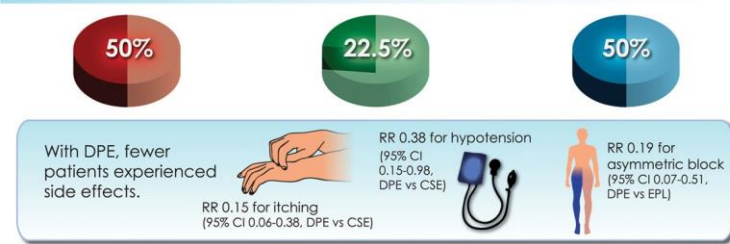
A recent study compared three approaches to early labor pain relief.<sup>1</sup>



Although time to achieve pain relief was significantly shorter with CSE....



.... with DPE, fewer patients needed physician top-ups.



Chau A et al. Anesthesia & Analgesia 124(2):p 560-569, February 2017.

Wanderer JP, Nathan N. A hole lot better: the dural puncture epidural technique. Anesth Analg. 2017;124:375





# Systematic reviews and meta-analyses DPE vs epidural

Faster analgesic onset, faster sacral spread, fewer top-ups.

2019, Heesen, IJOA.

Faster analgesic onset, faster sacral spread, fewer asymmetric blocks.

2019, Layera, JCA.

More patients with VAS <3/10 at 10 min and 20 min.

2022, Yin H, Journal of Anesthesia.



Ende HB *et al.* Anesthesiology May 2022, Vol. 136, A17.



# ANESTHESIOLOGY

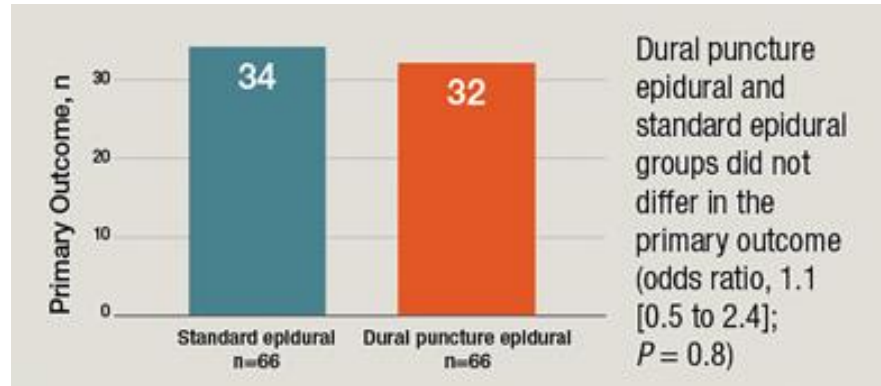
## Quality of Labor Analgesia with Dural Puncture Epidural *versus* Standard Epidural Technique in Obese Parturients: A Double-blind Randomized Controlled Study

Hon Sen Tan, M.D., M.Med., M.H.Sc.,  
Sydney E. Reed, M.D., Jennifer E. Mehdiratta, M.D., M.P.H.,  
Olga I. Diomedea, M.D., M.S., Riley Landreth, M.D.,  
Luke A. Gatta, M.D., Daniel Weikel, M.Sc.,  
Ashraf S. Habib, M.B.B.Ch., M.Sc., M.H.Sc., F.R.C.A.

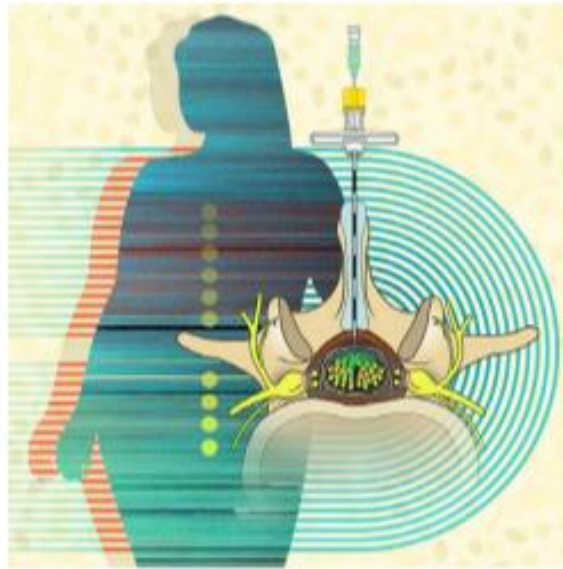
*ANESTHESIOLOGY* 2022; 136:678–87

### Composite outcome

- asymmetrical block
- epidural top-ups
- catheter adjustments
- catheter replacement
- failed conversion for cesarean section







**“Dural puncture epidural appears to be a clever idea in search of an indication.”**

Scott Segal, M.D., M.H.C.M., Peter H. Pan, M.D., M.S.E.E.

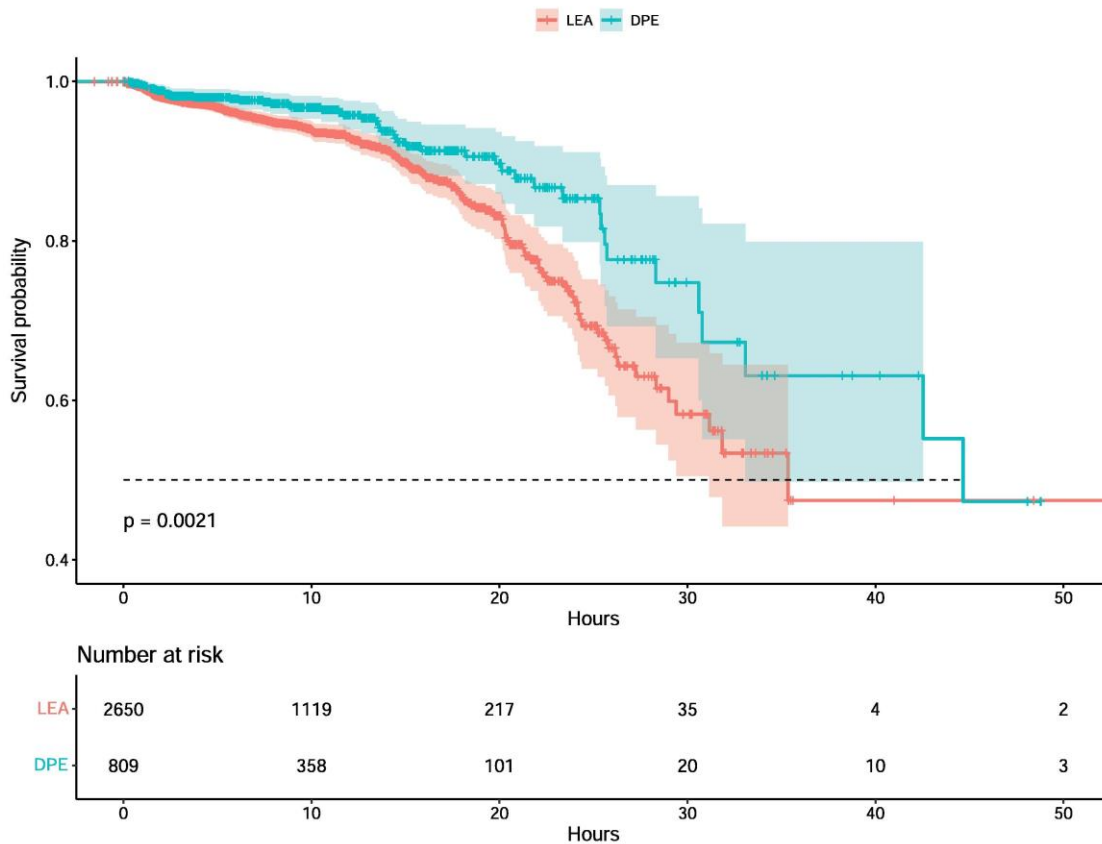


Fig. 2. Kaplan-Meier analysis of catheter failure. Analysis of 2667 lumbar epidural analgesia (LEA) and 810 dural puncture epidural (DPE) catheters. Catheters are censored at delivery time and this is delineated by a vertical hash mark on the curve. The log-rank test shows a significant difference in median catheter survival time between DPE analgesia (44.7 h) and LEA (35.4 h,  $P=0.002$ ). LEA: lumbar epidural analgesia; DPE: dural puncture epidural

Berger AA et al. Int J Obstet Anesth. 2022 Nov;52:103590.



Original Investigation | Anesthesiology

## Effect of Dural-Puncture Epidural vs Standard Epidural for Epidural Extension on Onset Time of Surgical Anesthesia in Elective Cesarean Delivery A Randomized Clinical Trial

Nadir Sharawi, MBBS, MSc; Matthew Williams, MD; Waseem Athar, MD; Caroline Martinello, MD; Kyle Stoner, MD; Cameron Taylor, MD; Nan Guo, PhD; Pervez Sultan, MBChB, MD (Res); Jill M. Mhyre, MD

Faster to reach adequate surgical level:

**DPE 422 seconds** [290-546]

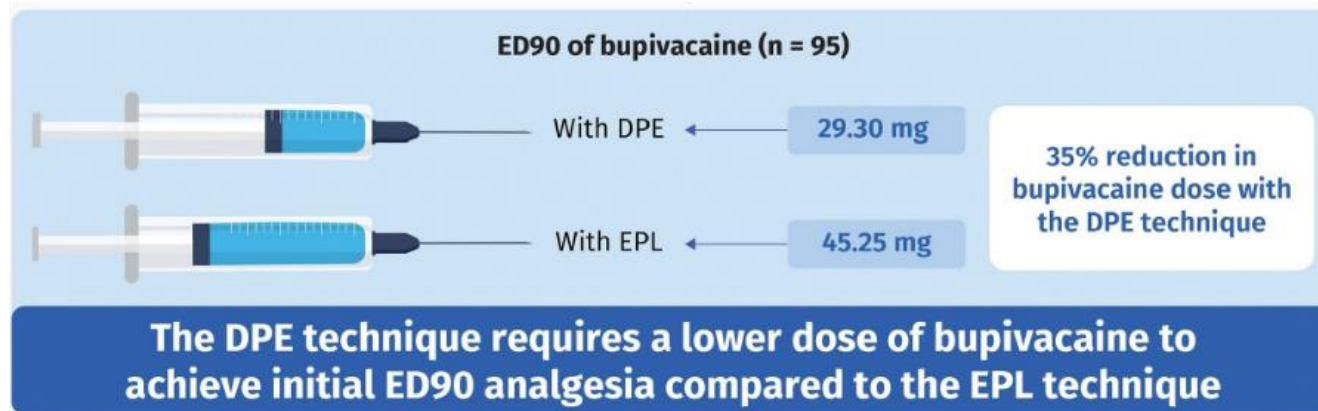
**Standard Epidural 655 seconds** [437-926]

Better quality of anesthesia.



# Labor Analgesia Initiation With Dural Puncture Epidural Versus Conventional Epidural Techniques: A Randomized Biased-Coin Sequential Allocation Trial to Determine the Effective Dose for 90% of Patients of Bupivacaine

Ayumi Maeda, MD,\* Diego Villela-Franyutti, MD,\* Mario I. Lumbreras-Marquez, MD, MMSc,\*† Anarghya Murthy, BS,\* Kara G. Fields, MS,\* Samuel Justice, PhD,\* and Lawrence C. Tsen, MD\*





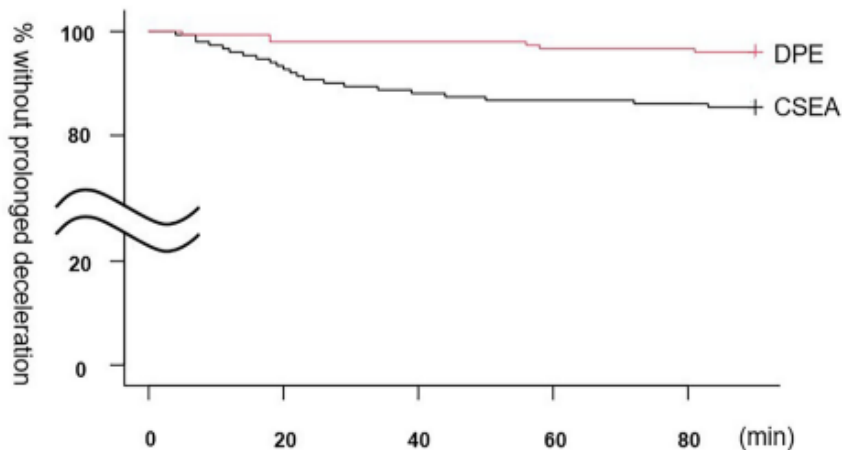
RESEARCH

Open Access



# Comparison of the incidence of fetal prolonged deceleration after induction of labor analgesia between dural puncture epidural and combined spinal epidural technique: a pilot study

Shoko Okahara<sup>1</sup>, Rie Inoue<sup>1</sup>, Yumi Katakura<sup>1</sup>, Hitomi Nagao<sup>1</sup>, Saori Yamamoto<sup>1</sup>, Shuko Nojiri<sup>2</sup>, Jun Takeda<sup>3</sup>, Atsuo Itakura<sup>3</sup> and Hiroyuki Sumikura<sup>1\*</sup>



**Fig. 2** Kaplan-Meier curve illustrating time after induction at which PD occurred  
Legend: CSEA, combined spinal epidural analgesia; DPE, dural puncture epidural

# So, what to choose?

## Epidural

For everybody

Use low-concentration local anesthetic solutions combined with opioids

Use PIEB + PCEA

## CSE

Labor induction

Multiparity or fast progressing labor

Maternal comorbidity?

High risk of cesarean section?

Epidural re-siting

Previous history of unsatisfactory epidural

Doubt regarding LOR

## DPE

Teaching

Abnormal CTG tracings

Maternal comorbidity?

High risk of cesarean section?

Epidural re-siting

Previous history of unsatisfactory epidural?

Doubt regarding LOR



A panoramic view of a city, likely Bern, Switzerland, featuring a prominent Gothic cathedral with a tall spire on the left. The city is built on a hillside overlooking a large blue lake. In the background, a range of rugged mountains is partially covered in snow under a clear blue sky. The text "Thank you!" is overlaid in the center-right of the image.

**Thank you!**