Universitätsspital Basel

Epidural labour analgesia

Thierry Girard, Basel Switzerland

Epidural labour analgesia

- Inititation
- Maintenance
- Side effects

Initiation of epidural labour analgesia

Timing of epidural

Journal of Clinical Anesthesia 41 (2017) 106–111

Contents lists available at ScienceDirect

Journal of Clinical Anesthesia

Original Contribution

Survey of nulliparous parturients' attitudes regarding timing of epidural analgesia initiation

Ghislaine C. Echevarria, Gilbert J. Grant *, Yousun Chung, Jerome Lax

Department of Anesthesiology, Perioperative Care and Pain Medicine, New York University School of Medicine, 550 1st Avenue, New York, NY 10016, USA

Table 1
Responses to the question. "If you did decide to 'hold off' getting an epidural, tell us why".

Reason for "holding off"	Delay epidural analgesia ($n = 94$)
Test pain tolerance	33 (35.1%)
Too early	17 (18.1%)
Slow down labor	13 (13.8%)
Natural process	12 (12.8%)
Afraid of procedure itself	4 (4.3%)
Increase risk of cesarean	3 (3.2%)
Obstetricians recommendation	2 (2.1%)
Wanted to move/walk	2 (2.1%)
No reason provided	8 (8.5%)

Value expressed as number (% of the total).

Echevarria et al. J Clin Anesth. 2017;41:106–11.

«The notion that epidural analgesia should not be administered “too early” during the course of labor was apparent in the responses. This notion was accepted as obstetric gospel for decades, until data to the contrary became incontrovertible»

Echevarria et al. J Clin Anesth. 2017;41:106–11.

«…nearly one-third of respondents believed that their risk for cesarean would be increased by epidural analgesia. This again illustrates that accurate, evidence-based information is not reaching parturients.»

Echevarria et al. J Clin Anesth. 2017;41:106–11.

«An antepartum plan to definitely forgo an epidural was 1.8 times more likely among women who attended a childbirth class when compared to those who did not attend.
(OR = 1.8; 95%CI:1.1–3.1; p = 0.04)»

Cochrane Database Syst Rev:CD007238.

Timing of epidural

Early versus late initiation of epidural analgesia for labour (Review)

Sng BL, Leong WL, Zeng Y, Siddiqui FJ, Assam PN, Lim Y, Chan ESY, Sia AT

2014

THE COCHRANE COLLABORATION®

Cochrane Database Syst Rev:CD007238.

Timing of epidural

- 16’000 patients
- early: 3cm and less
- late: 4cm and more

Cochrane Database Syst Rev:CD007238.

Timing of epidural

	risk ratio	n	quality
Cesarean section	1.02 (0.96-1.08)	15499	high
Instrumental delivery	0.93 (0.86-1.01)	15379	high
duration of first stage	?	14384	low
duration of second stage	-3.22 min. (-6.71-0.27)	14982	high

Cochrane Database Syst Rev:CD007238.

Early versus late initiation of epidural analgesia for labour (Review)

Sng BL, Leong WL, Zeng Y, Siddiqui FJ, Assam PN, Lim Y, Chan ESY, Sia AT

«…the time to initiate epidural analgesia is dependent upon women's requests…»

Initiation of epidural labour analgesia

Initiation of epidural labour analgesia

International Journal of Obstetric Anesthesia (2016) **26**, 4–7
0959-289X/$ - see front matter
http://dx.doi.org/10.1016/j.ijoa.2016.01.004

CrossMark

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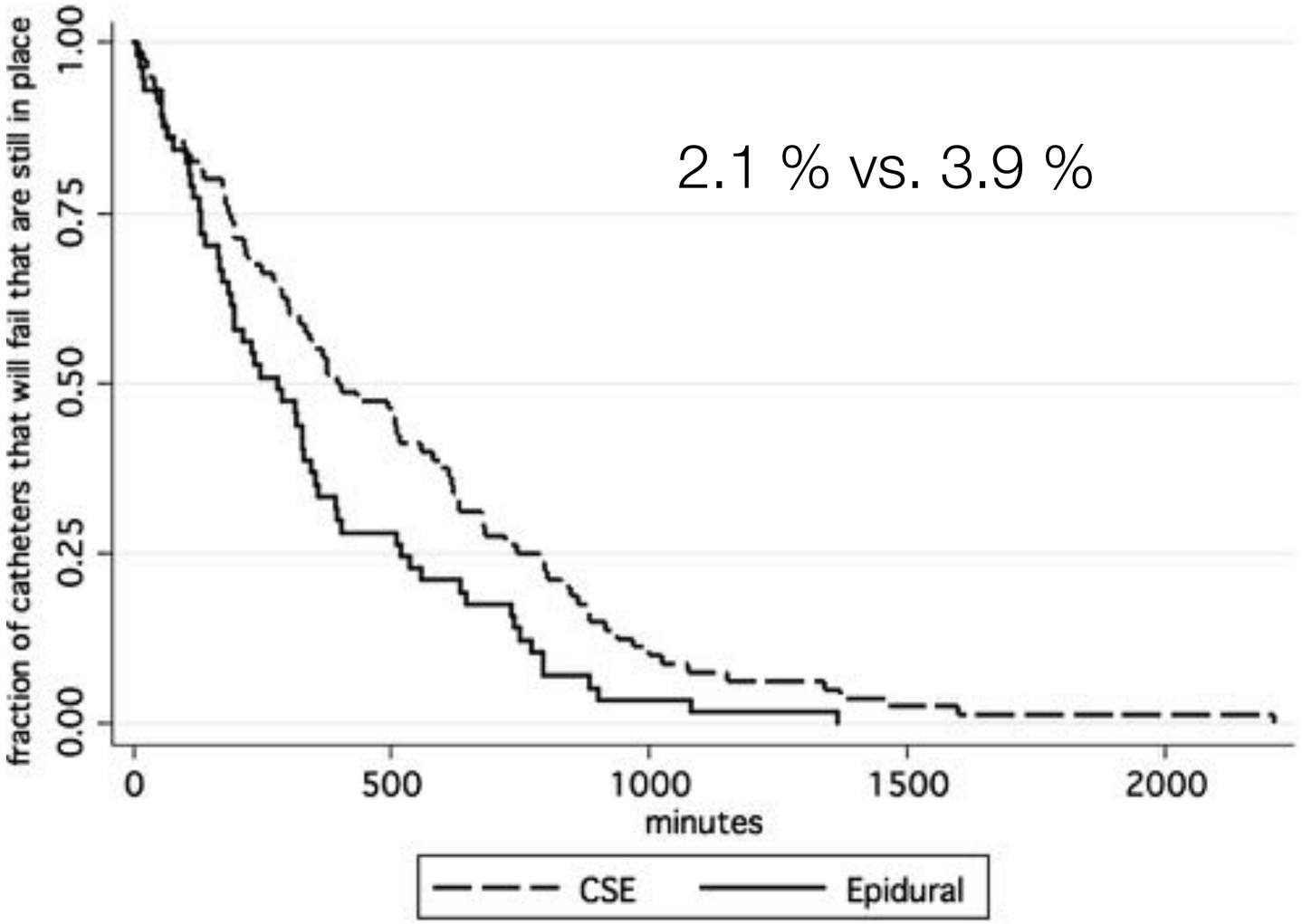
www.obstetanesthesia.com

ORIGINAL ARTICLE

Catheter failure rates and time course with epidural versus combined spinal-epidural analgesia in labor

J. Groden, A. Gonzalez-Fiol, J. Aaronson, A. Sachs, R. Smiley
Department of Anesthesiology, Columbia University College of Physicians and Surgeons, New York, NY, USA

Int J Obstet Anesth. 2016;26:4–7.



2.1 % vs. 3.9 %

Anesthesiology. 2016;125(3):516–24.

Combined Spinal Epidural Technique for Labor Analgesia Does Not Delay Recognition of Epidural Catheter Failures

A Single-center Retrospective Cohort Survival Analysis

Jessica M. Booth, M.D., Joshua C. Pan, B.S., Vernon H. Ross, M.D., Gregory B. Russell, M.S., Lynne C. Harris, B.S.N., Peter H. Pan, M.D., M.S.E.E.

Anesthesiology. 2016;125(3):516–24.

6.6 % vs. 11.6 %

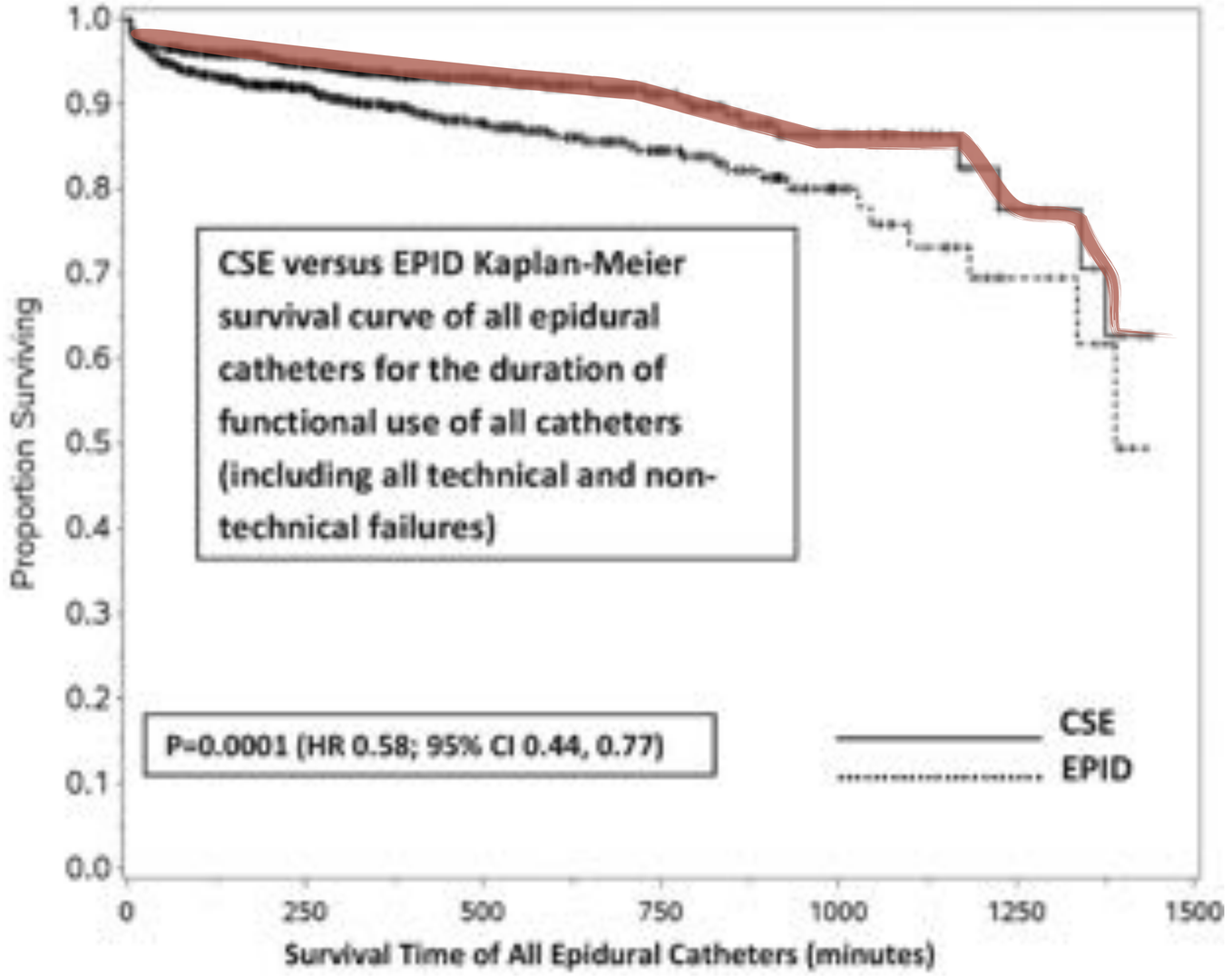


Table 4. Final Multivariable Model for Survival Analyses of All Catheters with Procedural Type, BMI, and Provider Experience Level Controlled in the Model

Parameter	*df*	Parameter Estimate	SE	Chi-square	*P* Value	Hazard Ratio	95% CI
Procedure	1	0.544	0.154	12.430	0.0002	0.58	0.43–0.79
BMI (kg/m^2)	1	0.026	0.009	8.573	0.003	1.03	1.02–1.04
Provider	3				0.75		
Provider 1	1	–0.298	0.284	1.102	0.29	0.74	0.43–1.30
Provider 2	1	–0.117	0.196	0.360	0.55	0.89	0.61–1.31
Provider 3	1	–0.058	0.175	0.109	0.74	0.94	0.67–1.33

Number of catheters in the model = total 2,355: combined spinal epidural technique (CSE) is 1,416 and traditional epidural technique (EPID) is 939. Number of unique subjects in the model = total 2,174: CSE 1,384 and EPID 790. Provider = providers' level of training: 1 = clinical anesthesia training year (CA) 1, 2 = CA2, 3 = CA3, 4 = CA4 and attending combined, where 4 is the referent group. Referent group for procedure is EPID, while exposure group is CSE. For hazard ratios, a value below 1 indicates lower risk of catheter failures; a value above 1 indicates increased risk of catheter failures.

BMI = body mass index; *df* = degrees of freedom.

Hattler et al. Anesth Analg 2016;123:955–964.

The Effect of Combined Spinal–Epidural Versus Epidural Analgesia in Laboring Women on Nonreassuring Fetal Heart Rate Tracings: Systematic Review and Meta-analysis

Judith Hattler, MD,* Markus Klimek, MD, PhD, DEAA, EDIC,† Rolf Rossaint, MD, PhD,‡ and Michael Heesen, MD, PhD*

Hattler et al. Anesth Analg 2016;123:955–964.

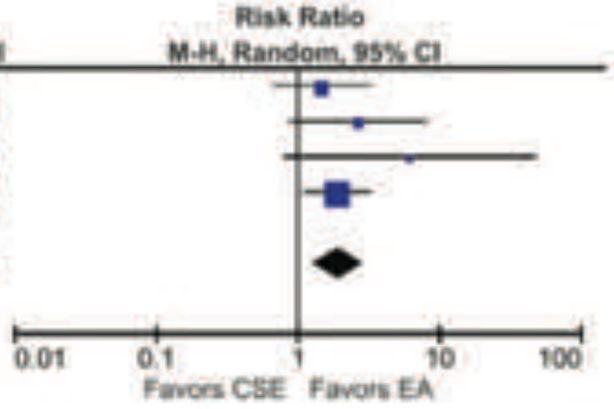
Fetal bradycardia

B

Study or Subgroup	CSE Events	CSE Total	EA Events	EA Total	Weight	Risk Ratio M-H, Random, 95% CI
Collis, 1995[10]	13	98	9	99	26.5%	1.46 [0.65, 3.26]
Nickells, 2000[11]	10	69	4	73	13.8%	2.64 [0.87, 8.04]
Abrao, 2009[9]	7	41	1	36	4.1%	6.15 [0.79, 47.60]
Gambling, 2013[24]	34	402	18	398	55.6%	1.87 [1.07, 3.26]
Total (95% CI)		**610**		**606**	**100.0%**	**1.93 [1.28, 2.92]**
Total events	64		32			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.04$, $df = 3$ ($P = 0.56$); $I^2 = 0\%$

Test for overall effect: $Z = 3.11$ ($P = 0.002$)



Anaesthesia 2014, 69, 64–71 doi:10.1111/anae.12456

Review Article

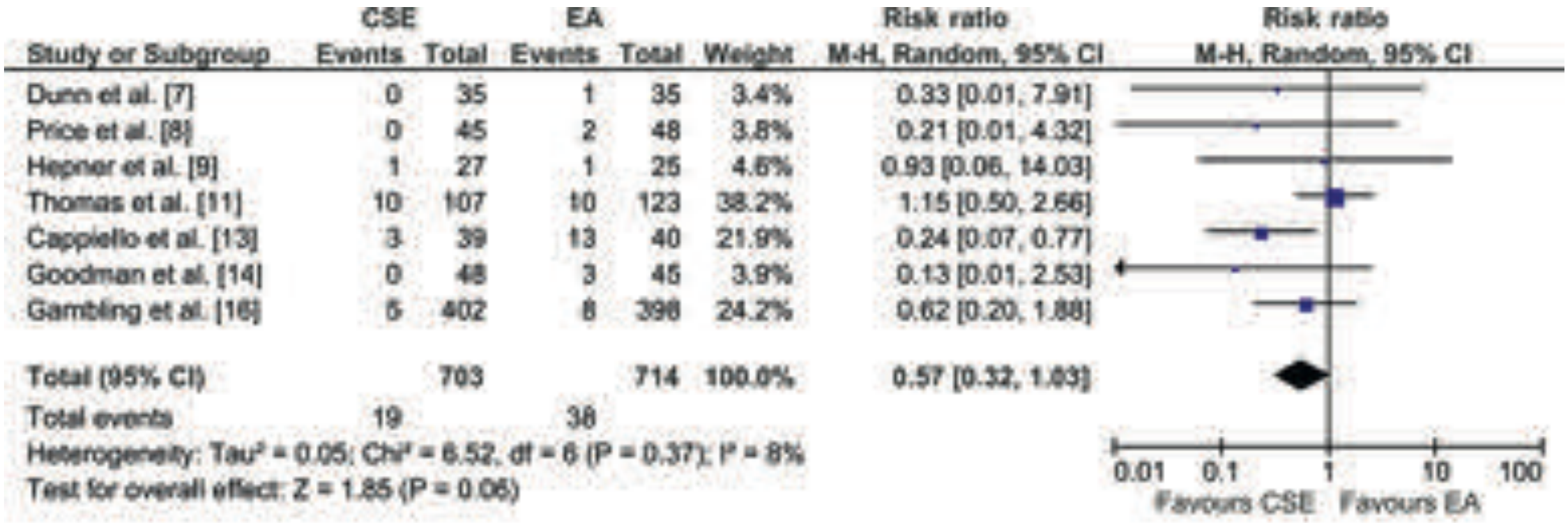
Meta-analysis of the success of block following combined spinal-epidural vs epidural analgesia during labour

M. Heesen,[1] M. Van de Velde,[2] S. Klöhr,[3] J. Lehberger,[4] R. Rossaint[5] and S. Straube[6]

- Replacement of epidural
- Unilateral block
- Epidural top-up

Heesen et al. Anaesthesia. 2013: 28;69(1):64–71.

Replacement of epidural catheter



Heesen et al. Anaesthesia. 2013: 28;69(1):64–71.

Unilateral block

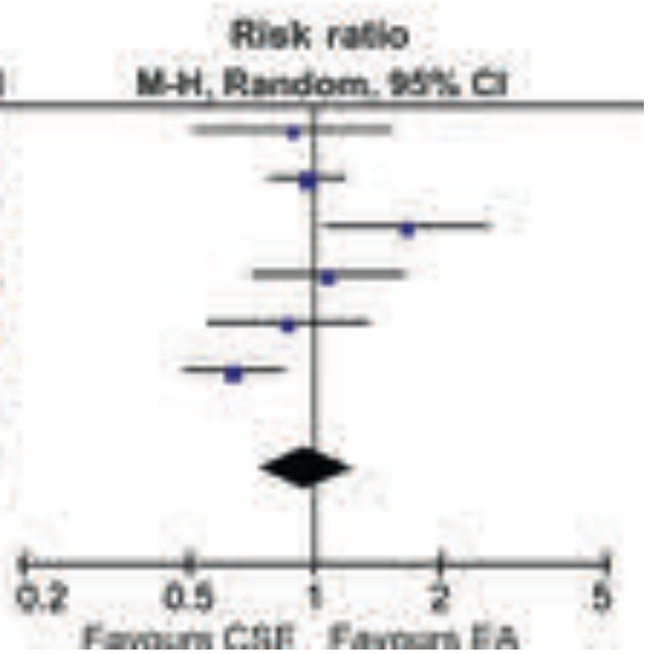
Heesen et al. Anaesthesia. 2013: 28;69(1):64–71.

Epidural top-up

Study or Subgroup	CSE Events	CSE Total	EA Events	EA Total	Weight	Risk ratio M-H, Random, 95% CI
Price et al. [8]	15	45	18	48	12.0%	0.89 [0.51, 1.54]
Thomas et al. [11]	63	107	75	123	22.7%	0.97 [0.78, 1.19]
Ngamprasertwong et al[12]	20	25	12	25	14.6%	1.67 [1.06, 2.62]
Cappiello et al. [13]	21	39	20	40	15.5%	1.08 [0.70, 1.65]
Goodman et al. [14]	19	43	21	41	14.7%	0.86 [0.55, 1.35]
Gambling et al. [16]	66	402	102	398	20.5%	0.64 [0.49, 0.84]
Total (95% CI)		661		675	100.0%	0.95 [0.74, 1.23]
Total events	204		248			

Heterogeneity: $Tau^2 = 0.06$; $Chi^2 = 14.86$, df = 5 (P = 0.01); $I^2 = 66\%$

Test for overall effect: Z = 0.37 (P = 0.71)



Heesen et al. Anaesthesia. 2013: 28;69(1):64–71.

…a consistent benefit of CSE over epidural analgesia cannot be demonstrated for the outcomes assessed in our review.

M. Heesen,[1] M. Van de Velde,[2] S. Klöhr,[3] J. Lehberger,[4] R. Rossaint[5] and S. Straube[6]

Dosing through epidural needle ?

Journal of Pain Research

Dovepress

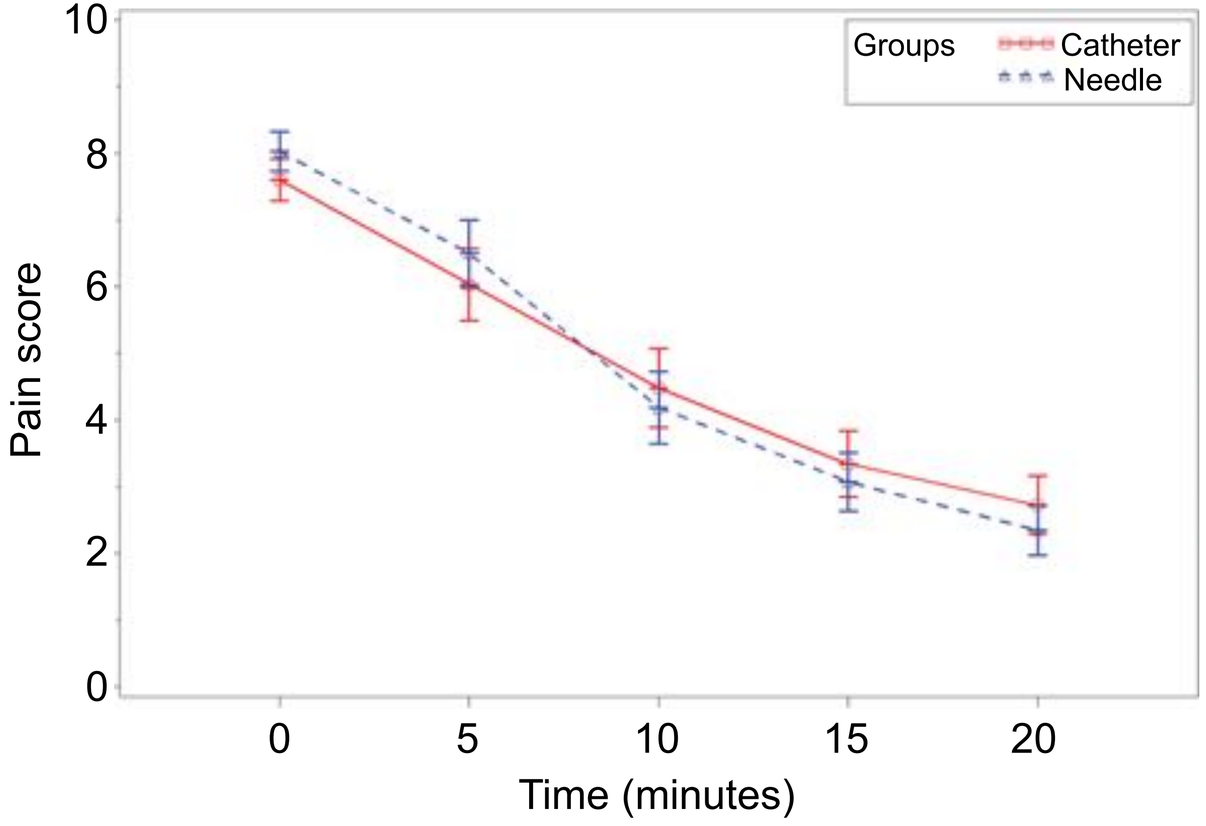
open access to scientific and medical research

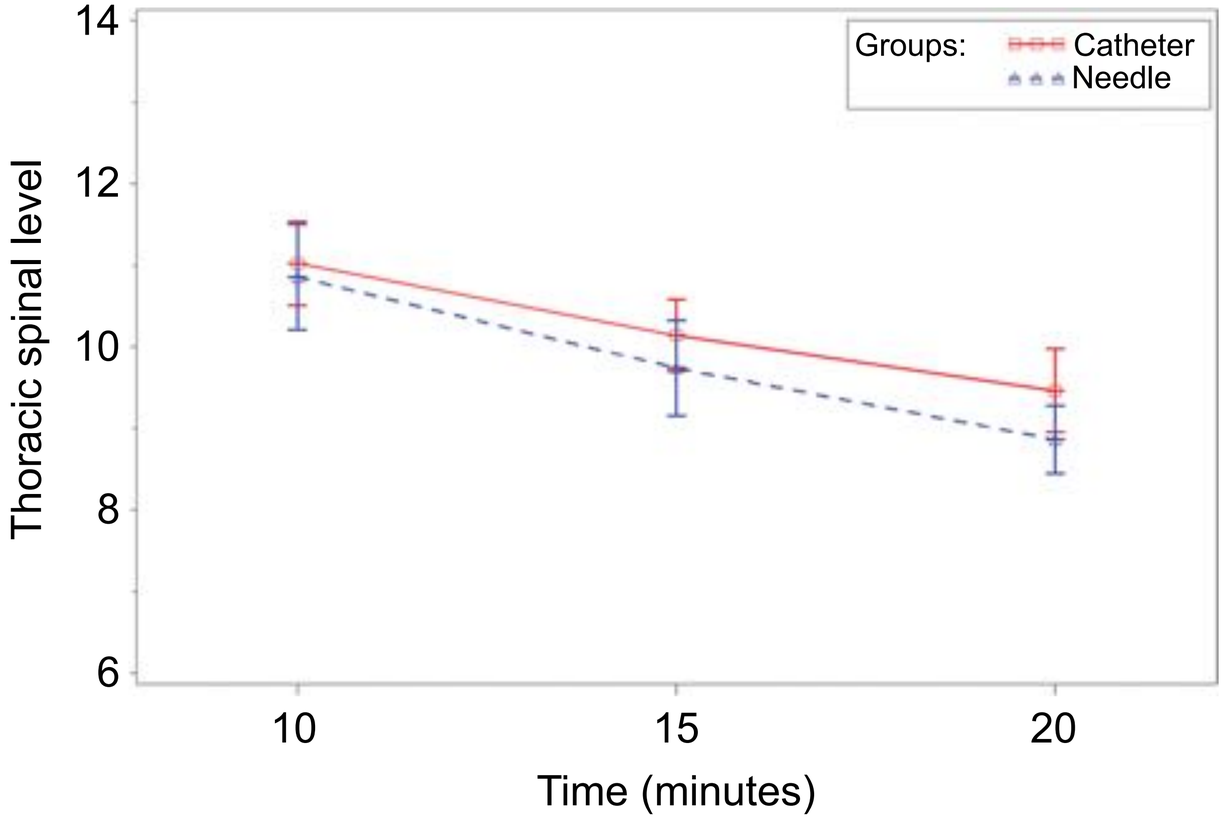
Open Access Full Text Article

ORIGINAL RESEARCH

Initiation of labor analgesia with injection of local anesthetic through the epidural needle compared to the catheter

Ristev et al. J Pain Res. 2017;10:2789-2796.





Ristev et al. J Pain Res. 2017;10:2789-2796.

«…Notably, 13 of 29 patients who were dosed through the epidural catheter reported uterine contraction pain relief prior to receiving the initial dose of epidural medication…»

1

Initiation of labor analgesia with injection of local anesthetic through the epidural needle compared to the catheter.

Ristev G, Sipes AC, Mahoney B, Lipps J, Chan G, Coffman JC

show author affiliations

J Pain Res. 2017; 10:2789-2796

Recommendations:

Good

05 Mar 2018

Roshan Fernando

F1000 Anesthesiology & Pain Management

Women's Hospital, Doha, Qatar.

Monkez Almasri

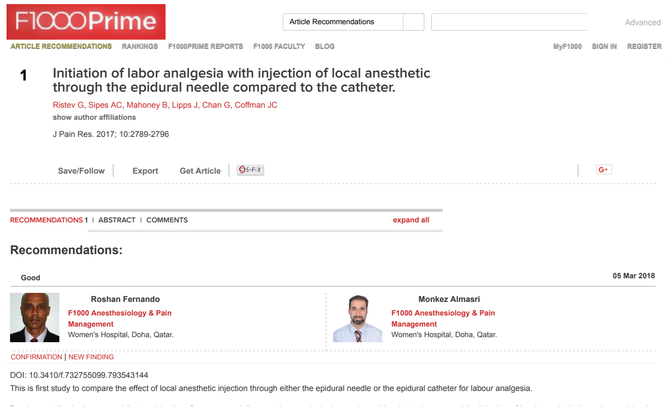
F1000 Anesthesiology & Pain Management

Women's Hospital, Doha, Qatar.

CONFIRMATION | NEW FINDING

DOI: 10.3410/f.732755099.793543144

This is first study to compare the effect of local anesthetic injection through either the epidural needle or the epidural catheter for labour analgesia.



F1000Prime

Article Recommendations Advanced

ARTICLE RECOMMENDATIONS RANKINGS F1000PRIME REPORTS F1000 FACULTY BLOG MyF1000 SIGN IN REGISTER

1 Initiation of labor analgesia with injection of local anesthetic through the epidural needle compared to the catheter.

Ristev G, Sipes AC, Mahoney B, Lipps J, Chan G, Coffman JC

show author affiliations

J Pain Res. 2017; 10:2789-2796

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RECOMMENDATIONS 1 | ABSTRACT | COMMENTS expand all

Recommendations:

Good 05 Mar 2018

Roshan Fernando
F1000 Anesthesiology & Pain Management
Women's Hospital, Doha, Qatar.

Monkez Almasri
F1000 Anesthesiology & Pain Management
Women's Hospital, Doha, Qatar.

CONFIRMATION | NEW FINDING

DOI: 10.3410/f.732755099.793543144

This is first study to compare the effect of local anesthetic injection through either the epidural needle or the epidural catheter for labour analgesia.

«…there is no benefit from dosing through the epidural needle (…). Additional concerns relate to the safety, with longer procedure times (…). Not only could this affect patient satisfaction with their labour analgesia, but it could also theoretically increase the risk of accidental dural puncture with the epidural needle.

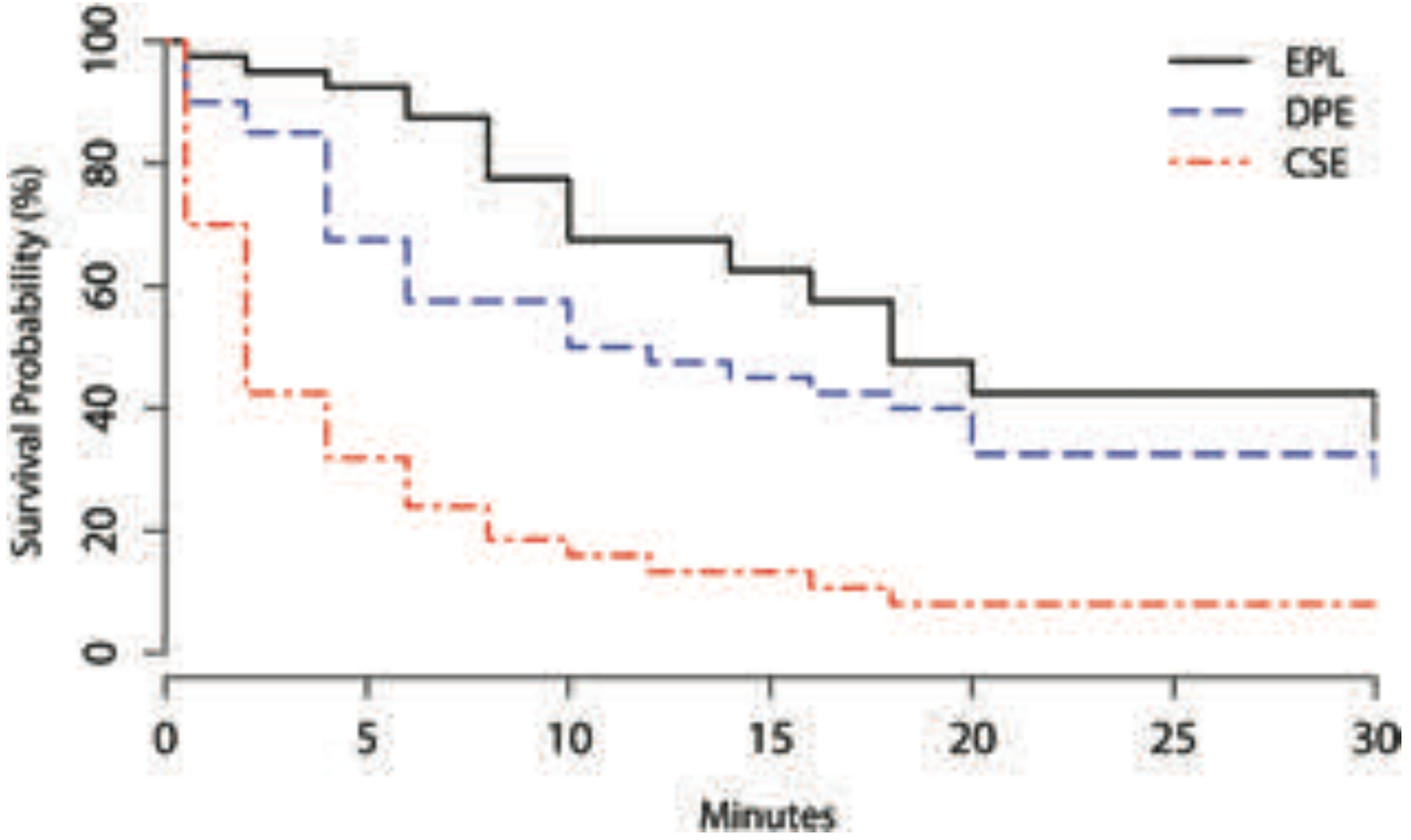
Chau et al. Anesth Analg. 2017;124(2):560–9.

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

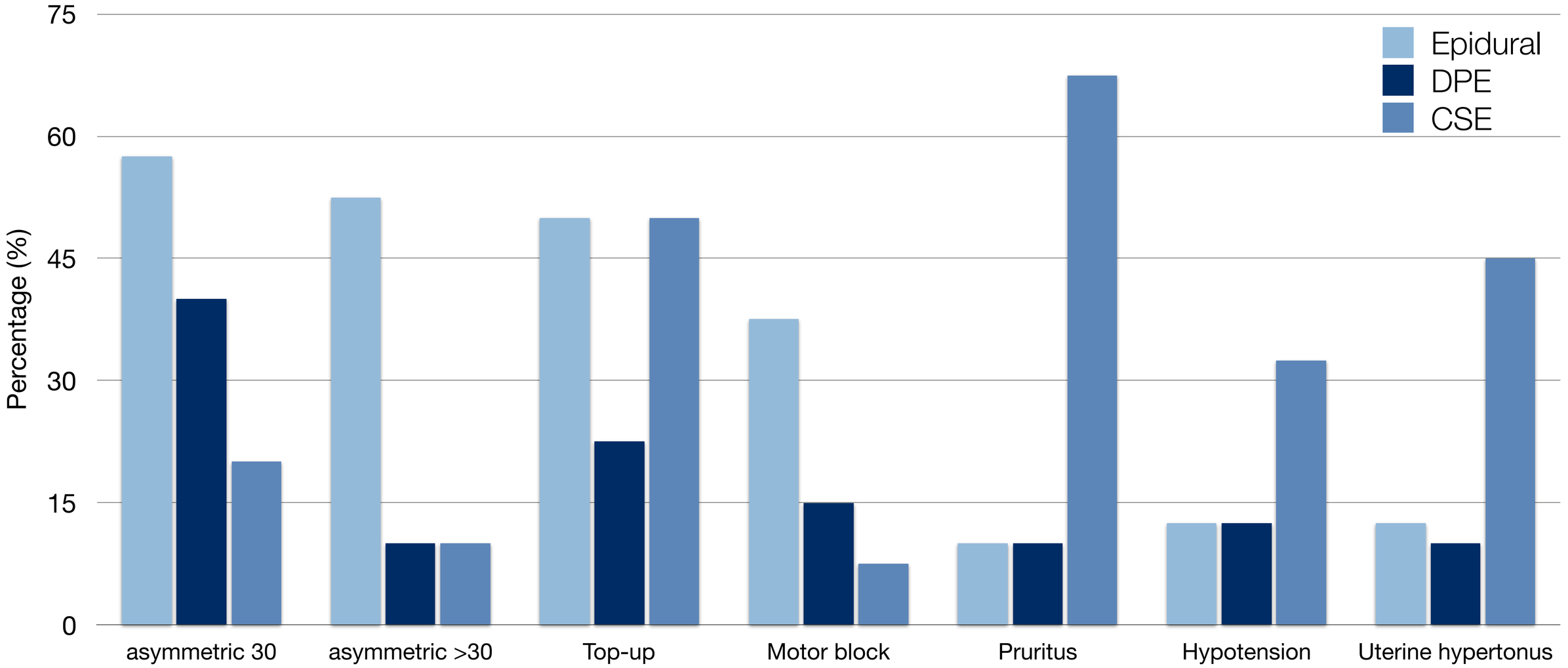
Anthony Chau, MD, MMSc, FRCPC,*†‡ Carolina Bibbo, MD,§ Chuan-Chin Huang, ScD,†
Kelly G. Elterman, MD,‖ Eric C. Cappiello, MD,†‡ Julian N. Robinson, MD,‡§ and Lawrence C. Tsen, MD†‡

Chau et al. Anesth Analg. 2017;124(2):560–9.

Pain score <1 following initial bolus



Chau et al. Anesth Analg. 2017;124(2):560–9.



Wilson et al. Anesthesia & Analgesia; 2018;126(2):545–51.

Labor Analgesia Onset With Dural Puncture Epidural Versus Traditional Epidural Using a 26-Gauge Whitacre Needle and 0.125% Bupivacaine Bolus: A Randomized Clinical Trial

Sylvia H. Wilson, MD, Bethany J. Wolf, PhD, Kayla Bingham, BS, Quiana S. Scotland, MD, John M. Fox, MD, Erick M. Woltz, BS, and Latha Hebbar, MD, FRCA

faster onset, no other difference

25G vs. 26G vs. 27G

Table 2. Outcomes by Neuraxial Technique

	LE (n = 40)	DPE (n = 40)	*P*
Primary outcome[a]			
VAS < 10 mm at 10 min	21 (44.7)	26 (55.3)	.256
Secondary outcomes			
Time to adequate analgesia[b] (min)	10 (8–14)	8 (6–10)	.042
Physician bolus during labor	3 (7.50)	7 (17.5)	.176
Patient satisfaction (mm)[a]			
Overall treatment	93 (12)	88 (25)	.547
Time to pain relief	91 (14)	87 (24)	.879
Epidural placement	95 (0.9)	87 (2.6)	.352
Speed of epidural placement	94 (11)	86 (24)	.275

A Randomized Controlled Trial of Music Use During Epidural Catheter Placement on Laboring Parturient Anxiety, Pain, and Satisfaction

Dan M. Drzymalski, MD, Lawrence C. Tsen, MD, Arvind Palanisamy, MBBS, MD, FRCA, Jie Zhou, MD, MS, MBA, Chuan-Chin Huang, ScD, and Bhavani S. Kodali, MD

Table 2. Genre of Music Chosen by Parturients

	Music Group (n = 50)	Control Group (n = 49)
Classical	18 (36%)	12 (24%)
Country	4 (8%)	5 (10%)
Folk	2 (4%)	3 (6%)
Jazz	2 (4%)	2 (4%)
New Age	8 (16%)	6 (12%)
Other	5 (10%)	3 (6%)
Reggae	2 (4%)	1 (2%)
Rhythm & Blues	4 (8%)	6 (12%)
Rock	5 (10%)	9 (18%)

Values are presented as n (%).

Other genres include: Latin, Blues, Funk, Gospel, Hip Hop, and Neo-Psychedelia.

Drzymalski et al. Anesth Analg (2017) 124:542–547.

- No difference in pain scores
- less relaxed in music group
- provider was equally relaxed
- preference for future music use

Epidural labour analgesia

- Inititation
- Maintenance
- Side effects

Maintenance of epidural labour analgesia

Epidural labour analgesia

- Low concentration of local anaesthetic
  - Bupivacaine (0.125%), 0.1%, 0.0625%
  - Ropivacaine (0.175%), 0.125%, 0.1%
- combined with lipophilic opioid
  - Fentanyl 1-2 µg / ml
  - Sufentanil 0.5-1 µg / ml

Anesth Analg. 2009;108(3):921–8.

CME Patient-Controlled Epidural Analgesia for Labor

Stephen H. Halpern, MD, MSc, FRCPC*

Brendan Carvalho, MBBCh, FRCA†

Anesth Analg. 2009;108(3):921–8.

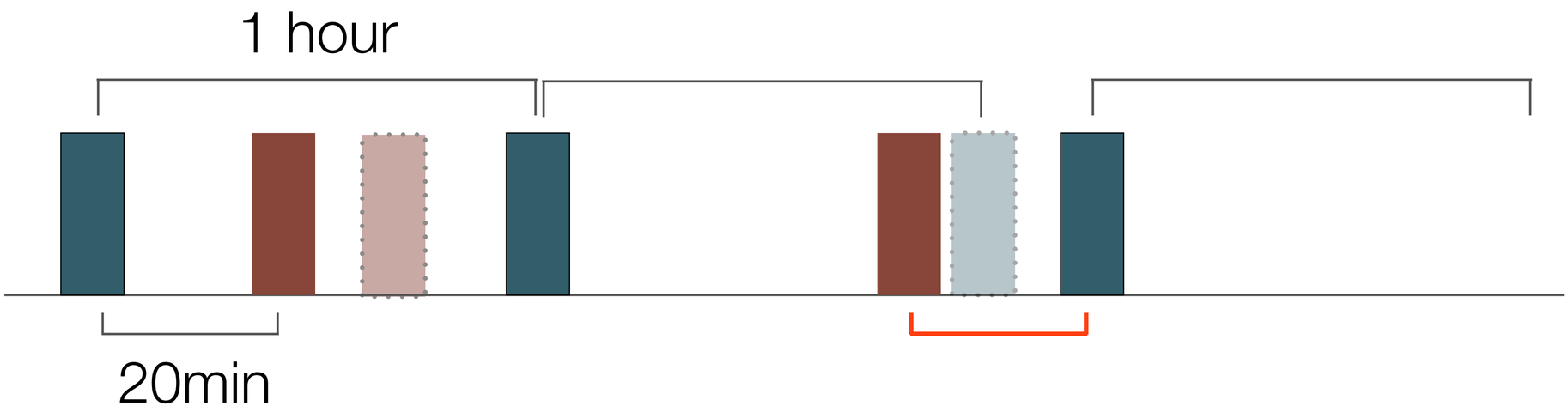
motor block

local anaesthetics

Anesth Analg. 2009;108(3):921–8.

clinican interventions

PIEB



Curr Opin Anaesthesiol. 2013;26(3):261–7.

REVIEW

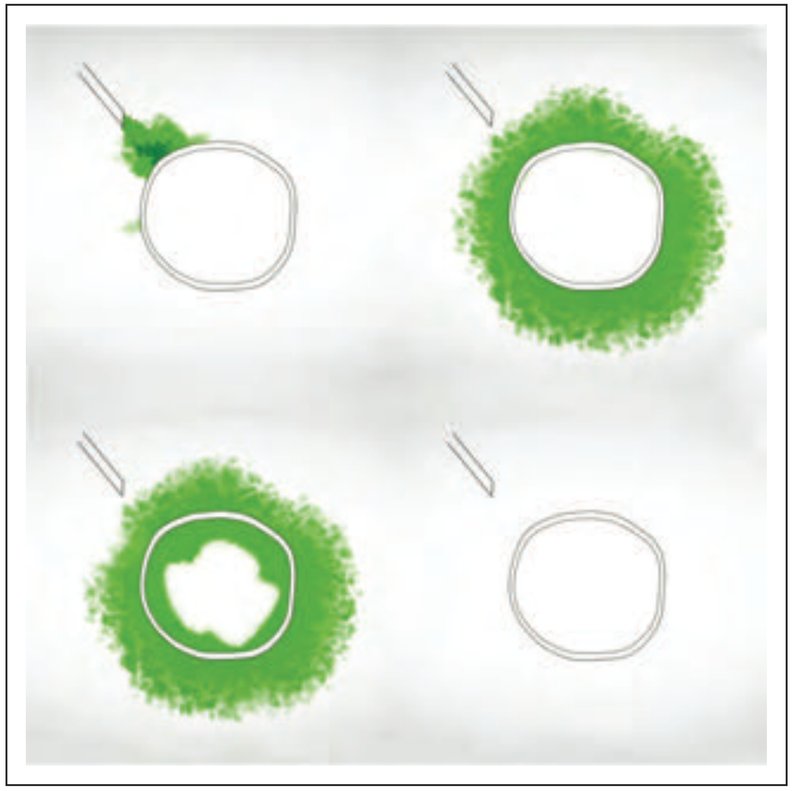
Techniques for the maintenance of epidural labor analgesia

Giorgio Capogna and Silvia Stirparo

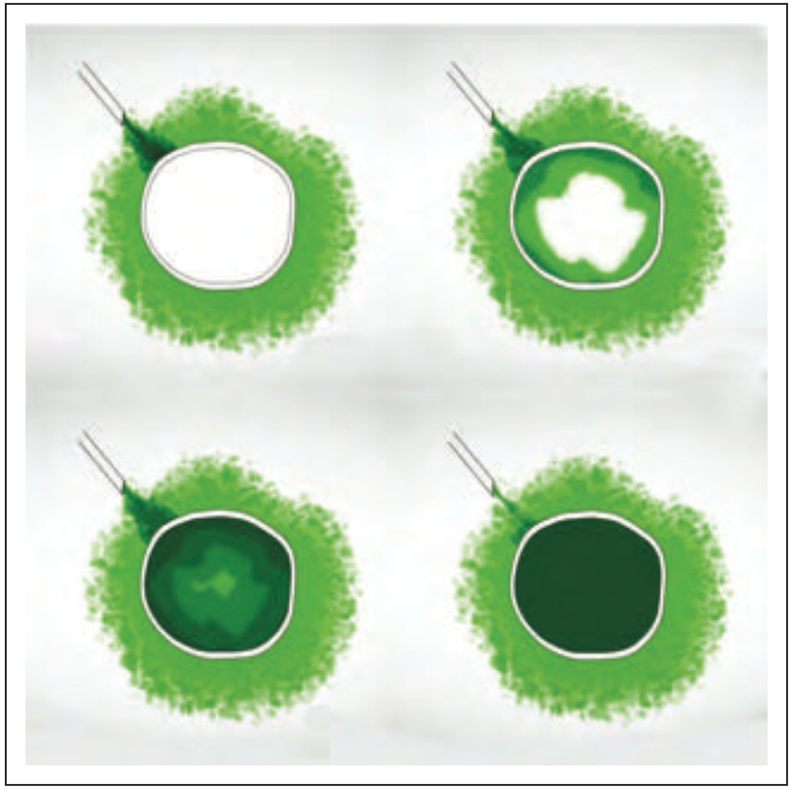
Purpose of review
After initiating neuraxial labor analgesia, there are many techniques that can be used to maintain analgesia for the duration of labor. In this review, we have examined the new techniques of maintenance of epidural labor analgesia recently proposed to overcome the undesirable effects of continuous infusion and patient-controlled epidural analgesia (PCEA).

Curr Opin Anaesthesiol. 2013;26(3):261–7.

intermittend bolus



continuous infusion

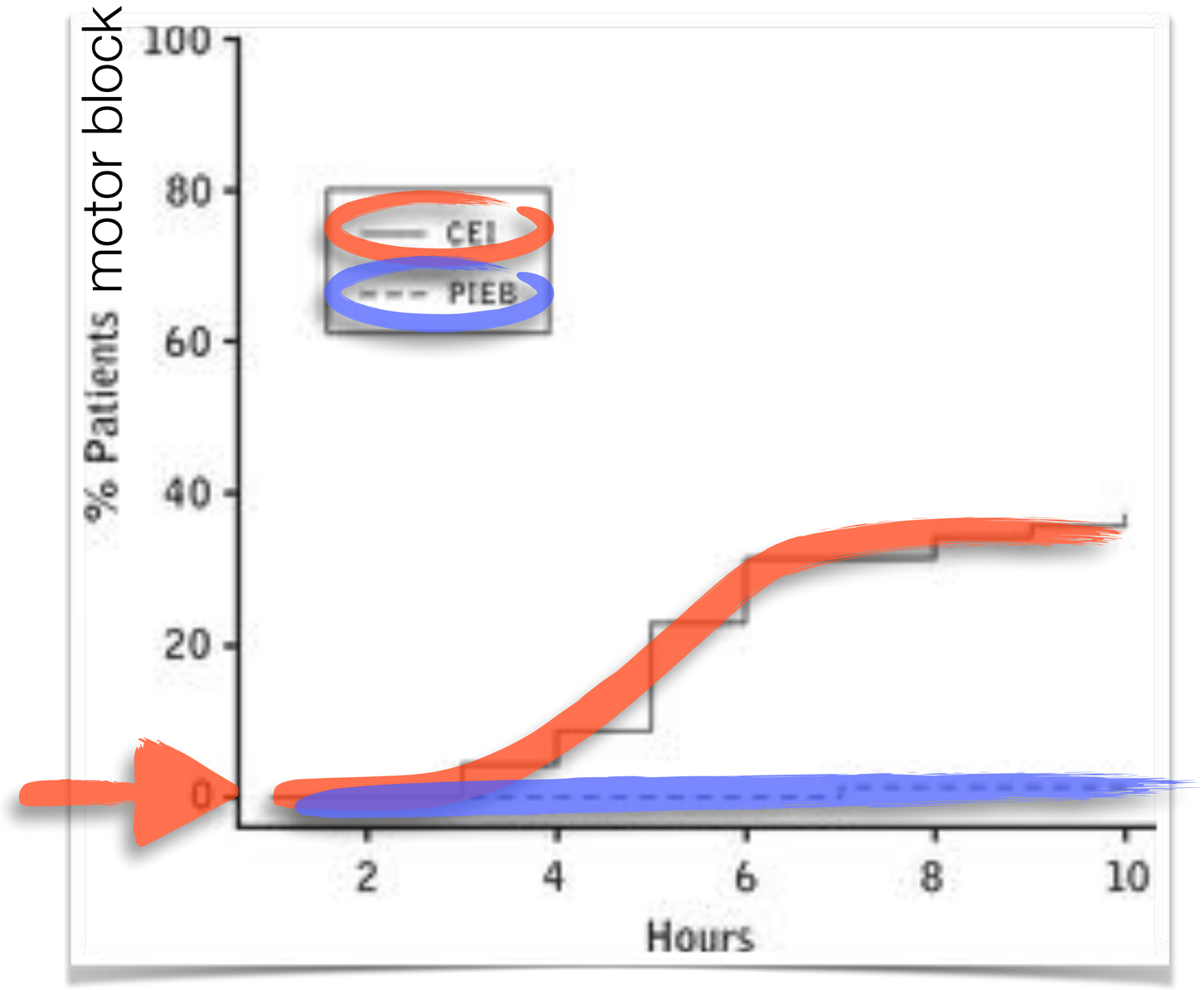


Anesthesia and analgesia (2011) vol. 113 (4) pp. 826-31

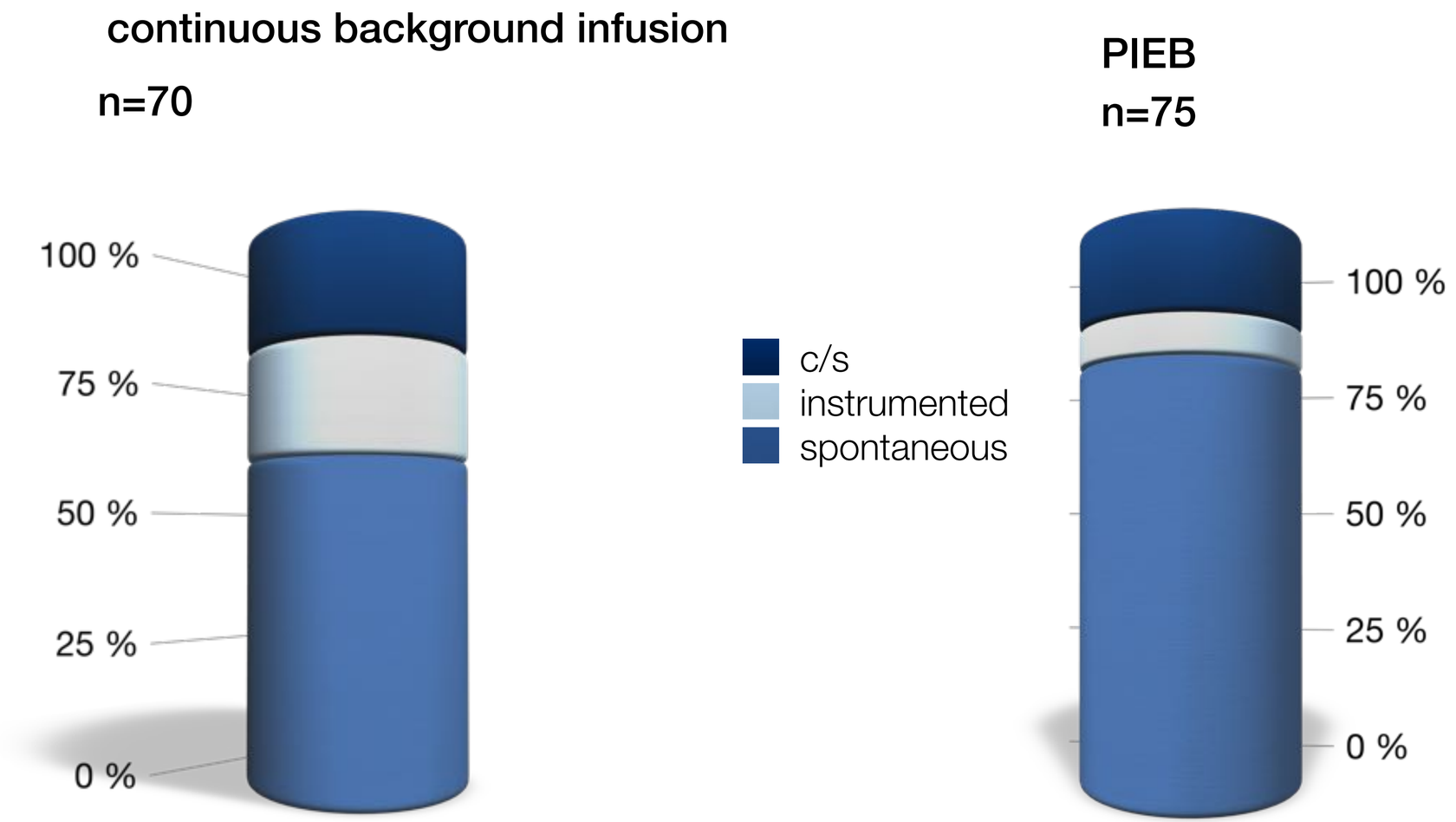
Programmed Intermittent Epidural Bolus Versus Continuous Epidural Infusion for Labor Analgesia: The Effects on Maternal Motor Function and Labor Outcome. A Randomized Double-Blind Study in Nulliparous Women

Giorgio Capogna, MD, Michela Camorcia, MD, Silvia Stirparo, MD, and Alessio Farcomeni, PhD

Anesthesia and Analgesia 2011;113:826



Anesthesia and Analgesia 2011;113:826



It's not easy being green, or is it? Alkaline battery versus A/C power for programmed intermittent epidural bolus pumps ☆

Alkaline battery-powered CADD®-Solis Ambulatory Infusion PCEA (patient-controlled epidural analgesia) pumps with the new PIEB (programmed intermittent epidural bolus) programming are found increasingly commonly within major obstetric anesthesia training institutions. CADD®-Solis pumps drain batteries faster in the PIEB mode compared to the continuous epidural infusion setting (88 hours vs 113 hours), and the low-battery alarm starts at 25%.[1] The use of the initial investment cost. CADD® pumps have an operational life of 7–10 years (source: Smiths representative), so at $310 per year battery cost times 7–10 years of pump life, the cost is $2170 to $3100 for batteries over the life of the nine pumps. Use of an A/C adapter would equate to savings of $865 to $1795 ($2170 to $3100 lifetime battery cost minus $1305 A/C adapter cost) saved over the lifetime of nine pumps, or an average saving of $148 per pump (average of $865 plus $1795 = $1330 divided by 9). There are no PubMed articles concerning the environment impact of alkaline batteries in medicine.

☆ Presented in part at the 2017 Society for Obstetric Anesthesia and Perinatology annual meeting in Bellevue, WA, USA.

Epidural labour analgesia

- Inititation
- Maintenance
- Side effects

Side effects of neuroaxial labour analgesia

- Infection
- Positioning
- Second stage
- Breastfeeding
- Dural tap

International Journal of Obstetric Anesthesia (2018) **33**, 8–16
0959-289X/$ - see front matter
https://doi.org/10.1016/j.ijoa.2017.10.001

ELSEVIER
www.obstetanesthesia.com

ORIGINAL ARTICLE

A survey of international antisepsis procedures for neuraxial catheterisation in labour

K. Fayman, A. Allan, C. Hudson, M. Logarta
Department of Anaesthesia, Campbelltown Hospital, Therry Road, Campbelltown, New South Wales 2560, Australia

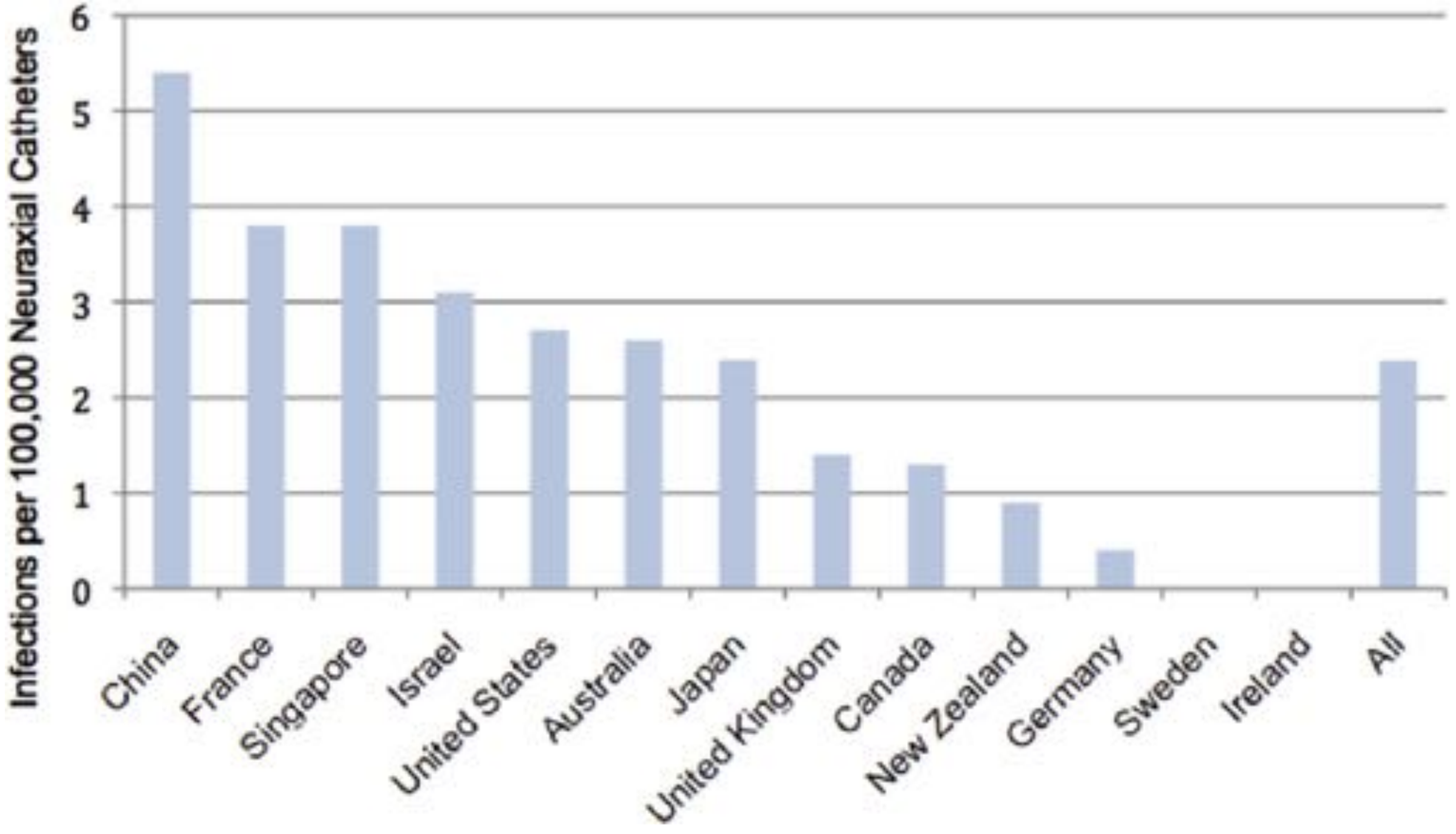
Table 1 Response rate by country

Country	Responses	Contacted	Response rate (%)
Australia	18	22	81.8
Canada	18	25	72.0
China	11	15	73.3
Finland	0	3	0.0
France	11	26	42.3
Germany	10	22	45.5
Ireland	5	6	83.3
Israel	7	10	70.0
Japan	7	12	58.3
New Zealand	6	8	75.0
Norway	0	3	0.0
Singapore	3	6	50.0
South Africa	0	2	0.0
South Korea	0	3	0.0
Sweden	1	6	16.7
United Kingdom	22	30	73.3
United States	32	46	69.6
Total	151	245	

Table 3 Sterile gown, cleaning solution and face mask use by country

	Sterile gown worn (%)			Cleaning solution used (%)			Face mask worn (%)		
	Always	Sometimes	Never	Chlorhexidine	Iodine	Either	Always	Sometimes	Never
USA	3.1	3.1	93.8	90.6	9.4	0.0	100.0	0.0	0.0
UK	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0
Australia	100.0	0.0	0.0	100.0	0.0	0.0	94.4	5.6	0.0
Canada	0.0	0.0	100.0	100.0	0.0	0.0	100.0	0.0	0.0
China	0.0	9.1	90.9	27.3	72.7	0.0	81.8	18.2	0.0
France	81.8	0.0	18.2	63.6	18.2	18.2	90.9	9.1	0.0
Germany	30.0	0.0	70.0	100.0	0.0	0.0	100.0	0.0	0.0
Israel	71.4	14.3	14.3	100.0	0.0	0.0	100.0	0.0	0.0
Japan	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0
NZ	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0
Ireland	20.0	0.0	80.0	60.0	40.0	0.0	100.0	0.0	0.0
Singapore	33.3	66.7	0.0	66.7	33.3	0.0	66.7	33.3	0.0
Sweden	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0

Fayman et al. Int J Obstet Anesth (2018) 33:8–16.



Fayman et al. Int J Obstet Anesth (2018) 33:8–16.

Country	Gown	Chlorhexidin	Face mask	Rate
Ireland	20	60	100	0
Sweden	100	100	100	0
Germany	30	100	100	0.4
NZ	100	100	100	0.9
Canada	0	100	100	1.3
UK	100	100	100	1.4
Japan	100	100	100	2.3
Australia	100	100	94.4	2.6
USA	3.1	90.6	100	2.7
Israel	71.4	100	100	3.1
France	81.8	63.6	90.9	3.8
Singapore	33.3	66.7	66.7	3.8
China	0	27.3	81.8	5.4

Upright versus lying down position in second stage of labour in nulliparous women with low dose epidural: BUMPES randomised controlled trial

The Epidural and Position Trial Collaborative Group

WHAT THIS STUDY ADDS

35.2% vs. 41.1%

In nulliparous women in labour at term with an epidural and a singleton fetus, a policy of adopting a lying down position (left or right lateral) during the second stage of labour increases the chance of spontaneous vaginal birth compared with a policy of adopting an upright position

There were no adverse consequences of this approach for mother or baby in the short term, or at 12 months post birth

Shen et al. Obstetrics & Gynecology; 2017;130(5):1097–103.

Original Research

Epidural Analgesia During the Second Stage of Labor

A Randomized Controlled Trial

XiaoFeng Shen, MD, Yunping Li, MD, ShiQin Xu, MD, Nan Wang, MD, Sheng Fan, MD, Xiang Qin, RN, Chunxiu Zhou, RN, and Philip E. Hess, MD

Table 2. Maternal Delivery Outcomes

Outcome	SALINE Group (n=200)	EPIDURAL Group (n=200)	Difference (95% CI)	*P*
Duration of 2nd stage (min)	51±25	52±27	3.3% (−6.8 to 13.5%); 101 sec (−3.5 to 7 min)	.52
Mode of delivery				
Cesarean	0 (0)	2 (1)	0.5% (−0.1 to 0.3%)	.50
Forceps	2 (1)	5 (2.5)	1.5% (−1.6 to 4.6%)	.25
Episiotomy	64 (32)	70 (35)	3% (−6.8 to 12.8%)	.52
VAS pain				
Time 0	1.2 (0.6–2.3)	1.5 (0.7–2.7)	0.3 (−0.6 to −0.2)	.06
30	1.4 (0.6–2.4)	1.3 (0.8–2.0)	0.1 (−0.2 to 0.4)	.80
60	1.5 (0.9–1.5)	1.1 (0.5–2.0)	0.4 (−0.1 to 0.9)	.09
90	3.1 (1.6–3.3)	2.4 (1.2–3.1)	0.7 (−1.2 to 1.9)	.46

Shen et al. Obstetrics & Gynecology; 2017;130(5):1097–103.

Secondary findings

- 12% epidural stopped before 2nd stage. Duration equal
- 14 epidural stoped due to poor progress
  - 2nd stage was longer
  - 8 saline, 6 ropivacaine

In summary, stopping the epidural infusion at the start of the second stage of labor does not affect the duration or any other outcome, with the exception of possibly resulting in lower maternal satisfaction.

Breastfeeding

Lee et al. Anesthesiology (2017) 127:614–624.

PERIOPERATIVE MEDICINE

Epidural Labor Analgesia—Fentanyl Dose and Breastfeeding Success

A Randomized Clinical Trial

Amy I. Lee, M.D., Robert J. McCarthy, Pharm.D., Paloma Toledo, M.D., M.P.H., Mary Jane Jones, R.N., Nancy White, R.N., I.B.C.L.C., Cynthia A. Wong, M.D.

Lee et al. Anesthesiology (2017) 127:614–624.

Table 3. Labor Analgesia Outcomes, Mode of Delivery, Maternal and Umbilical Cord Fentanyl and Bupivacaine Levels, Infant and Breastfeeding Outcomes during Hospital Stay

	Patient-controlled Epidural Analgesia Solution			
	Bupivacaine 1 mg/ml + fentanyl 0 μg/ml (n = 111)	Bupivacaine 0.8 mg/ml + fentanyl 1 μg/ml (n = 109)	Bupivacaine 0.625 mg/ml + 2 μg/ml fentanyl (n = 112)	*P* Value
Cervical dilation at labor analgesia request (cm)	3 (3 to 4)	3 (2 to 4)	3 (2.5 to 4)	0.14
VRPS (0 to 100) 15 min following intrathecal drug administration	2 (0 to 6)	3 (1 to 9)	3 (0 to 9)	0.15
Upper level of sensory analgesia to ice 15 min following intrathecal drug administration				
Left	T_6 (T_5 to T_7)	T_6 (T_7 to T_5)	T_6 (T_7 to T_5)	0.84
Right	T_6 (T_5 to T_7)	T_6 (T_7 to T_5)	T_6 (T_7 to T_5)	0.97
Motor block assessment* n (%)				
15 min following intrathecal injection				0.61
None	106 (95)	105 (97)	110 (98)	
Partial	4 (4)	3 (3)	2 (2)	
Almost complete	1 (1)	0	0	
Complete	0	0	0	
2 h following intrathecal injection				0.70
None	106 (95)	105 (96)	108 (96)	
Partial	4 (4)	4 (4)	4 (4)	
Almost complete	1 (1)	0	0	
Complete	0	0	0	
At delivery				0.03
None	92 (82)	100 (91)	108 (96)	
Partial	14 (13)	5 (5)	4 (4)	
Almost complete	4 (4)	4 (4)	0	
Complete	1 (1)	0	0	
Duration of epidural infusion (min)	207 (149 to 298)	216 (165 to 327)	197 (133 to 319)	0.37
Total epidural infusion volume (ml)	56 (40 to 85)	63 (46 to 94)	62 (41 to 98)	0.49
Manual bupivacaine boluses for breakthrough pain, n (%)	14 (13)	21 (19)	24 (21)	0.20
Cumulative fentanyl dose (μg)	15 (15 to 15)	78 (60 to 109)	139 (97 to 210)	< 0.001
Cumulative bupivacaine dose (mg)	58 (40 to 86)	55 (37 to 81)	42 (25 to 61)	< 0.001
Plasma bupivacaine concentration (ng/ml)	228 (159 to 306)	173 (118 to 257)	144 (108 to 230)	< 0.001
Plasma fentanyl concentration (ng/ml)	0.01 (0.007 to 0.02)	0.07 (0.05 to 0.09)	0.13 (0.09 to 0.18)	< 0.001
Verbal rating score for analgesia satisfaction (0 to 100)	91 (76 to 97)	91 (76 to 99)	86 (74 to 96)	0.38
Mode of delivery, n (%)				
Vaginal	111 (100)	107 (98)	110 (98)	
Assisted vaginal	0	1 (1)	2 (2)	0.73
Cesarean	0	1 (1)	0	
Infant weight (kg)	3.54 (3.32 to 3.77)	3.61 (3.28 to 3.91)	3.57 (3.31 to 3.87)	0.39
Umbilical vein plasma bupivacaine concentration (ng/ml)	63 (48 to 82)	50 (31 to 72)	44 (27 to 67)	< 0.001
Umbilical vein plasma fentanyl concentration (ng/ml)	0.005 (0.005 to 0.10)	0.03 (0.02 to 0.04)	0.06 (0.04 to 0.09)	< 0.001
Apgar score < 7 at 1 min, n (%)	1 (4)	2 (4)	0 (0)	0.36
Neonatal intensive care unit admission, n (%)	1 (1)	2 (2)	2 (2)	0.81
Breastfeeding at lactation consultant assessment, n (%)				0.12
Yes	98 (88)	96 (88)	98 (87)	
No	8 (7)	9 (8)	3 (3)	
Consultant not available	5 (5)	4 (4)	11 (10)	

Patient-controlled Epidural Analgesia Solution

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Lee et al. Anesthesiology (2017) 127:614–624.

PERIOPERATIVE MEDICINE

Epidural Labor Analgesia—Fentanyl Dose and Breastfeeding Success

A Randomized Clinical Trial

Amy I. Lee, M.D., Robert J. McCarthy, Pharm.D., Paloma Toledo, M.D., M.P.H., Mary Jane Jones, R.N., Nancy White, R.N., I.B.C.L.C., Cynthia A. Wong, M.D.

ABSTRACT

Background: Breastfeeding is an important public health concern. High cumulative doses of epidural fentanyl administered for labor analgesia have been reported to be associated with early termination of breastfeeding. We tested the hypothesis that breastfeeding success is adversely influenced by the cumulative epidural fentanyl dose administered for labor analgesia.

Methods: The study was a randomized, double-blind, controlled trial of parous women at greater than 38 weeks gestation who planned to breastfeed, had successfully breastfed a prior infant, and who received neuraxial labor analgesia. Participants were randomized to receive one of three epidural maintenance solutions for labor analgesia (bupivacaine 1 mg/ml, bupivacaine 0.8 mg/ml with fentanyl 1 μg/ml, or bupivacaine 0.625 mg/ml with fentanyl 2 μg/ml). The primary outcome was the proportion of women breastfeeding at 6 weeks postpartum. Maternal and umbilical venous blood fentanyl and bupivacaine concentration at delivery were measured.

Results: A total of 345 women were randomized and 305 had complete data for analysis. The frequency of breastfeeding at 6 weeks was 97, 98, and 94% in the groups receiving epidural fentanyl 0, 1, and 2 μg/ml, respectively ($P = 0.34$). The cumulative fentanyl dose (difference: 37 μg [95% CI of the difference, −58 to 79 μg], $P = 0.28$) and maternal and umbilical cord venous fentanyl and bupivacaine concentrations did not differ between women who discontinued breastfeeding and those who were still breastfeeding at 6 weeks postpartum.

Conclusions: Labor epidural solutions containing fentanyl concentrations as high as 2 μg/ml do not appear to influence breastfeeding rates at 6 weeks postpartum. **(Anesthesiology 2017; 127:614-24)**

BREASTFEEDING is an important public health concern, with documented maternal and infant health benefits.[1,2] Neuraxial labor analgesia is used in the majority of births in the United States,[3] but controversy exists as to whether neuraxial labor analgesia negatively impacts breastfeeding. A 2016 systematic review included 23 studies that investigated the association between neuraxial labor analgesia and breastfeeding outcomes.[4] Results were conflicting; half of the studies found no association between neuraxial analgesia and breastfeeding outcomes, while the other half identified negative associations, and one found a positive association. Most studies were observational trials; only three studies were randomized controlled trials. A possible explanation for these conflicting results is that many studies did not control for confounding variables known to influence breastfeeding success.[4,5] Some studies were underpowered, analgesia management in both the neuraxial analgesia and control groups differed or was not well described.

What We Already Know about This Topic

- There is controversy and disagreement between studies as to whether neuraxial analgesia for labor, particularly with fentanyl, affects postpartum breastfeeding

What This Article Tells Us That Is New

- A randomized parallel group study of three epidural solutions of bupivacaine with or without fentanyl showed that breastfeeding success at 6 weeks was not influenced by the epidural fentanyl concentration or the cumulative epidural fentanyl dose administered for labor analgesia
- Maternal and umbilical cord venous fentanyl and bupivacaine concentrations did not differ between women who discontinued breastfeeding (3 to 6%) and those who were still breastfeeding at 6 weeks postpartum

Opioids, such as fentanyl, are commonly used in combination with local anesthetics in epidural solutions used for labor analgesia. Two prospective randomized studies examining the effect of epidural fentanyl on breastfeeding success reported

This article is featured in "This Month in Anesthesiology," page 1A. Corresponding article on page 593.

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Anesth & Analg. 2016 ahead of print

Active Management of Labor Epidural Analgesia Is the Key to Successful Conversion of Epidural Analgesia to Cesarean Delivery Anesthesia

Melissa E. Bauer, DO,* and Jill M. Mhyre, MD†

«Three major risk factors are consistently associated with failed epidural conversion: care provided by a nonobstetric anesthesiologist, increased boluses during labor as a result of pain, and urgency of cesarean delivery.»

Anesth & Analg. 2016 ahead of print

Active management of labor analgesia

«….is a care philosophy in which the anesthesiologist integrates information about block quality, progress of labor, maternal and fetal well-being, and maternal and obstetric decision-making to optimize block quality and density before a decision for cesarean delivery is declared.»

Replacement of labor epidural

«…. timely replacement will help facilitate safe conversion…»

«….aggressive replacement of epidural catheters providing suboptimal labor analgesia…»

Labour anaesthesia

«Despite its many benefits, dedicated staffing may only be practical in a minority of delivery units with sufficient volume to support the service…»

…even a high-volume labor epidural service is not considered an anesthetizing location; this reduces the incentive for many practices to provide dedicated coverage…»

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