



SFÖAI, Svensk Förening för Obstetrisk Anestesi och Intensivvård inbjuder till

Labour analgesia - epidural or alternatives ?

Thierry Girard
Basel, Switzerland

CONFLICT OF INTEREST

Smiths-medical



Epidural versus non-epidural or no analgesia in labour (Review)

Anim-Somuah M, Smyth RMD, Jones L



**THE COCHRANE
COLLABORATION®**

Told you
not to date
that ostrich !

I want an epidural !
I want an epidural !

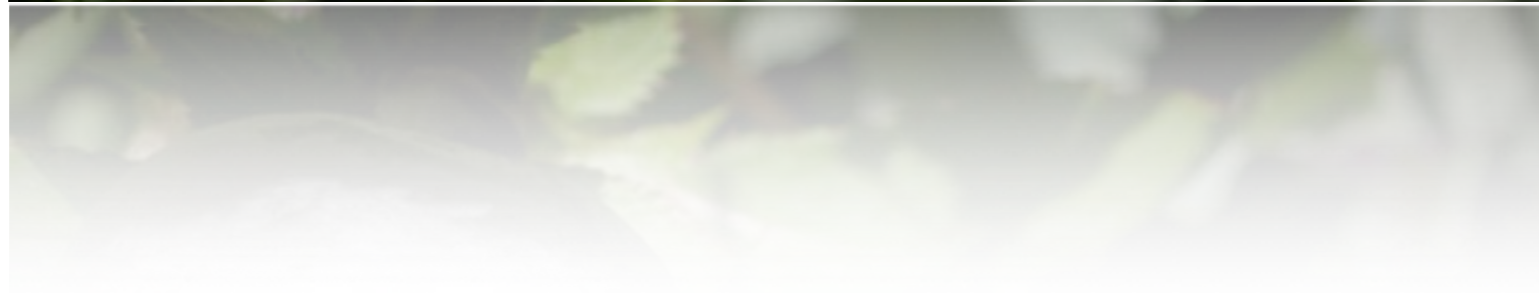


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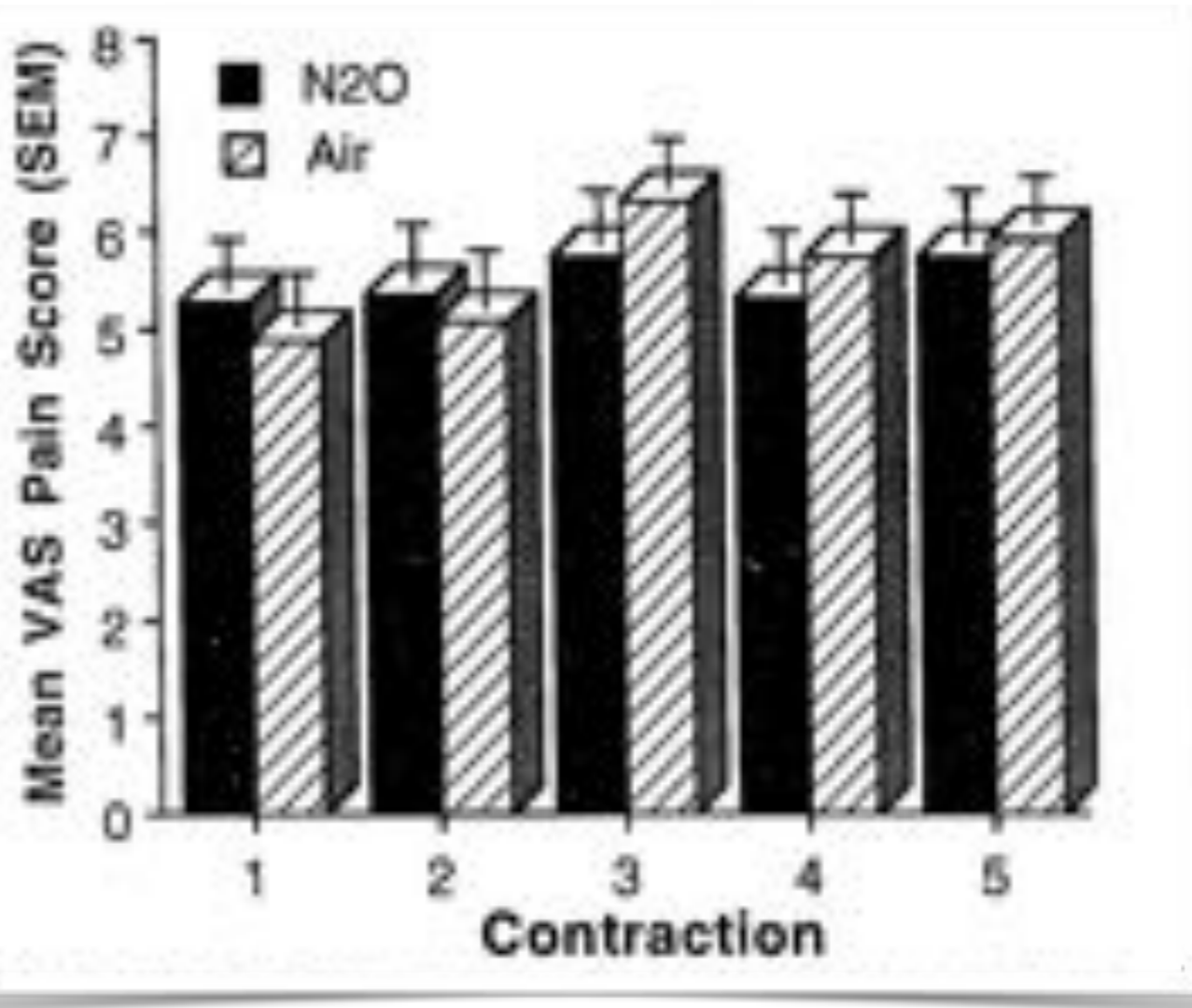
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Nitrous Oxide in Early Labor

Safety and Analgesic Efficacy As Placebo-controlled Study

Jan Carstonu, M.A., M.D., F.R.C.P.C.,* Shimon Levy,
Denise Daley, M.D., F.R.C.P.C.,† Joel Katz, Ph.D.,‡



Inhaled analgesia for pain management in labour (Review)

Klomp T, van Poppel M, Jones L, Lazet J, Di Nisio M, Lagro-Janssen ALM



Authors' conclusions

Inhaled analgesia appears to be effective in reducing pain intensity and in giving pain relief in labour.

... nitrous oxide appears to result in even more side effects such as nausea, vomiting, dizziness and drowsiness...



Cheese's Early Days

Our city's beginnings



http://tinycheese.blogspot.com/2010_06_01_archive.html

INCREDIBLE PAIN continued all night - I eventually got on Remifentanyl - the new morphine based drug which you self-administer, dosing yourself when you need it. It was absolutely WONDERFUL.

Didn't actually stop you feeling pain but does stop you caring about it. I got absolutely sky high, thoroughly amused the midwife by talking utter rubbish,, I even started seeing things - including Nelson Mandela on a bicycle... blooming weird but there you go.

Remifentanil for labour analgesia: a meta-analysis of randomised controlled trials

Alexander Schnabel, Niklas Hahn, Jens Broscheit, Ralf M. Muellenbach, Lorenz Rieger,
Norbert Roewer and Peter Kranke

Eur J Anaesthesiol 2012; 29:000–000

Conclusion

There is good evidence that a remifentanil PCA provides better analgesia for labour than intramuscular or intravenous pethidine with almost comparable maternal adverse events. Epidural analgesia provided better pain relief than remifentanil. The conclusions regarding the comparison of remifentanil with inhalational nitrous oxide and fentanyl are less clear due to limited data. As there were few randomised trials included in this meta-analysis, with few adverse events reported, an appropriate risk-to-benefit analysis is currently not feasible. Large randomised controlled trials reporting on safety issues and patient satisfaction using appropriate administration modes are urgently needed to complement our knowledge of this alternative method for pain relief during labour.

Table 3. Suggested Guidelines for Patient-Controlled IV Analgesia (PCIA) with Remifentanyl

Eligibility

Informed consent

No opioid use in the previous 4 h

Dedicated IV cannula for remifentanyl administration

PCIA protocol

PCIA bolus: 40 μg

Lockout interval: 2 min

Continuous observations

SaO₂ (pulse oximetry)

Nursing supervision: one-to-one

30-min observations

Respiratory rate

Sedation score

Pain score

Indications for contacting the anesthesia provider

Excessive sedation score (not arousable to voice)

Respiratory rate <8 breaths/min

SaO₂ <90% while breathing room air

**NOT in case of
intrauterine death**

Remifentanyl PCA is perfectly safe for the baby

“Just make sure that mum doesn’t stop breathing !.”

– Dr Bernard Norman, OAA 3day course, London 2011

Case Report

Cardiac arrest in an obstetric patient using remifentanil patient-controlled analgesia

R. Marr,¹ J. Hyams² and V. Bythell¹

1 Consultant Anaesthetist, 2 Specialty Trainee, The Royal Victoria Infirmary, Newcastle upon Tyne, UK

Summary

This case report describes the management of a patient, diagnosed with an intrauterine death at 31 weeks' gestation, who suffered a cardiorespiratory arrest during her induced labour while using a remifentanil PCA. She made a full recovery from resuscitation which included a peri-mortem caesarean section.

.....

Editorial

N. A. Muchatuta
S. M. Kinsella

Remifentanil for labour analgesia: time to draw breath?

perceived benefits. Without due respect for the side-effects of remifentanil, we risk sleepwalking into a maternal death related to its use in the near future – we have been warned [21].



Patient-controlled intravenous analgesia remifentanil for labor analgesia: time to stop, think and reconsider

Marc Van de Velde^{a,b}

Purpose of review

Remifentanil is a relatively new but commonly used opioid alternative in the management of labor pain relief. The present article evaluates efficacy and safety of patient-controlled intravenous analgesia (PCIA) with remifentanil in the management of labor pain relief.

Recent findings

Remifentanil PCIA provides analgesia that is superior to nitrous oxide or other opioids such as meperidine, but is less effective when compared with epidural analgesia. Recent evidence suggests it produces significant respiratory depression making routine use as first line analgesia strategy virtually impossible.

Summary

Remifentanil PCIA is a valuable analgesic strategy whenever regional analgesia is contraindicated. Using it as first line strategy seems to be contraindicated because of significant respiratory side-effects to the mother. Whenever used advanced and continuous monitoring using capnography, saturation monitoring and one-to-one midwifery care are mandatory!

Keywords

labor, pain relief, patient-controlled intravenous analgesia, remifentanil



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www.obstetanesthesia.com

REVIEW ARTICLE

Remifentanil for labor analgesia: an evidence-based narrative review

M. Van de Velde,^a B. Carvalho^b

^a*Department of Cardiovascular Sciences, Katholieke Universiteit Leuven and Department of Anaesthesiology, University Hospitals Gasthuisberg, Leuven, Belgium*

^b*Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University, CA, USA*

ABSTRACT

This manuscript reviews the available literature on remifentanil patient-controlled intravenous analgesia in labor focusing on efficacy and safety. Remifentanil compares favorably to other potent systemic opioids but with fewer opioid-related neonatal effects. However, remifentanil provides modest and short-lasting labor analgesia that is consistently inferior when compared to neuraxial analgesia. The initial analgesic effect provided with remifentanil also diminishes as labor progresses. In several studies, remifentanil induced significant respiratory depressant effects in laboring women with episodes of desaturation, hypoventilation and even apnea. Given the safety concerns, we recommend that remifentanil patient-controlled intravenous analgesia should not be a routine analgesia technique during labor. In cases where neuraxial analgesia is refused or contraindicated and the use of remifentanil justified, continuous and careful monitoring is required to detect respiratory depression to provide safe care of both the pregnant woman and unborn child.

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CORRESPONDENCE

Remifentanil patient-controlled analgesia for labour: learning points from a registry



SAOA

www.remipca.org

The board of the Swiss Association of Obstetric Anaesthesia (SAOA) read with interest the narrative review on remifentanil patient-controlled analgesia (PCA) for labour.¹ This review raises important issues. We appreciate that the Swiss RemiPCA SAFE Network was specifically acknowledged and would like to share results from this database.² Results are based on different settings from various hospitals (large teaching-, small regional- and private hospitals) where remifentanil labour analgesia is, depending on the institution, either used as a first-line treatment or when neuraxial analgesia is contraindicated. The board of the SAOA would like to add some considerations and narrative inputs.



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RESEARCH

Patient controlled analgesia with remifentanyl versus epidural analgesia in labour: randomised multicentre equivalence trial



OPEN ACCESS

Liv M Freeman *gynaecologist*¹, Kitty W Bloemenkamp *gynaecologist*¹, Maureen T Franssen *gynaecologist*², Dimitri N Papatsonis *gynaecologist*³, Petra J Hajenius *gynaecologist*⁴, Markus W Hollmann *professor of anaesthesiology*⁵, Mallory D Woiski *gynaecologist*⁶, Martina Porath *gynaecologist*⁷, Hans J van den Berg *anaesthesiologist*⁸, Erik van Beek *gynaecologist*⁹, Odette W H M Borchert *anaesthesiologist*¹⁰, Nico Schuitemaker *gynaecologist*¹¹, J Marko Sikkema *gynaecologist*¹², A H M Kuipers *anaesthesiologist*¹³, Sabine L M Logtenberg *midwife/PhD candidate*¹⁴, Paulien C M van der Salm *gynaecologist*¹⁵, Katrien Oude Rengerink *epidemiologist*⁴, Enrico Lopriore *neonatologist*¹⁶, M Elske van den Akker-van Marle *assistant professor of health economics*¹⁷, Saskia le Cessie *associate professor of medical statistics*¹⁸, Jan M van Lith *professor of obstetrics*¹, Michel M Struys *professor of anaesthesiology*¹⁹, Ben Willem J Mol *professor of obstetrics*²⁰, Albert Dahan *professor of anaesthesiology*²¹, Johanna M Middeldorp *gynaecologist*¹

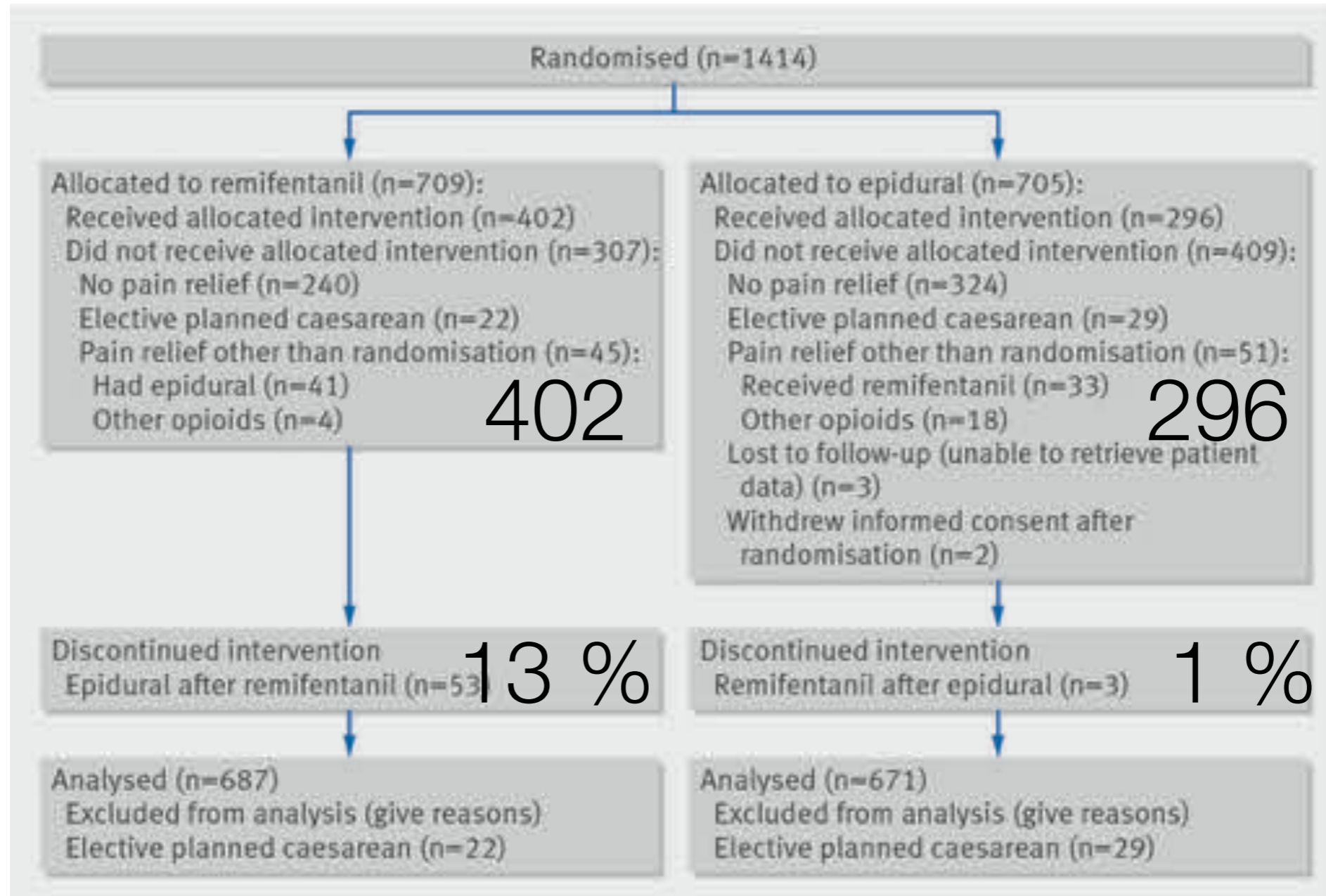


Table 3| Area under curve for satisfaction with pain relief and pain scores during active labour and after sta allocated to patient controlled remifentanil or epidural analgesia in labour

Measure (No of women per group)	Mean area under curve		
	Remifentanil	Epidural analgesia	Difference (95% CI)
With missing AUC values imputed			
Satisfaction with pain relief during active labour (687/671)	30.9	33.7	-2.8 (-6.9 to 1.3)
Satisfaction with pain relief after pain relief (447/347*)	25.6	36.1	-10.4 (-13.9 to -7.0)
Pain during active labour (687/671)	30.9	27.2	3.8 (0.92 to 6.6)
Pain score after pain relief (447/347*)	26.7	20.3	6.4 (3.5 to 9.4)

	Remifentanil (n=687)	Epidural analgesia (n=671)	Relative risk (95% CI)	P value
Median (IQR) gestational age at delivery (weeks)	39.7 (38.3-40.7)	39.7 (38.3-40.7)	—	0.37
Onset of labour:				
Spontaneous	282 (41)	281 (42)	0.98 (0.88 to 1.09)	0.76
Induced	405 (59)	390 (58)	1.02 (0.91 to 1.32)	0.76
Requested pain relief	447 (65)	347 (52)	1.32 (1.18 to 1.48)	<0.001
Median (IQR) time (min) from request to start analgesia	28 (15-45)	55 (32-80)	—	<0.001
Median (IQR) duration of analgesia (min)	236 (128-376)	309 (181-454)	—	<0.001
Median (IQR) duration second stage (min)	20 (10-46)	24 (10-53)	—	0.09
Mode of delivery:				
Spontaneous	518 (75)	501 (75)	1.01 (0.90 to 1.15)	0.75
Vaginal instrumental	63 (9)	70 (10)	0.93 (0.77 to 1.13)	0.45
Caesarean section	106 (15)	100 (15)	1.01 (0.88 to 1.17)	0.87

	Remifentanil (n=447)	Epidural analgesia (n=347)	Relative risk (95% CI)	P value
Temperature °C during labour:				
>38 °C	35 (9)	55 (18)	0.66 (0.50 to 0.86)	<0.001
Maximum reported:				
Median (IQR)	37.0 (36.6-37.4)	37.3 (36.7-37.8)	—	<0.001
Range	35.0-39.4	35.1-40.4	—	—
Saturation %:				
<95%	154 (37)	37 (12)	1.63 (1.46 to 1.82)	<0.001
<92%	71 (18)	14 (5)	1.52 (1.35 to 1.71)	<0.001
Minimum reported:				
Median (IQR)	95 (93-97)	97 (96-98)	—	<0.001
Range	50-100	76-100	—	—
Hypotension (<90 mm Hg systolic)	29 (7)	38 (12)	0.75 (0.57 to 1.00)	0.03
Respiratory depression	4 (1)	0 (0)	—	0.15
Nausea	62 (21)	25 (12)	1.27 (1.09 to 1.49)	0.01
Vomiting	55 (18)	28 (13)	1.16 (0.97 to 1.38)	0.12
Itching	17 (6)	20 (10)	0.77 (0.54 to 1.10)	0.1

Original Article

A prospective observational study of maternal oxygenation during remifentanyl patient-controlled analgesia in labour

A. A. Messmer,¹ J. M. Potts² and C. E. Orlikowski³

1 Consultant, Department of Anaesthesia, 3 Consultant, Department of Perinatal Pain, Hobart Hospital, Hobart, Tasmania, Australia

2 Statistician, The Analytical Edge, Hobart, Tasmania, Australia

87%

70%

16 s

Remifentanil-PCA

Einleitung

Remifentanil ist ein kurzwirksames Opiat mit einer reinen μ -agonistischen Wirkung. Remifentanil-PCA ist nach der neuraxialen Analgesie die aktuell effektivste Methode zur geburtshilflichen Analgesie. Die Analgesie ist jedoch deutlich schwächer und nach 2-3 Stunden kommt es in der Regel zur Wirkungsabnahme. Die Nebenwirkung entspricht derjenigen anderer Opiode: Übelkeit, Erbrechen, Atemdepression u.a.

Es sind verschiedene Fälle von Atemdepression bis zum Atemstillstand beschrieben worden. Aus diesem Grund sind entsprechenden Vorsichtsmaßnahmen zu treffen. Wir setzen Remifentanil-PCA im Gebärsaal ausschliesslich dann ein, wenn es eine Kontraindikation gegen ein neuraxiales Verfahren gibt.

Voraussetzungen

Indikation: Unmöglichkeit einer neuraxialen Analgesie (zum Beispiel):

- Gerinnungsstörung (angeboren, erworben, iatrogen)
- Anatomische Besonderheit (schwere Skoliose etc.)
- Infekt über der Einstichstelle/ Sepsis (Chorioamnitis unter Antibiose ist **keine** KI für PDA)
- Punktionsunmöglichkeit
- Ablehnung der Patientin

Relative Kontraindikationen

- BMI > 40
- Epilepsie
- Herz/Kreislaufkrankung, Schwere Pneumopathie
- Schlafapnoesyndrom

Absolute Kontraindikation

- Intrauteriner Fruchttod
- Abortinduktion

Weitere Voraussetzungen

- Indikation muss mit Oberarzt/ärztin Geburtshilfe und Oberarzt/ärztin Anästhesie abgesprochen sein.
- Informed consent mit der Notiz, dass Remifentanil-PCA off-label ist
- Eigener venöser Zugang für Remifentanil-PCA mit Rückschlagventil und langsamer Hintergrundinfusion von Ringer-Lactat
- Kontinuierliche Messung der Sauerstoffsättigung
- Nasenbrille zur Sauerstoffgabe liegt bereit.
- Beatmungsbeutel ist bereit.
- 1:1 Betreuung durch die Hebamme

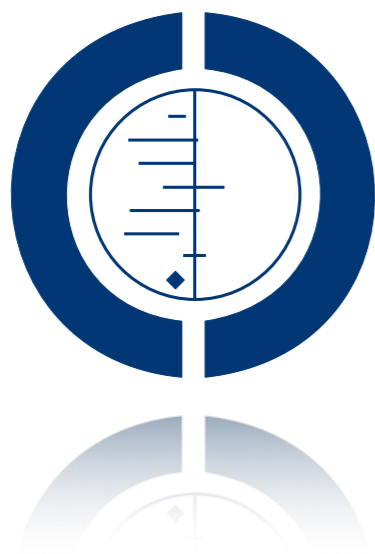
Zu beachten

1. Hebamme soll den Gebärsaal nicht verlassen.
2. Der PCA Bolus darf **ausschliesslich** durch die Patientin bedient werden.
3. Atemfrequenz, Sauerstoffsättigung und Schmerzen (VAS) sind alle 30 min. zu protokollieren
4. Installation durch Anästhesie nur mit CADD Pumpe und Remifentanil-Programm.

Alarmierung Anästhesie 86600

1. Tiefe Sedation der Patientin (auf Ansprechen nicht weckbar)
2. Atemfrequenz unter 8/min
3. Sättigung <90% bei Raumluft oder <95% mit Sauerstoff.





Epidural versus non-epidural or no analgesia in labour (Review)

Anim-Somuah M, Smyth RMD, Howell CJ

	risk ratio	95% CI	NNT
caesarean section	1.07	0.93 - 1.23	
backpain	1	0.89 - 1.12	
instrumented delivery	1.42	1.28 - 1.57	20

The NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

FEBRUARY 17, 2005

VOL. 352 NO. 7

~~The Risk of Cesarean Delivery~~ with Neuraxial Analgesia Given Early versus Late in Labor

Cynthia A. Wong, M.D., Barbara M. Scavone, M.D., Alan M. Peaceman, M.D., Robert J. McCarthy, Pharm.D.,
John T. Sullivan, M.D., Nathaniel T. Diaz, M.D., Edward Yaghmour, M.D., R-Jay L. Marcus, M.D.,
Saadia S. Sherwani, M.D., Michelle T. Sproviero, M.D., Meltem Yilmaz, M.D., Roshani Patel, R.N.,
Carmen Robles, R.N., and Sharon Grouper, B.S.



Smombie

Epidural labour analgesia

Low concentration of local anaesthetic

- Bupivacaine (0.125%), 0.1%, 0.0625%
- Ropivacaine (0.175%), 0.125%, 0.1%

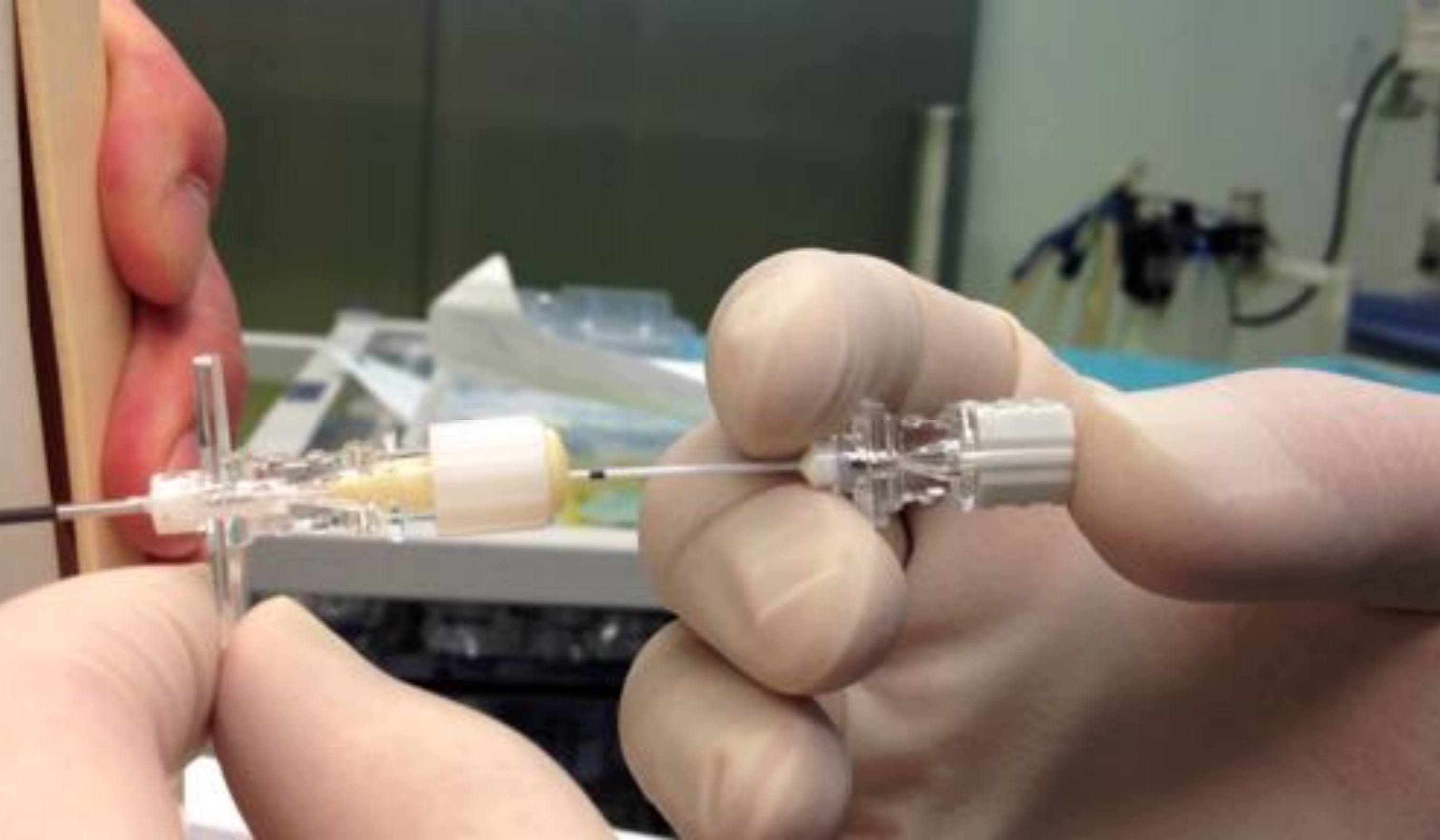
combined with lipophilic opioid

- Fentanyl 1-2 μg / ml
- Sufentanil 0.5-1 μg / ml

PCEA compared to continuous epidural infusion in an ultra-low-dose regimen for labor pain relief: a randomized study

S. LEDIN ERIKSSON¹, C. GENTELE² and C. H. OLOFSSON³

¹Department of Anaesthesiology and Intensive Care, Gävle-Sandviken County Hospital, Gävle, ²Department of Anaesthesiology and Intensive Care, Söder Hospital, Stockholm, and ³Department of Anaesthesiology and Intensive Care, Karolinska Hospital, Stockholm, Sweden



CSEA

Int J Obstet Anesth. 2000;9(1):3–6.

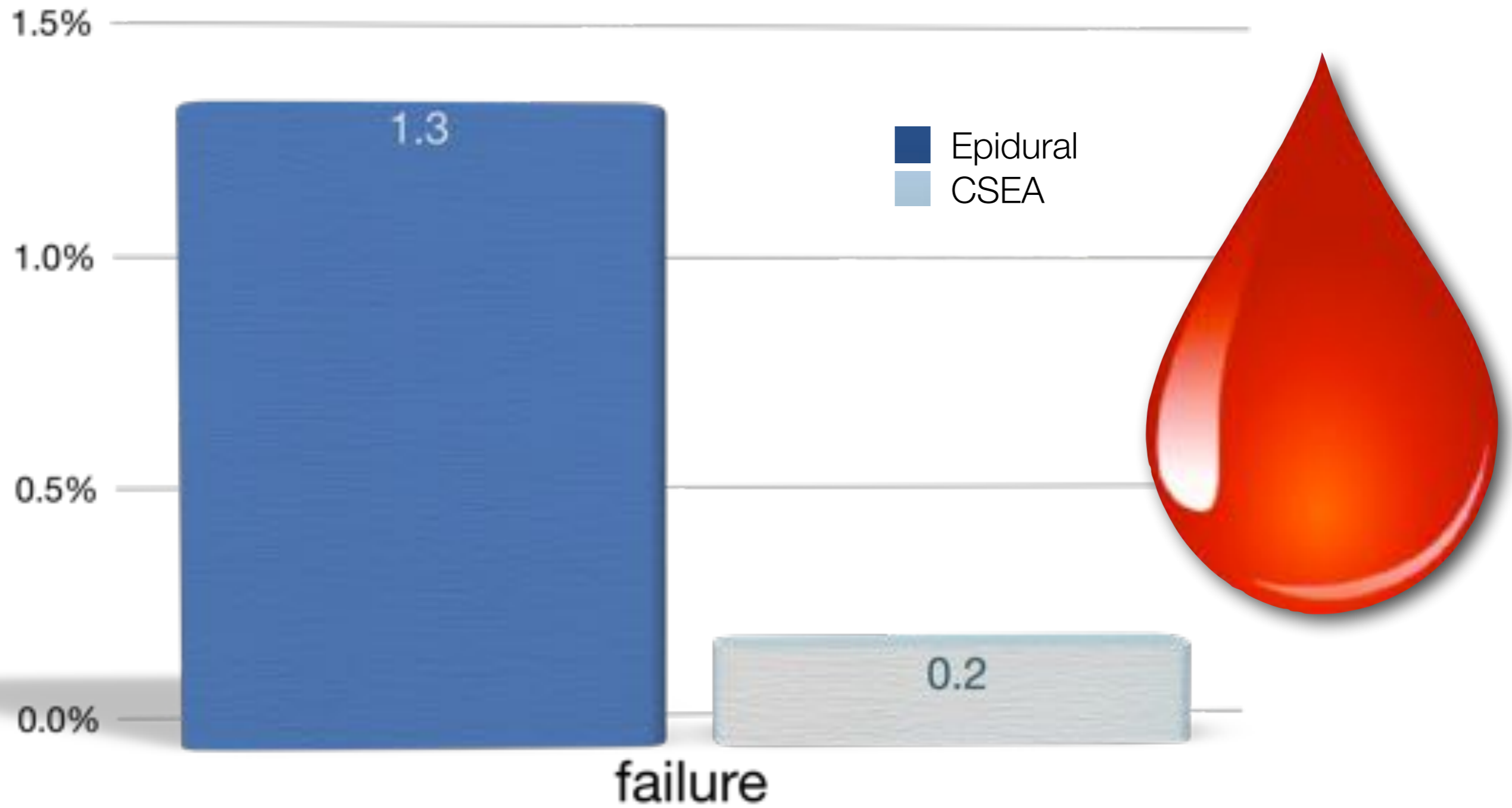
International Journal of Obstetric Anesthesia (2000) **9**, 3–6
© 2000 Harcourt Publishers Ltd

ORIGINAL ARTICLE

Are combined spinal-epidural catheters reliable?

M. C. Norris

Int J Obstet Anesth. 2000;9(1):3–6.



Int J Obstet Anesth. 2004;13(4):227–33.

International Journal of Obstetric Anesthesia (2004) 13, 227–233

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doi:10.1016/j.ijoa.2004.04.008

ORIGINAL ARTICLE

Incidence and characteristics of failures in obstetric neuraxial analgesia and anesthesia: a retrospective analysis of 19,259 deliveries

P. H. Pan, T. D. Bogard, M. D. Owen

Department of Anesthesiology, Division of Obstetric Anesthesia, Wake Forest University School of Medicine, Winston-Salem, NC, USA

Table 2. Characteristics of neuraxial labor analgesia failures

Types of failures	Epidural	CSE
Neuraxial labor analgesia (n)	7849	4741
Overall failure rate (%)	14	10
<i>Initial placement failure</i>		
Intravenous epidural catheter (%)	7	5
^a Cleared with manipulation (%)	46	48
Known wet tap or intrathecal catheter (%)	1.4	0.8
Known wet tap required EBP (%)	31	28
^b Occult wet tap (%)	0.45	0.4
^b Occult wet tap required EBP (%)	83	79
<i>Subsequent failure</i>		
^c Catheter migrated i.v. (%)	0.24	0.25
^a Cleared with manipulation (%)	21	8
^c Catheter migrated intrathecally (%)	0	0
<i>Other failure</i>		
^d No CSF or spinal analgesia (%)		2.4
Inadequate analgesia with epidural catheter (%)	8.4	4.2
^e Catheter replacement for poor analgesia (%)	7.1	3.2
Multiple replacement of epidural (%)	1.9	0.65

International Journal of Obstetric Anesthesia (2016) 26, 4–7

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<http://dx.doi.org/10.1016/j.ijoa.2016.01.004>



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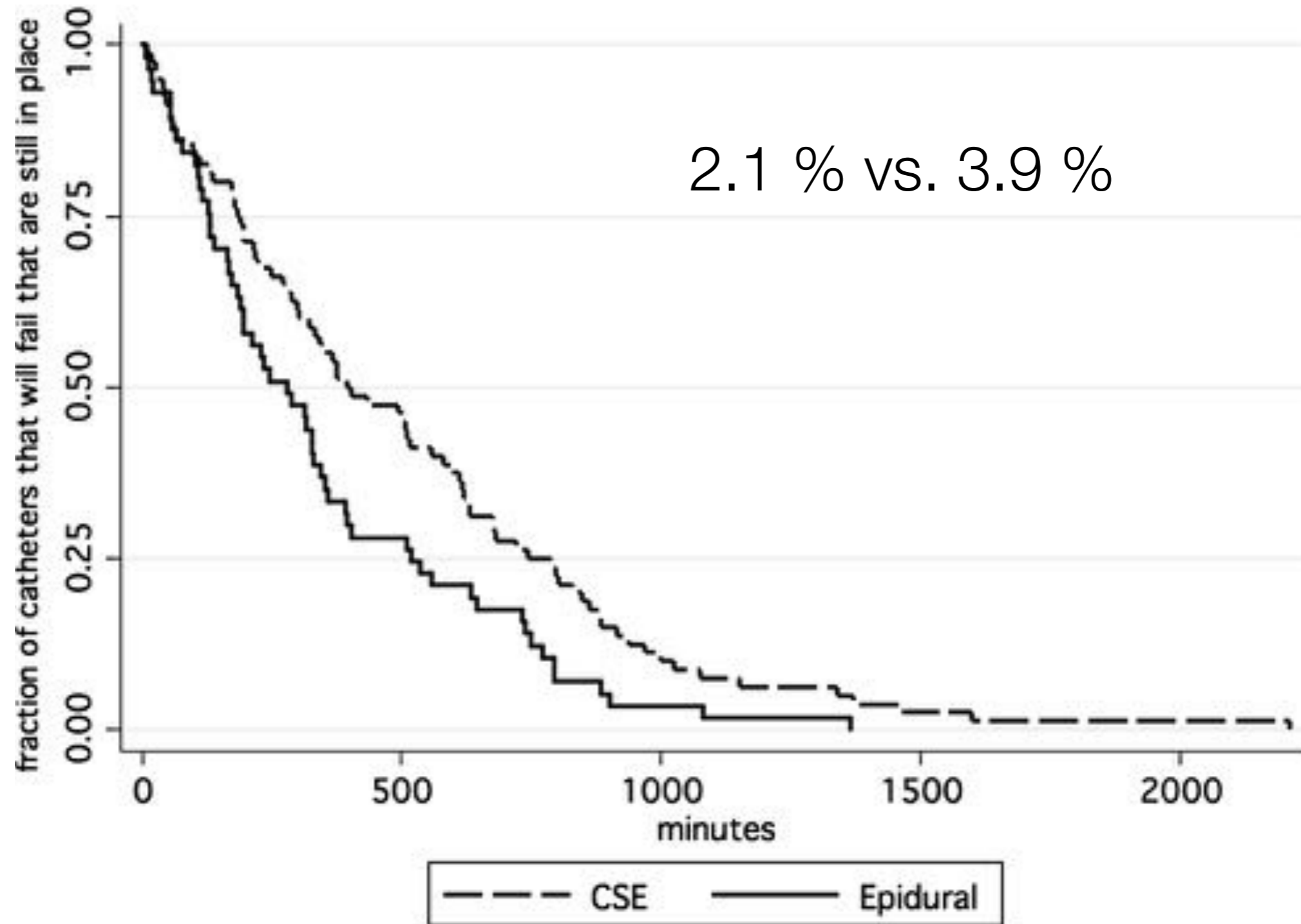
www.obstetanesthesia.com

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



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.

6.6 % vs. 11.6 %

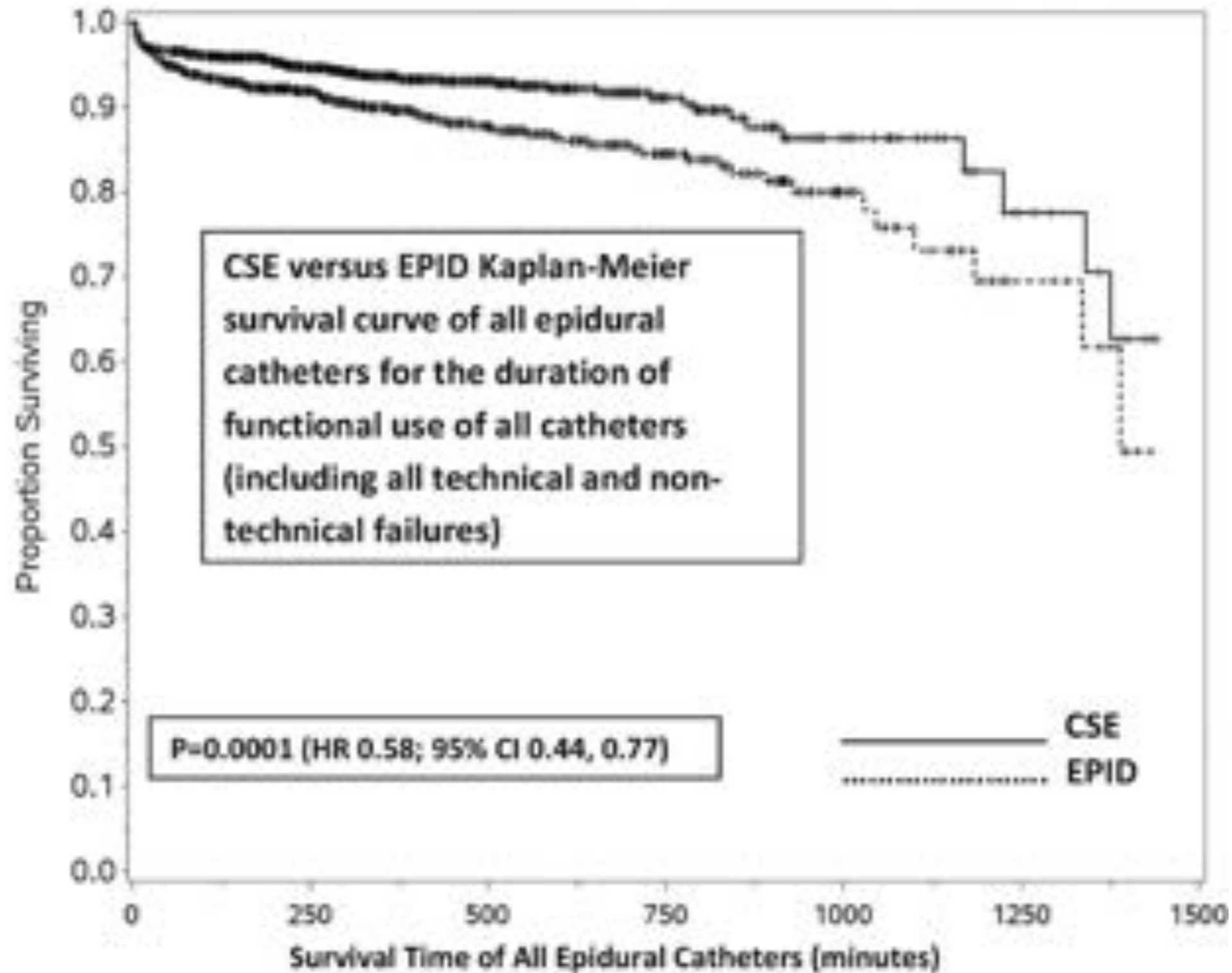


Table 4. Final Multivariable Model for Survival Analyses of All Catheters with Procedural Type, BMI, and Provider Experience Level Controlled in the Model

Parameter	<i>df</i>	Parameter Estimate	SE	Chi-square	<i>P</i> 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.

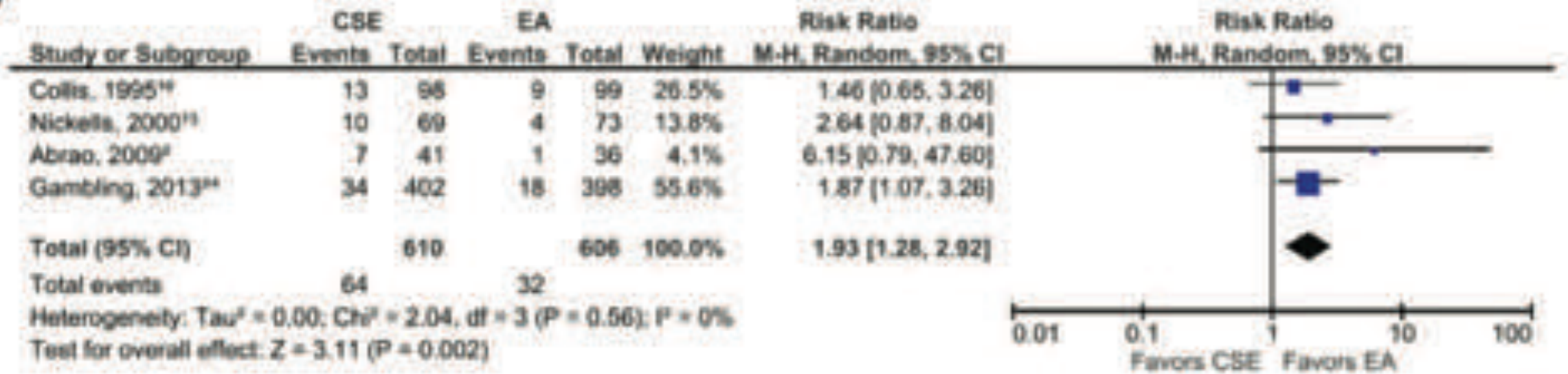
BMI = body mass index; *df* = degrees of freedom.

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

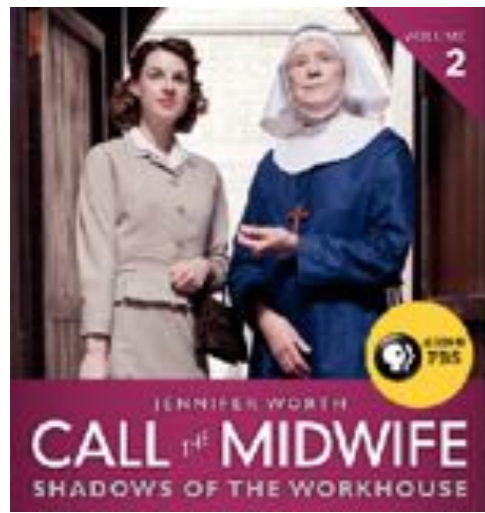
Judith Hattler, MD,* Markus Klimek, MD, PhD, DEAA, EDIC,† Rolf Rossaint, MD, PhD,‡ and Michael Heesen, MD, PhD*

Fetale bradycardia

B







at full cervical dilation ($p < 0.001$). Two parturients in the Infusion group had their epidural infusion stopped by the obstetrician during the second stage of labour and their data were analysed up to the point of

Anaesthesia. 2013;68(3):267–75.



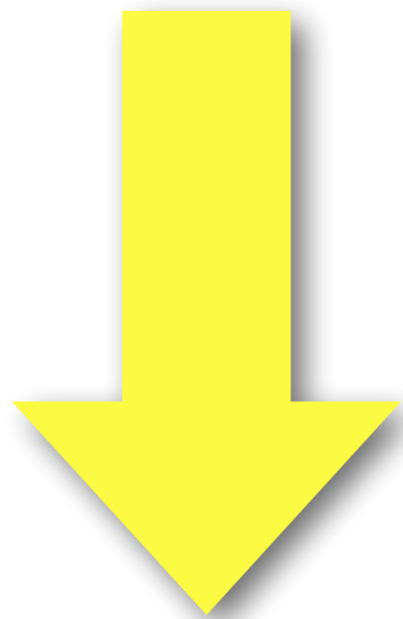
Anesth Analg. 2009;108(3):921–8.

(CME) Patient-Controlled Epidural Analgesia for Labor

Stephen H. Halpern, MD, MSc,
FRCPC*

Brendan Carvalho, MBBCh,
FRCA†

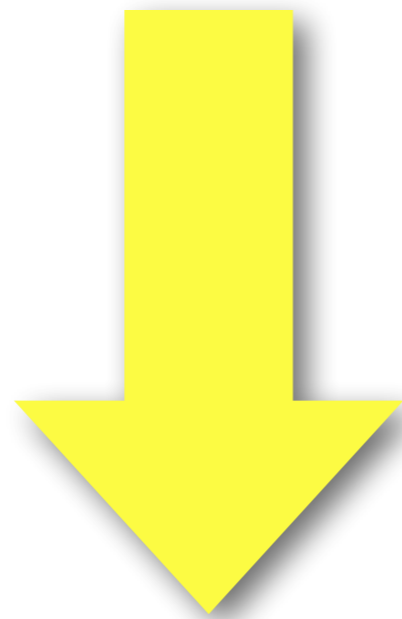
Anesth Analg. 2009;108(3):921–8.



motor block

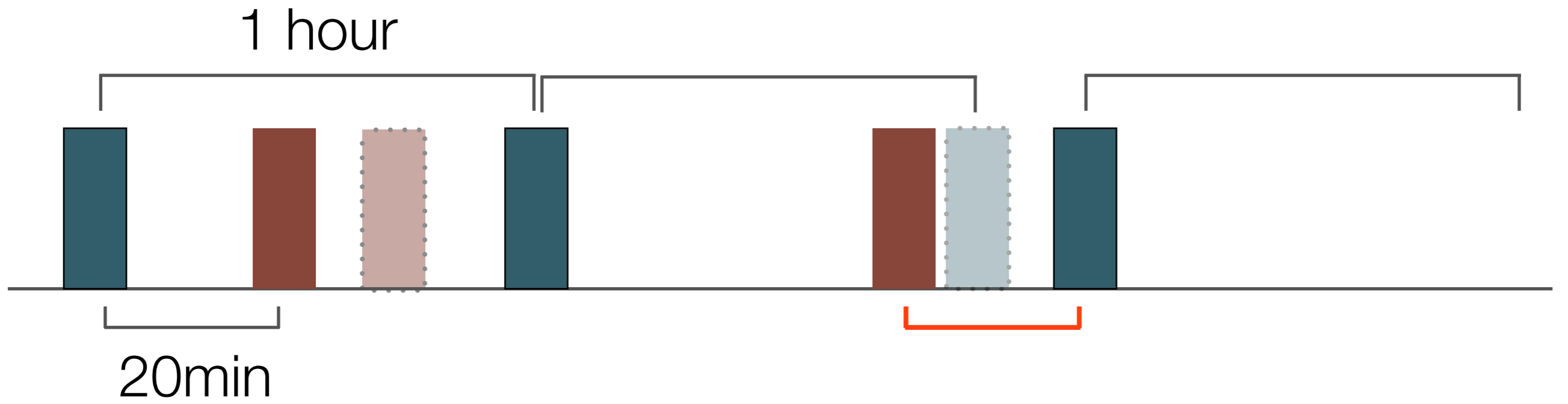
local anaesthetics

Anesth Analg. 2009;108(3):921–8.



**clinican
interventions**

PIEB



REVIEW



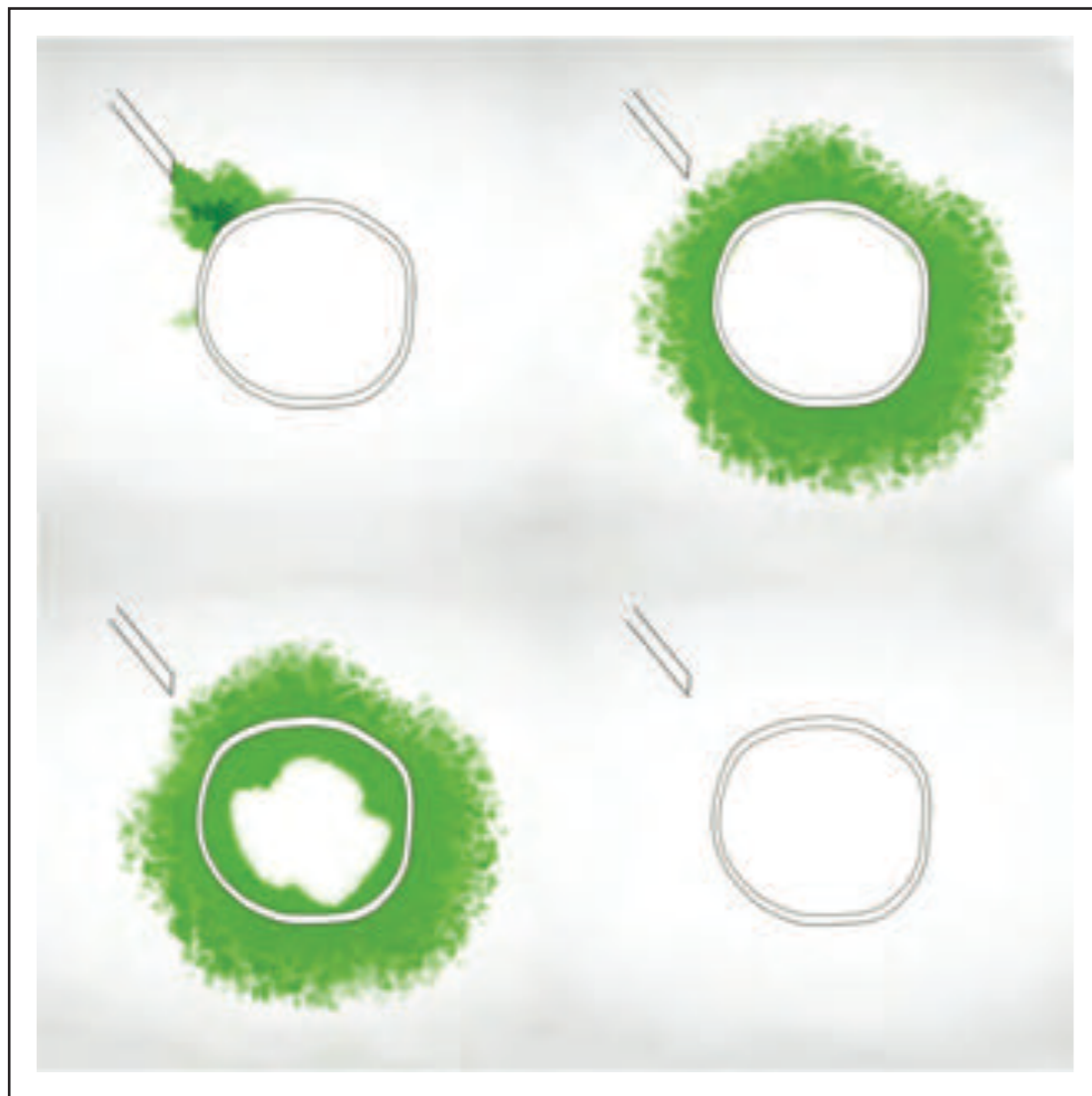
Techniques for the maintenance of epidural labor analgesia

Giorgio Capogna and Silvia Stirparo

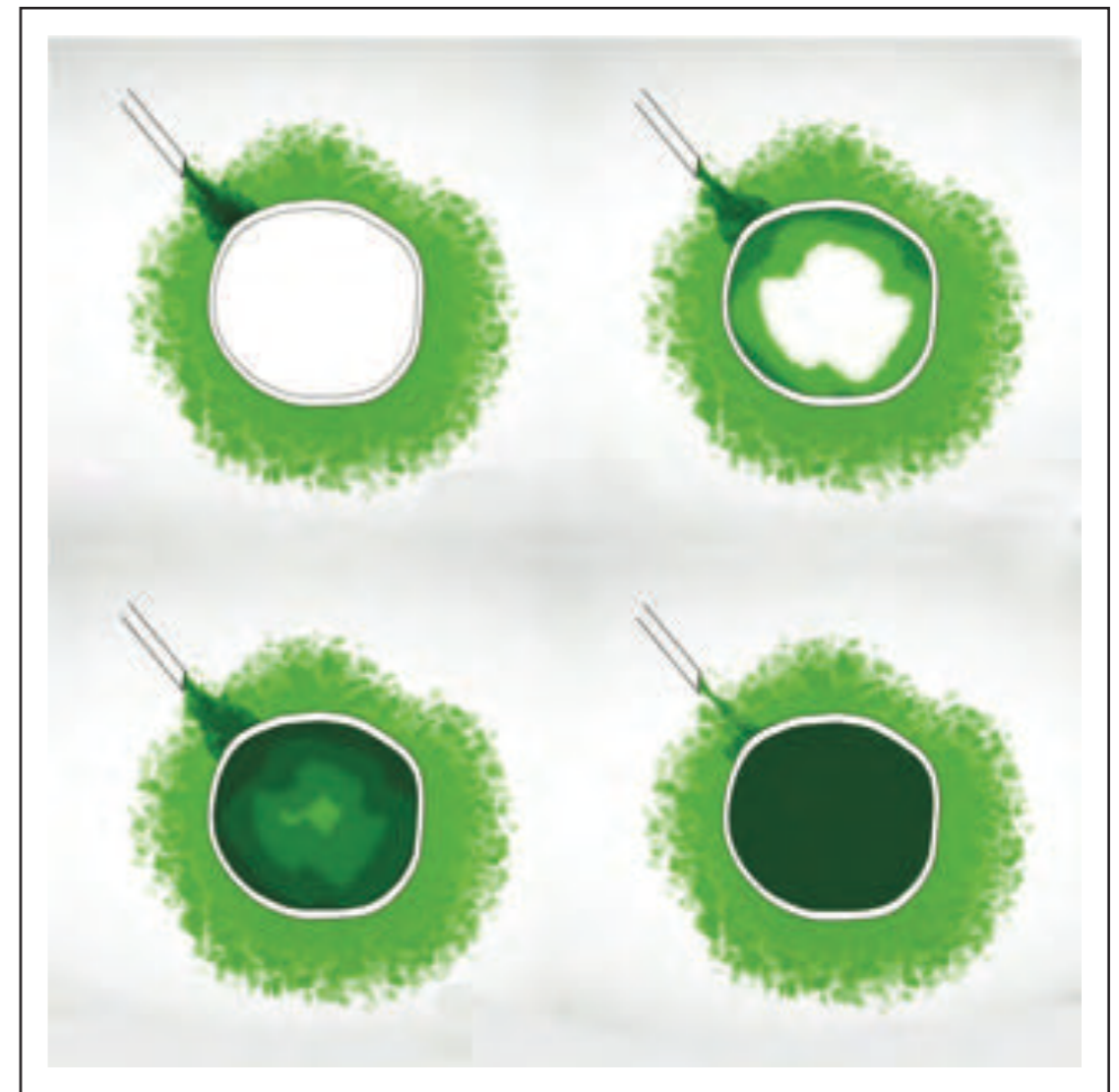
Purpose of review

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).

intermittend bolus



continuous infusion



The Effect of Manipulation of the Programmed Intermittent Bolus Time Interval and Injection Volume on Total Drug Use for Labor Epidural Analgesia: A Randomized Controlled Trial

Cynthia A. Wong, MD, Robert J. McCarthy, MD, Bruce Hewlett, MD

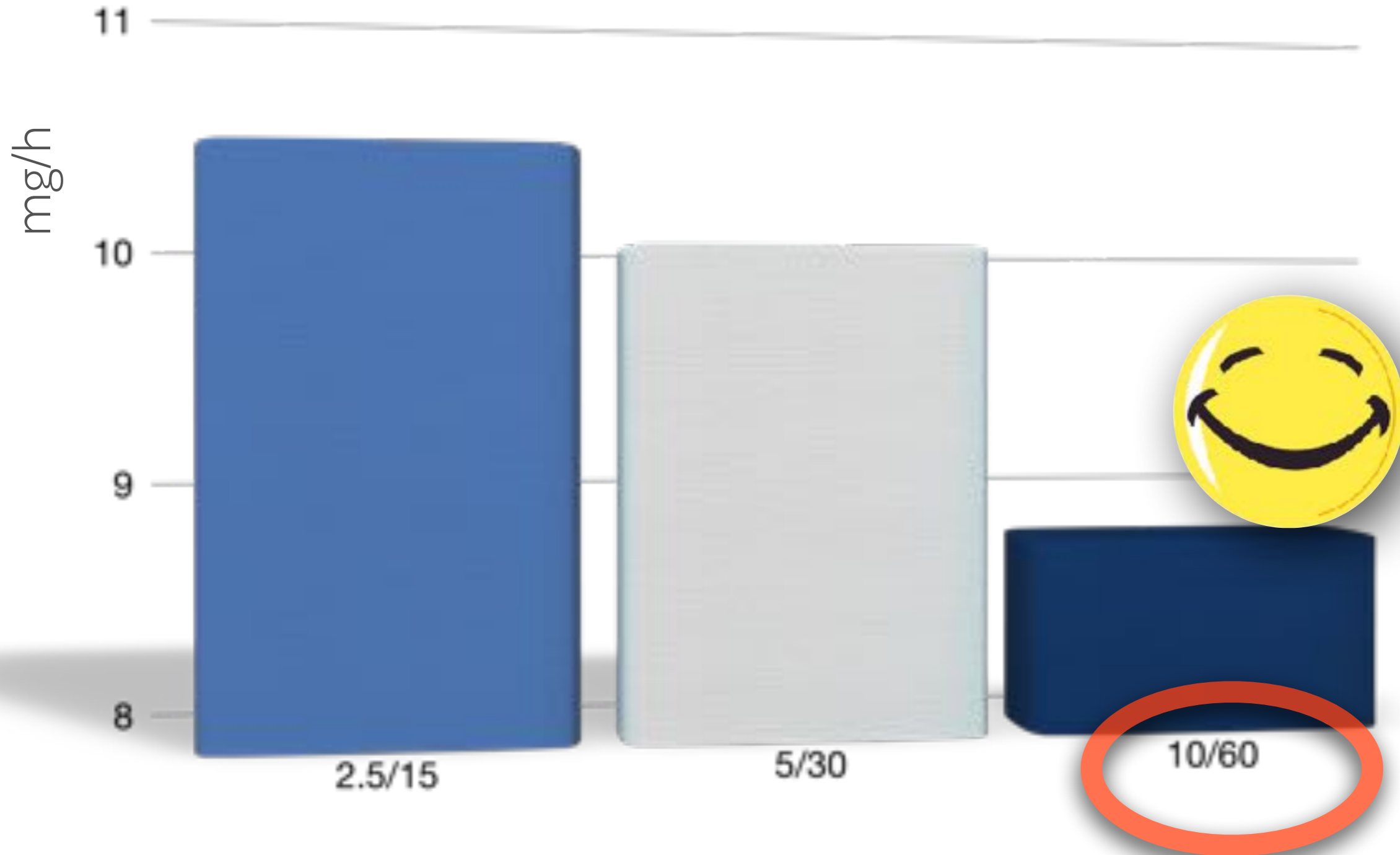
360 ml/h

Table 1. Study Group Allocation

Group	Time Interval (min)	Bolus Volume (mL)
2.5/15	15	2
5/30	30	5
10/60	60	10

single orifice

BUPIVACAIN DOSE



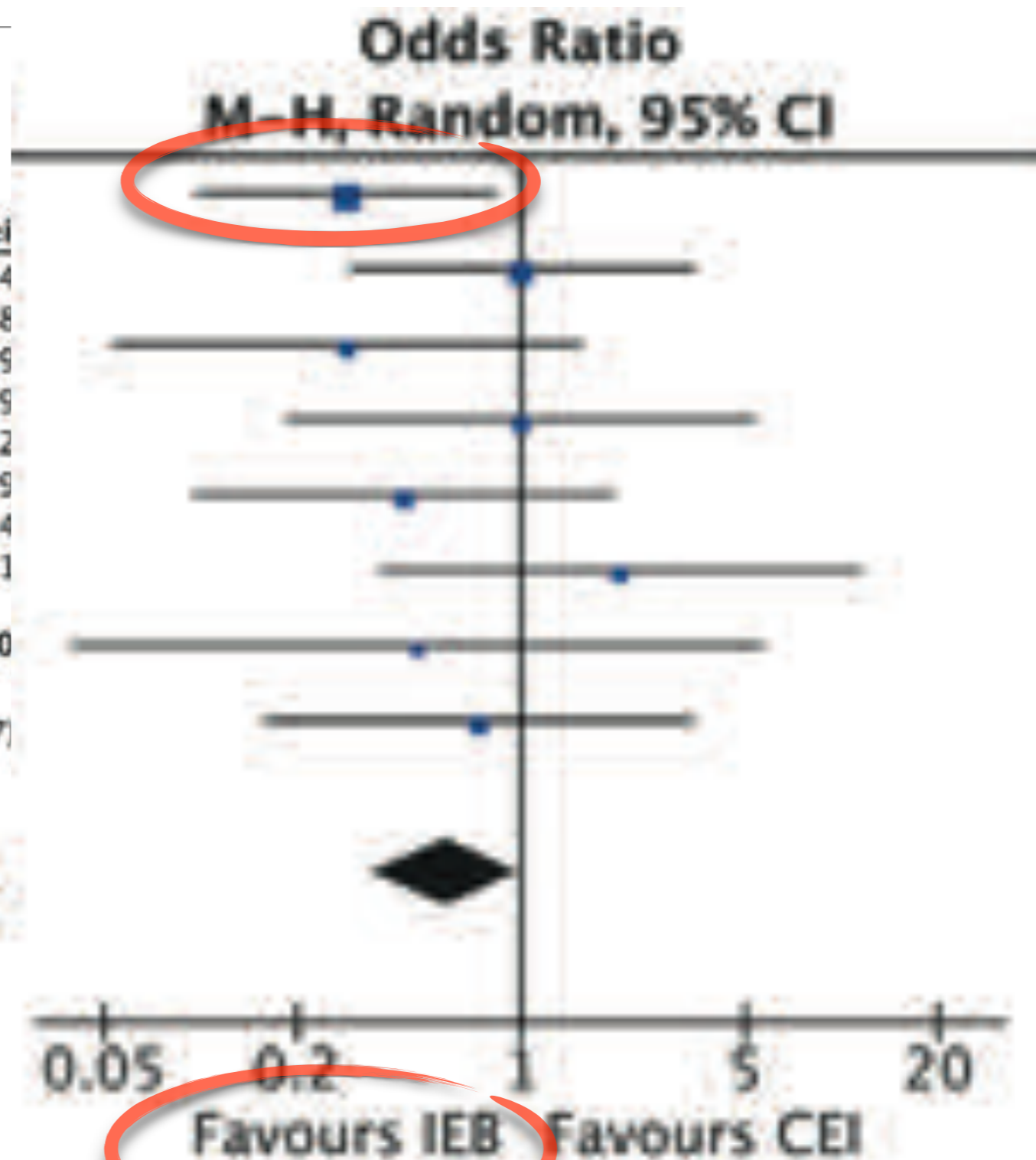
Intermittent Epidural Bolus Compared with Continuous Epidural Infusions for Labor Analgesia: A Systematic Review and Meta-Analysis

Ronald B. George, MD, FRCPC,* Terrence K. Allen, MBBS, FRCA,† and
Ashraf S. Habib, MB, ChB, MSc, MHS, FRCA‡

ASSISTED VAGINAL DELIVERY

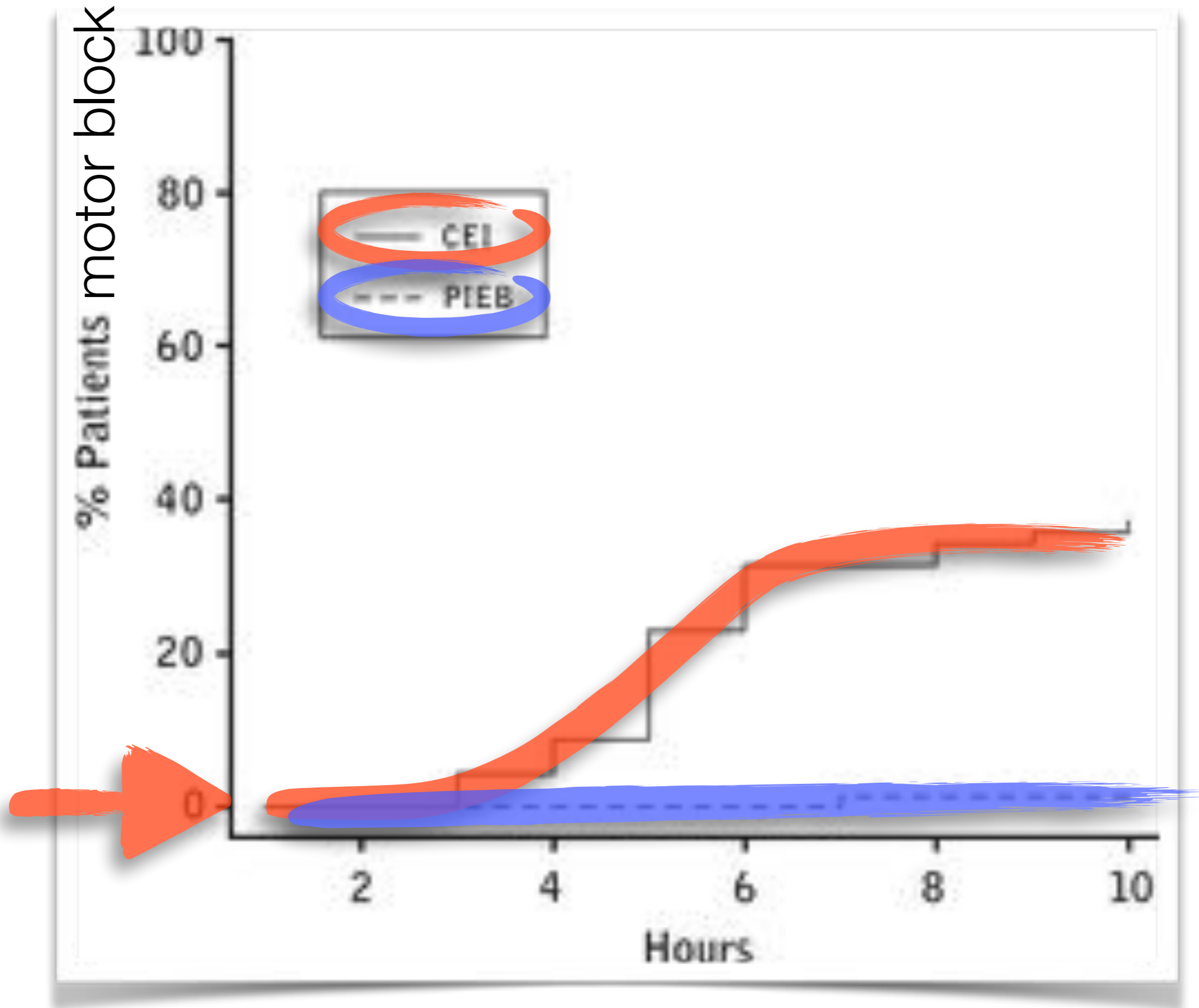
Study or Subgroup	IEB		CEI		Weight
	Events	Total	Events	Total	
Capogna 2011 ²⁰	5	75	14	70	24
Fettes 2006 ²¹	10	20	10	20	18
Leo 2010 ²²	2	31	6	31	9
Lim 2005 ²³	3	30	3	30	9
Lim 2010 ²⁴	3	25	6	25	12
Salim 2005 ²⁵	4	64	2	63	9
Sia 2007 ²⁷	1	21	2	21	4
Wong 2006 ²⁸	3	63	4	63	11
Total (95% CI)		329		323	100
Total events	31		47		
Heterogeneity: Tau ² = 0.00; Chi ² = 5.73, df = 7 (P = 0.57)					
Test for overall effect: Z = 1.96 (P = 0.05)					

0.59 [0.35, 1.00]



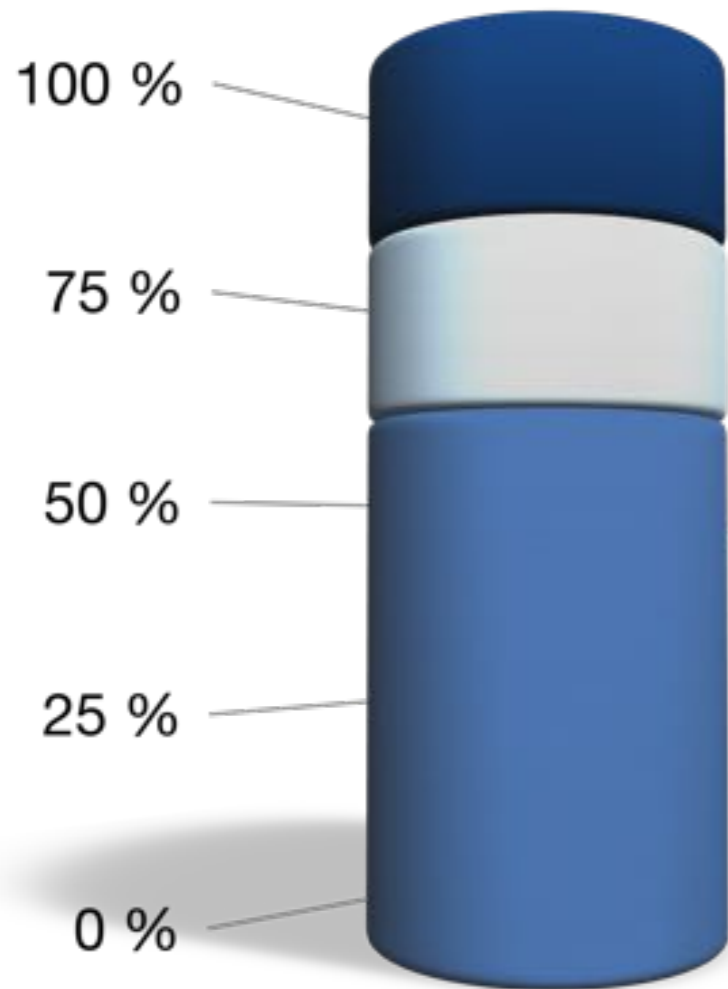
**Programmed Intermittent Epidural Bolus Versus
Continuous Epidural Infusion for Labor Analgesia:
The Effects on Maternal Motor Function and Labor
Outcome. A Randomized Double-Blind Study in
Nulliparous Women**

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



continuous background infusion

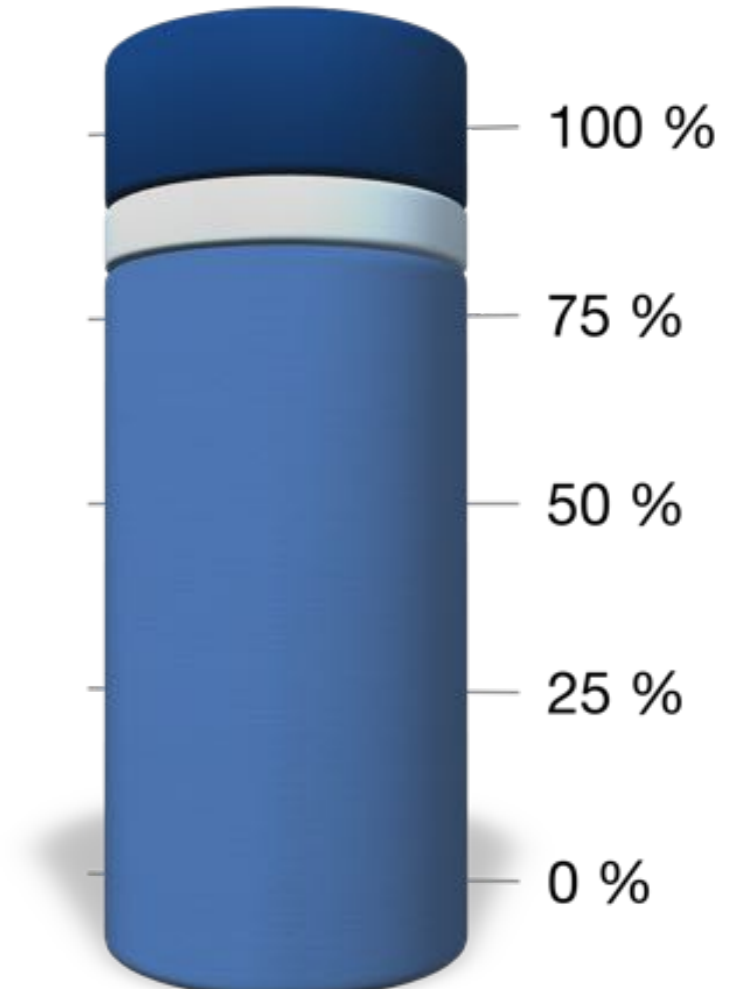
n=70



- c/s
- instrumented
- spontaneous

PIEB

n=75



Risk Factors for Unintended Dural Puncture in Obstetric Patients: A Retrospective Cohort Study

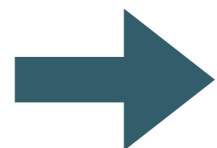
Sharon Orbach-Zinger, MD,* Eran Ashwal, MD,† Lilach Hazan, MD,* Danielle Bracco, BA,‡ Alex Ioscovich, MD,‡ Liran Hiersch, MD,† Andrey Khinchuck, MD,*† Amir Aviram, MD,† and Leonid A. Eidelman, MD*

«In our hospital, anesthesiologists begin working in the delivery suite only after they have completed at least 2 years of residency and have previously performed 300 to 500 spinal anesthetic procedures for cesarean delivery and a large number of supervised epidurals on non-obstetric patients. »

Risk of accidental dural puncture

Table 1. Demographic and Baseline Obstetric Data

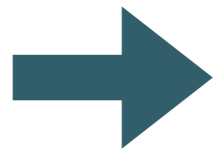
	UDP (N = 177)	Epidural (N = 708)	P
Maternal age (years) ^a	30.7 ± 5.1	30.1 ± 4.8	0.15
Pregestational body mass index (kgs) ^a	28.7 ± 5.4	28.1 ± 4.6	0.24
Gravidity ^b	2 (1–3)	2 (1–3)	0.22
Parity ^b	1 (0–1)	1 (0–2)	0.46
Nulliparity ^c	72 (40.7)	300 (42.4)	0.81
Chronic hypertension ^c	2 (1.1)	13 (1.8)	0.74
Preeclampsia ^c	3 (1.7)	11 (1.6)	>.99
Gestational diabetes ^c	9 (5.1)	33 (4.7)	0.74
Pre-gestational diabetes mellitus ^c	0 (0)	8 (1.1)	0.37
Gestational age at delivery (wks) ^a	39.1 ± 1.9	40.1 ± 1.5	0.47
Preterm delivery (<37 wks) ^c	7 (4.0)	30 (4.2)	1.0
Premature rupture of membranes ^c	29 (16.4)	166 (23.4)	0.04
Induction of labor ^c	26 (14.7)	82 (11.6)	0.47
Oxytocin augmentation ^c	17 (9.6)	91 (12.9)	0.30
Cervical dilation at analgesia (cm) ^b	4 (3–4)	3 (3–4)	<.001



Impact of accidental dural puncture

Table 3. Obstetric Characteristics of the Study and Control Groups

	UDP (N = 177)	Epidural (N = 708)	P
VNS pain score postanesthesia (0–100) ^a	4.71 ± 13.7	10.10 ± 15.7	0.001
Mode of delivery			
Spontaneous vaginal ^b	142 (80.2)	580 (81.9)	0.59
Instrumental vaginal ^b	25 (14.1)	108 (15.3)	0.81
Cesarean delivery ^b	12 (6.8)	32 (4.5)	0.24
Neuraxial-delivery interval (h) ^a	5.8 ± 4.8	5.4 ± 3.8	0.28
Maternal length of stay (d) ^a	3.3 ± 1.4	2.7 ± 0.8	<.001
Prolonged hospitalization ^b	46 (26.0)	81 (11.4)	<.001
Apgar 5-min < 7 ^b	1 (0.6)	1 (0.1)	0.36
NICU admission ^b	2 (1.1)	16 (2.3)	0.55



Impact of accidental dural puncture

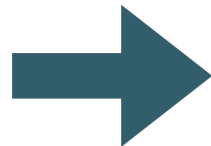
Table 4. Unintended Dural Puncture: Complications

Postdural puncture headache ^a	107 (60.5)
Average time until onset of headache (h) ^b	23.7 ± 9.9
Average VNS pain score (sitting) ^b	71.1 ± 22.9
Tinnitus ^a	1 (0.9)
Photophobia ^a	3 (2.8)
Nausea ^a	6 (5.6)
Back pain ^a	17 (15.9)
Epidural blood patch ^a	38 (35.5)
Average time from dural puncture until blood patch (h) ^b	56.9 ± 54.7
Average blood volume injected for blood patch (mL) ^b	27.3 ± 7.7
Women requiring second epidural blood patch ^a	1 (2.6)

Risk factors

Table 5. Multivariable Logistic Regression Model: Factors Associated With Unintentional Dural Puncture

	OR (95% CI)	P
Maternal age	1.01 (0.96–1.06)	0.64
Pregestational BMI	1.02 (0.98–1.07)	0.23
Nulliparity	0.99 (0.63–1.55)	0.98
PROM	0.55 (0.32–0.93)	0.02
Induction of labor	1.31 (0.71–2.41)	0.38
Oxytocin augmentation	0.76 (0.41–1.56)	0.39
Degree of cervical dilation (cm)	1.23 (1.04–1.42)	0.01
VNS pain score before analgesia	0.99 (0.98–1.01)	0.08
Epidural needle depth	1.48 (1.08–2.03)	0.02



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.»

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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