SFOAI

What's New in Obstetric Anesthesia!

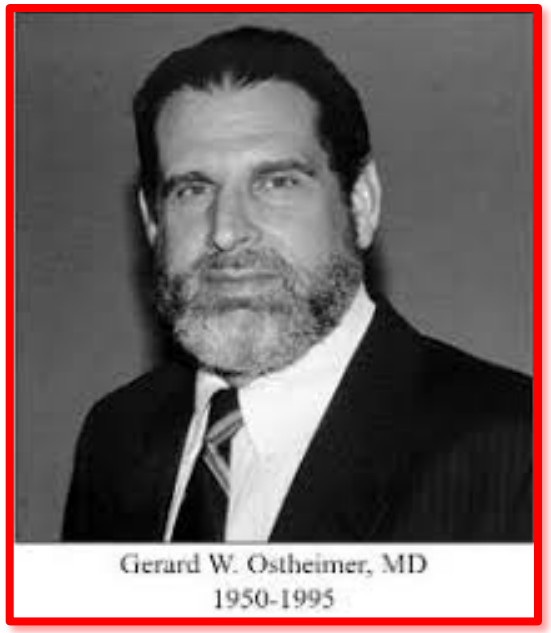
Nyhet[illegible]tetrisk anestesi!

Ove Karlsson, MD, PhD

NU-sjukvården

What’s New in Obstetric Anesthesia?

- The Society of Obstetric Anesthesia and Perinatology, SOAP
  - ”The Gerard W Ostheimer lecture”
- Obstetric Anesthesia Association, OAA
  - ”What’s New in Obstetric Anesthesia” lecture
- Anesthesia & Analgesia, A&A
  - Review article
- International Journal of Obstetric Anesthesia, IJOA
  - Review article


Gerard W. Ostheimer, MD
1950-1995

SPECIAL ARTICLE

What Is New in Obstetric Anesthesia: The 2017 Gerard W. Ostheimer Lecture

Brian T. Bateman, MD, M

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International Journal of Obstetric Anesthesia (2019) 37, 68–72
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https://doi.org/10.1016/j.ijoa.2018.09.004

REVIEW ARTICLE

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What's New in Obstetric Anesthesia? The 2017 Gerard W. Ostheimer Lecture

Ashraf S. Habib, MBE

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2019;129:

International Journal of Obstetric Anesthesia (2019) 38, 119–126
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https://doi.org/10.1016/j.ijoa.2019.03.005

REVIEW ARTICLE

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What's new in obstetric anesthesia in 2017?

A.S. Habib
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ABSTRACT
The Gerard W. Ostheimer lecture is delivered every year at the annual meeting of the Society for Obstetric Anesthesia and Perinatology. The lecture aims to provide the anesthesiologist who provides obstetric anesthesia care with a review of the most relevant articles that were published in the preceding calendar year. This article highlights the literature published in 2017 related to maternal mortality, maternal cardiac arrest, cesarean delivery and labor analgesia.

What Is New in Obstetric Anesthesia: The 2017 Gerard W. Ostheimer Lecture

Brian T. Bateman, MD, MSc

The Gerard W. Ostheimer lecture is given each year at the Society for Obstetric Anesthesia and Perinatology annual meeting and is intended to summarize important new scientific literature ew highlights some of the most con- lmark clinical trials that are likely to It summarizes several articles that esia and postoperative pain control. sed interventions that can improve quality improvement initiatives that . (Anesth Analg 2019;128:123–7)

Table. Proposed To-Do List

1. Consider adding azithromycin to standard antibiotics in patients undergoing cesarean delivery after labor or rupture of membranes
2. Transition to chlorhexidine for skin antisepsis before cesarean
3. Avoid the use of misoprostol to prevent or treat postpartum hemorrhage
4. Use low-dose intrathecal morphine (50–100 μg) for most patients
5. Implement a Maternal Early Warning Trigger system
6. Increase your operating room temperature
7. Work with your obstetricians and nurses to implement the National Partnership venous thromboembolism prophylaxis bundle

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Randomized Trial Comparing Skin Antiseptic Agents at Cesarean Delivery

Methodius G. Tuuli, M.D., M.P.H., Jingxia Liu, Ph.D., Molly J. Stout, M.D., M.S.C.I., Shannon Martin, R.N., Alison G. Cahill, M.D., M.S.C.I., Anthony O. Odibo, M.D., M.S.C.E., Graham A. Colditz, M.D., Dr.P.H., and George A. Macones, M.D., M.S.C.E.

ABSTRACT

BACKGROUND

Preoperative skin antisepsis has the potential to decrease the risk of surgical-site infection. However, evidence is limited to guide the choice of antiseptic agent at cesarean delivery, which is the most common major surgical procedure among women in the United States.

METHODS

In this single-center, randomized, controlled trial, we evaluated whether the use of chlorhexidine–alcohol for preoperative skin antisepsis was superior to the use of iodine–alcohol for the prevention of surgical-site infection after cesarean delivery. We randomly assigned patients undergoing cesarean delivery to skin preparation with either chlorhexidine–alcohol or iodine–alcohol. The primary outcome was superficial or deep surgical-site infection within 30 days after cesarean delivery, on the basis of definitions from the Centers for Disease Control and Prevention.

RESULTS

From September 2011 through June 2015, a total of 1147 patients were enrolled; 572 patients were assigned to chlorhexidine–alcohol and 575 to iodine–alcohol. In an intention-to-treat analysis, surgical-site infection was diagnosed in 23 patients (4.0%) in the chlorhexidine–alcohol group and in 42 (7.3%) in the iodine–alcohol group (relative risk, 0.55; 95% confidence interval, 0.34 to 0.90; P=0.02). The rate of superficial surgical-site infection was 3.0% in the chlorhexidine–alcohol group and 4.9% in the iodine–alcohol group (P=0.10); the rate of deep infection was 1.0% and 2.4%, respectively (P=0.07). The frequency of adverse skin reactions was similar in the two groups.

CONCLUSIONS

The use of chlorhexidine–alcohol for preoperative skin antisepsis resulted in a significantly lower risk of surgical-site infection after cesarean delivery than did the use of iodine–alcohol. (Funded by the National Institutes of Health and Washington University School of Medicine in St. Louis; ClinicalTrials.gov number, NCT01472549.)

From the Department of Obstetrics and Gynecology (M.G.T., M.J.S., S.M., A.G.C., G.A.M.) and the Division of Public Health Sciences (J.L., G.A.C.), Washington University School of Medicine in St. Louis, St. Louis; and the Department of Obstetrics and Gynecology, University of South Florida, Tampa (A.O.O.). Address reprint requests to Dr. Tuuli at the Department of Obstetrics and Gynecology, Washington University School of Medicine in St. Louis, 4566 Scott Ave., Campus Box 8064, St. Louis, MO 63110, or at tuulim@wudosis.wustl.edu.

This article was published on February 4, 2016, at NEJM.org.

N Engl J Med 2016;374:647-55.
DOI: 10.1056/NEJMoa1511048

Table 2. Prespecified Primary and Secondary Outcomes and Post Hoc Additional Outcomes, According to Treatment Group, in the Intention-to-Treat Analysis.

Outcome	Chlorhexidine–Alcohol (N=572)	Iodine–Alcohol (N=575)	Relative Risk (95% CI)	P Value*
Primary outcome				
Surgical-site infection — no. (%)	23 (4.0)	42 (7.3)	0.55 (0.34–0.90)	0.02
Superficial incisional	17 (3.0)	28 (4.9)	0.61 (0.34–1.10)	0.10
Deep incisional	6 (1.0)	14 (2.4)	0.43 (0.17–1.11)	0.07
Secondary outcomes				
Median length of hospital stay (IQR) — days	4 (3–4)	4 (3–4)	—	0.24
Physician office visit — no. (%)	45 (7.9)	72 (12.5)	0.63 (0.44–0.90)	0.009
Hospital readmission — no. (%)	19 (3.3)	25 (4.3)	0.76 (0.43–1.37)	0.37
Endometritis — no. (%)	8 (1.4)	11 (1.9)	0.73 (0.30–1.80)	0.49
Adverse skin reaction — no. (%)				
Erythema at operative site	13 (2.3)	11 (1.9)	1.19 (0.54–2.63)	0.67
Skin irritation	0	3 (0.5)	—	0.08
Allergic skin reaction	2 (0.3)	1 (0.2)	2.02 (0.18–22.11)	0.56
Skin irritation or allergic skin reaction	2 (0.3)	4 (0.7)	0.51 (0.09–2.73)	0.42
Additional outcomes				
Other wound complication — no. (%)				
Skin separation	66 (11.5)	66 (11.5)	1.01 (0.73–1.39)	0.97
Seroma	24 (4.2)	28 (4.9)	0.87 (0.51–1.47)	0.58
Hematoma	7 (1.2)	5 (0.9)	1.41 (0.45–4.41)	0.56
Cellulitis	5 (0.9)	10 (1.7)	0.50 (0.17–1.46)	0.20
Fire or chemical skin burn — no.	0	0	—	—

- Randomiserad prospektiv
- Klorhexidin sprit/Jod sprit
- 572/575
- Sårinfektion
  - Klorhexidin 4,0 %
  - Jodsprit 7,3 %

Society for Obstetric Anesthesia and Perinatology
Section Editor: Jill M. Mhyre
META-ANALYSIS

The Effect of Intrathecal Morphine Dose on Outcomes After Elective Cesarean Delivery: A Meta-Analysis

Pervez Sultan, MBChB, FRCA,* Stephen H. Halpern, MD,† Ellile Pushpanathan, MBBS, BMedSci, FRCA,‡ Selina Patel, MBBS, FRCA,* and Brendan Carvalho, MBBCh, FRCA§

BACKGROUND: The intrathecal morphine dose achieving optimal analgesia for cesarean delivery while minimizing side effects has not yet been deduced. In this meta-analysis, our objective was to determine whether low- or high-dose intrathecal morphine provides acceptable duration and intensity of analgesia with fewer side effects.

METHODS: A literature search (PubMed, EMBASE, MEDLINE, Scopus, Web of Science, and CINAHL) was performed to identify randomized controlled trials involving patients undergoing elective cesarean delivery under spinal anesthesia comparing low-dose (LD; 50–100 μg) morphine with higher dose (HD; >100–250 μg). The primary outcome was the time for first request for supplemental analgesia. The secondary outcomes included pain scores, morphine use, maternal side effects (vomiting and pruritus), and Apgar scores. Mean differences (MDs) and odds ratios (ORs) were calculated using random effects modeling with 95% confidence intervals (CIs).

RESULTS: Eleven articles met our inclusion criteria. Four hundred eighty patients were recruited in all study groups (233 patients in the HD and 247 in the LD groups). The mean time to first analgesic request was longer (MD, 4.49 hours [95% CI, 1.85–7.13]; $P = 0.0008$) in the HD group compared with the LD group. Pain scores (0–100 scale) at 12 hours (MD, 2.54 [95% CI, −2.55 to 7.63]; $P = 0.33$) as well as morphine consumption at 24 hours (MD, 1.31 mg [95% CI, −3.06 to 7.31]; $P = 0.42$) were not significantly different. The incidence of nausea or vomiting (OR, 0.44 [95% CI, 0.27–0.73]; $P = 0.002$) and pruritus (OR, 0.34 [95% CI, 0.20–0.59]; $P = 0.0001$) was lower in the LD group. The incidence of Apgar scores <7 at 1 minute was not different between groups (OR, 1.11 [95% CI, 0.06–20.49]; $P = 0.94$).

CONCLUSIONS: This meta-analysis shows that HDs of intrathecal morphine prolong analgesia after cesarean delivery compared with lower doses. The MD of 4.5 hours (95% CI, 1.9–7.1 and 99% CI, 1.0–8.2 hours) of pain relief must be balanced against the increased risk of maternal pruritus and vomiting. Results from this study can be used by clinicians to weigh the benefits and potential side effects of using HDs of intrathecal morphine for cesarean delivery. (Anesth Analg 2016;123:154–64)

- Metaanalys
- Randomiserade
- Intratekalt morfin
  - Lågdos 50-100 ug
  - Högdos >100-250 ug
- 11 studier
- Tid till första dos diskret längre med hög dos
- Smärta 12 t, ingen skillnad
- Morfin konsumtion 24 t, ingen skillnad
- Hög dos mer biverkningar
  - Klåda
  - PONV

Society for Obstetric Anesthesia and Perinatology

Section Editor: Cynthia A. Wong

A Randomized Controlled Trial Comparing Two Multimodal Analgesic Techniques in Patients Predicted to Have Severe Pain After Cesarean

Jessica L. Booth, MD, Lynnette C. Harris, BSN, CCRC, James C. Eisenach, MD, and Peter H. Pan, MD

BACKGROUND: Improved pain control after cesarean delivery remains a challenging objective. Poorly treated acute pain following delivery is associated with an increased risk of chronic pain and depression. This study was conducted to determine whether the addition of systemic acetaminophen and an increased dose of intrathecal morphine would further reduce acute pain. The primary outcome was pain intensity with movement at 24 hours postoperatively. Secondary measures included persistent pain and depression at 8 weeks.

METHODS: Seventy-four parturients scheduled for elective cesarean delivery under spinal anesthesia that were predicted to be above the 80th percentile for evoked pain intensity based on a 3-item preoperative screening questionnaire were enrolled. Patients in the intervention group received 300 mcg spinal morphine and 1 gram acetaminophen every 6 hours for 24 hours postoperatively. Patients in the control group received 150 mcg spinal morphine and placebo tablets. All patients received scheduled ibuprofen by mouth and IV morphine patient-controlled analgesia. At 24 hours, patients rated their pain intensity with movement, at rest, on average, and worst score using a visual analog scale for pain (100-mm unmarked line). The presence of persistent pain and depression was assessed at 8 weeks using the Edinburgh postpartum depression survey.

RESULTS: Providing a higher dose of spinal morphine combined with systemic acetaminophen to patients predicted to be at high risk for severe post–cesarean delivery pain significantly reduced evoked pain scores with movement at 24 hours (mean ± SD: 46 ± 25 mm in control group versus 31 ±17 mm in intervention group, $P = 0.009$; 95% confidence interval for the difference between means: 4 mm, 26 mm). There was no difference in the incidence of persistent pain (13% (4/30) in control group versus 10% (3/30) in intervention group, $P > 0.99$), or depression at 8 weeks postoperatively (10% (3/30) in control group versus 13% (4/30) in intervention group, $P > 0.99$).

CONCLUSIONS: Adding a higher dose of intrathecal morphine and oral acetaminophen to a multimodal pain regimen in patients predicted to be at risk for high acute postpartum pain after cesarean delivery results in a significant reduction of acute postoperative pain scores at 24 hours. (Anesth Analg 2016;122:1114–9)

Table 2. Visual Analog Pain Score Assessment and Side Effects for the First 24 Hours After Cesarean Delivery

Visual analog pain score (0–100 mm)[a]	150 mcg PF-morphine + placebo (control group, $n = 30$)	300 mcg PF-morphine + acetaminophen (intervention group, $n = 30$)	P value
Movement at 24 hours,[b] mean ± SD (mm)	46 ± 25	31 ± 17	0.009
Resting at 24 hours, median [IQR] (mm)	19 (0–33)	4 (0–10)	0.011
Average over 24 hours, mean ± SD (mm)	37 ± 19	23 ± 14	0.002
Worst over 24 hours, median [IQR] (mm)	69 (49–77)	62 (42–70)	0.15
Side effects			
Percentage of pruritus requiring treatment	Overall: 50%	Overall: 70%	0.11
	Postanesthesia care unit: 33%	Postanesthesia care unit: 47%	0.35
	Postpartum unit: 40%	Postpartum unit: 57%	0.17
Percentage of nausea requiring treatment	Overall: 53%	Overall: 60%	0.60
	Postanesthesia care unit: 33%	Postanesthesia care unit: 23%	0.33
	Postpartum unit: 37%	Postpartum unit: 50%	0.33

- Formulär för predicera smärta
- Randomiserad kontrollerad
- Standard
  - Mofin 150 ug
  - Ibuprofen
- Hög dos
  - Morfin 300 ug
  - Ibuprofen
  - Paracetamol
- VAS vila 24 t median(IQR) mm
  - Standar 19 (0-33)
  - Hög dos 4 (0-10)
- VAS rörelse 24 t, medel (+/-SD)
  - Standard 46 (25)
  - Hög dos 31 (17)

Original Research

OBSTETRICS

Use of Maternal Early Warning Trigger tool reduces maternal morbidity

Laurence E. Shields, MD; Suzanne Wiesner, RN, MBA; Catherine Klein, RN, CNM; Barbara Pelletreau, RN, MPH; Herman L. Hedriana, MD

BACKGROUND: Maternal mortality in the United States has increased unabated for the past 20 years. Maternal morbidity is also affecting an increasingly large number of women in the United States. A number of national and state organizations have recommend the use of maternal early warning tools as a method to combat this problem. There are limited data suggesting that the use of these types of clinical assessment tools can reduce maternal morbidity.

OBJECTIVE: We sought to determine if maternal morbidity could be reduced with the implementation of a clinical pathway-specific Maternal Early Warning Trigger (MEWT) tool.

STUDY DESIGN: The tool was developed internally and prospectively implemented as a pilot project in 6 of 29 hospitals within a large hospital system. The primary goal was early assessment and treatment of patients suspected of clinical deterioration. The tool addressed the 4 most common areas of maternal morbidity: sepsis, cardiopulmonary dysfunction, preeclampsia-hypertension, and hemorrhage. To be considered positive, triggers needed to be sustained for >20 minutes and were defined as severe (single abnormal value): maternal heart rate (HR) >130 beats/min (bpm), respiratory rate >30/min, mean arterial pressure <55 mm Hg, oxygen saturation <90%, or nurse concern; or nonsevere (required 2 abnormal values): temperature >38 or <36°C, blood pressure >160/110 or <85/45 mm Hg, HR >110 or <50 bpm, respiratory rate >24 or <10/min, oxygen saturation <93%, fetal HR >160 bpm, altered mental status, or disproportionate pain. Within each group, recommended management or assessment was also provided. Outcome measures were Centers for Disease Control and Prevention (CDC)-defined severe maternal mo
and intensive care unit (ICU) admi
to analyze the effect of the MEW
period and a 13-month MEWT s
findings noted were not simply
without the utilization of the ear
a control population from nonpilot
13-month time periods.

RESULTS: There were 36,832 deliveries at the pilot sites (24,221 pre- and 12,611 post-MEWT testing) and 146,359 at the nonpilot sites (95,718 pre- and 50,641 post-MEWT testing) during the 2 study time periods. Use of the MEWT tool resulted in significant reductions in CDC severe maternal morbidity ($P < 0.01$) and composite morbidity ($P < 0.01$). ICU admissions were unchanged. At nonpilot sites CDC severe maternal morbidity, composite morbidity, and ICU admissions were unchanged between baseline and the post-MEWT testing time period.

CONCLUSION: The use of the MEWT tool in this study, designed to address 4 of the most common causes of maternal morbidity, as well as provide assessment and management recommendations, resulted in significant improvement in maternal morbidity. The variation in hospital delivery services at the pilot sites suggests that this maternal early warning tool would be suitable for use in the majority of maternity centers in the United States.

Key words: critical vital signs, maternal decompensation, maternal mortality

TABLE 2
Results from pre- and post-Maternal Early Warning Trigger time periods

	Pre-MEWT	Post-MEWT	Trend	*P* value	Prenonpilot	Postnonpilot	Trend	*P* value	Postpilot vs postnonpilot *P* value
Deliveries	24221	12611			95,718	50,641			
CDC-SMM	2.0%	1.6%	↓	<.01	2.4%	2.4%	→	.9	<.01
Composite morbidity	5.9%	5.1%	↓	<.01	6.2%	6.2%	→	.9	<.01
Eclampsia/1000[a]	2.0	0.4	↓	<.01	1.1	1.1	→	.9	.02
Hemorrhage	2.9%	2.7%	↓	.1	3.2%	3.3%	↑	.5	<.01
Transfusion	0.7%	0.6%	↓	.5	0.7%	0.8%	↑	.01	.04
D&C/1000[a]	4.1	3.0	↓	.1	3.0	3.8	↑	.02	.2
Hysterectomy/1000[a]	0.94	0.63	↓	.3	0.95	0.95	↑	.9	.2
Sepsis/1000[a]	0.78	1.3	↑	.14	0.26	0.42	↑	.1	

CDC, Centers for Disease Control and Prevention; *D&C*, dilation and curettage; *MEWT*, Maternal Early Warning Trigger tool; *SMM*, severe maternal morbidity.

[a] Rate given per 1000 deliveries.

Shields et al. Maternal trigger tool and severe maternal morbidity. Am J Obstet Gynecol 2016.

- Maternal Early Warning Trigger tool
- Utformad för att hitta och behandla sepsis, preeklampsi, PPH och hjärtsjukdom.
- Resultat, minskad frekvens:
  - Maternell morbiditet
  - Eklampsi

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REVIEW ARTICLE

What's New in Obstetric Anesthesia: a focus on maternal morbidity and mortality

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ABSTRACT
The Ostheimer lecture is given each year at the annual meeting of the Society for Obstetric Anesthesia and Perinatology. It summarizes "What's New in Obstetric Anesthesia" based on a systematic evaluation of the relevant literature published in the previous calendar year. In this review I consider studies published in 2016 focused on the prevalence of, and risk factors for, maternal morbidity and mortality. I also discuss novel therapeutic approaches to the prevention and treatment of major sources of maternal morbidity and mortality.

Keywords: Maternal morbidity; Maternal mortality; Anesthesia; Postpartum hemorrhage; Preeclampsia; Health services research

Mödradödlighet i världen?

1. Blödning
2. Preeklampsi
3. Infektion
4. Missfall
5. Tromboembolism

Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

*GBD 2015 Maternal Mortality Collaborators**

Summary

Background In transitioning from the Millennium Development Goal to the Sustainable Development Goal era, it is imperative to comprehensively assess progress toward reducing maternal mortality to identify areas of success, remaining challenges, and frame policy discussions. We aimed to quantify maternal mortality throughout the world by underlying cause and age from 1990 to 2015.

Methods We estimated maternal mortality at the global, regional, and national levels from 1990 to 2015 for ages 10–54 years by systematically compiling and processing all available data sources from 186 of 195 countries and territories, 11 of which were analysed at the subnational level. We quantified eight underlying causes of maternal death and four timing categories, improving estimation methods since GBD 2013 for adult all-cause mortality, HIV-related maternal mortality, and late maternal death. Secondary analyses then allowed systematic examination of drivers of trends, including the relation between maternal mortality and coverage of specific reproductive health-care services as well as assessment of observed versus expected maternal mortality as a function of Socio-demographic Index (SDI), a summary indicator derived from measures of income per capita, educational attainment, and fertility.

Findings Only ten countries achieved MDG 5, but 122 of 195 countries have already met SDG 3.1. Geographical disparities widened between 1990 and 2015 and, in 2015, 24 countries still had a maternal mortality ratio greater than 400. The proportion of all maternal deaths occurring in the bottom two SDI quintiles, where haemorrhage is the dominant cause of maternal death, increased from roughly 68% in 1990 to more than 80% in 2015. The middle SDI quintile improved the most from 1990 to 2015, but also has the most complicated causal profile. Maternal mortality in the highest SDI quintile is mostly due to other direct maternal disorders, indirect maternal disorders, and abortion, ectopic pregnancy, and/or miscarriage. Historical patterns suggest achievement of SDG 3.1 will require 91% coverage of one antenatal care visit, 78% of four antenatal care visits, 81% of in-facility delivery, and 87% of skilled birth attendance.

Interpretation Several challenges to improving reproductive health lie ahead in the SDG era. Countries should establish or renew systems for collection and timely dissemination of health data; expand coverage and improve quality of family planning services, including access to contraception and safe abortion to address high adolescent fertility; invest in improving health system capacity, including coverage of routine reproductive health care and of more advanced obstetric care—including EmOC; adapt health systems and data collection systems to monitor and reverse the increase in indirect, other direct, and late maternal deaths, especially in high SDI locations; and examine their own performance with respect to their SDI level, using that information to formulate strategies to improve performance and ensure optimum reproductive health of their population.

Funding Bill & Melinda Gates Foundation.

Lancet 2016; 388: 1775–812

This online publication has been corrected. The corrected version first appeared at thelancet.com on January 5, 2017

See Editorial page 1447

See Comment pages 1448 and 1450

*Collaborators listed at the end of the Article

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Dr Nicholas J Kassebaum, Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA 98121, USA
nickjk@uw.edu

- Mödradödlighet minskat 30 %
  - 1990: 390.000
  - 2015: 275.000
  - WHO statistik
    - 1990: 5-600.000
    - 2015: 300.000
- MMR 2015
  - Medel 195/100.000
  - Max 1074/100.000
  - Norden 4/100.000
  - Island 0,7/100.000
  - USA 26/100.000 (ökar)
- Vanligaste orsaker
  - PPH
  - Preeklampsi

Anaesthesia-related maternal mortality in low-income and middle-income countries: a systematic review and meta-analysis

Soha Sobhy, Javier Zamora*, Kuhan Dharmarajah, David Arroyo-Manzano, Matthew Wilson, Ramesan Navaratnarajah, Arri Coomarasamy, Khalid S Khan, Shakila Thangaratinam*

Summary

Background The risk factors contributing to maternal mortality from anaesthesia in low-income and middle-income countries and the burden of the problem have not been comprehensively studied up to now. We aimed to obtain precise estimates of anaesthesia-attributed deaths in pregnant women exposed to anaesthesia and to identify the factors linked to adverse outcomes in pregnant women exposed to anaesthesia in low-income and middle-income countries.

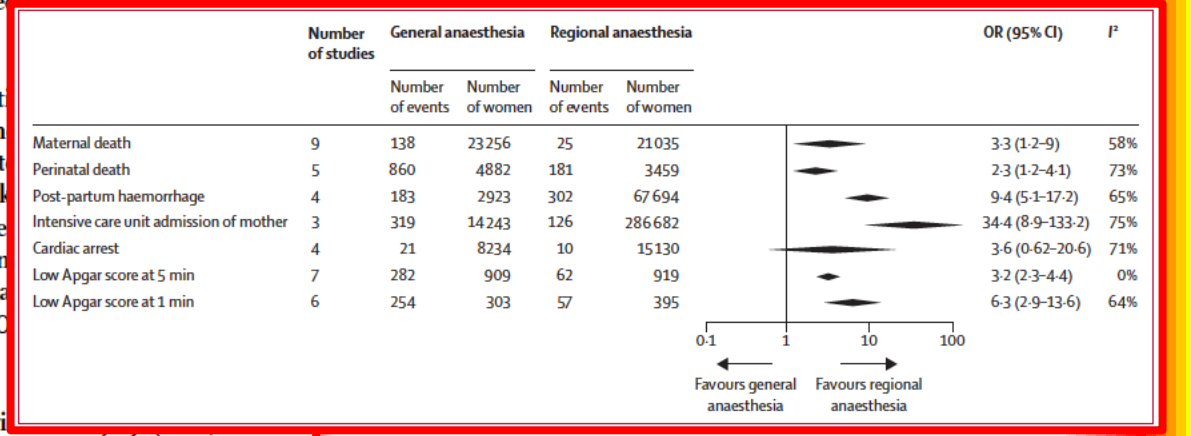
Methods In this systematic review and meta-analysis, we searched major electronic databases from inception unt Oct 1, 2015, for studies reporting risks of maternal death from anaesthesia in low-income and middle-incom countries. Studies were included if they assessed maternal and perinatal outcomes in pregnant women exposed t anaesthesia for an obstetric procedure in countries categorised as low-income or middle-income by the World Bank We excluded studies in high-income countries, those involving non-pregnant women, case reports, and studie published before 1990 to ensure that the estimates reflect the current burden of the condition. Two independen reviewers undertook quality assessment and data extraction. We computed odds ratios for risk factors and anaesthesia related complications, and pooled them using a random effects model. This study is registered with PROSPERO number CRD42015015805.

Findings 44 studies (632 556 pregnancies) reported risks of death from anaesthesia in women who had an obstetri surgical procedure; 95 (32 149 636 pregnancies and 36 144 deaths) provided rates of anaesthesia-attributed deaths as a proportion of maternal deaths. The risk of death from anaesthesia in women undergoing obstetric procedures was 1·2 per 1000 women undergoing obstetric procedures (95% CI 0·8–1·7, I^2=83%). Anaesthesia accounted for 2·8% (2·4–3·4, I^2=75%) of all maternal deaths, 3·5% (2·9–4·3, I^2=79%) of direct maternal deaths (ie, those that resulted from obstetric complications), and 13·8% (9·0–20·7, I^2=84%) of deaths after caesarean section. Exposure to general anaesthesia increased the odds of maternal (odds ratio [OR] 3·3, 95% CI 1·2–9·0, I^2=58%), and perinatal deaths (2·3, 1·2–4·1, I^2=73%) compared with neuraxial anaesthesia. The rate of any maternal death was 9·8 per 1000 anaesthetics (5·2–15·7, I^2=92%) when managed by non-physician anaesthetists compared with 5·2 per 1000 (0·9–12·6, I^2=95%) when managed by physician anaesthetists.

Interpretation The current international priority on strengthening health systems should address the risk factors such as general anaesthesia and rural setting for improving anaesthetic care in pregnant women.

Lancet Glob Health 2016; 4: e320–27

See Comment page e290



	Number of studies	General anaesthesia		Regional anaesthesia		OR (95% CI)	I^2
		Number of events	Number of women	Number of events	Number of women		
Maternal death	9	138	23256	25	21035	3·3 (1·2–9)	58%
Perinatal death	5	860	4882	181	3459	2·3 (1·2–4·1)	73%
Post-partum haemorrhage	4	183	2923	302	67694	9·4 (5·1–17·2)	65%
Intensive care unit admission of mother	3	319	14243	126	286682	34·4 (8·9–133·2)	75%
Cardiac arrest	4	21	8234	10	15130	3·6 (0·62–20·6)	71%
Low Apgar score at 5 min	7	282	909	62	919	3·2 (2·3–4·4)	0%
Low Apgar score at 1 min	6	254	303	57	395	6·3 (2·9–13·6)	64%

CIBERESP), Madrid, Spain (Prof J Zamora, D Arroyo-Manzano MSc); Northwick Park Hospital, Harr (K DH of He Univ Shef Barts Whit (R Na Scho Expe of M

- Generell anestesi och maternell mortalitet
- GA ökar Odds Ratio 3,3 jmf regional anestesi
- Maternell mortalitet
  - Non-physician 9,8/1000 anestesier
  - Physician 5,2/1000 anestesier

Global Health: *Procedures and Instruments*

Control of Postpartum Hemorrhage Using Vacuum-Induced Uterine Tamponade

Yuditiya Purwosunu, MD, Widyastuti Sarkoen, MD, Sabaratnam Arulkumaran, MD, PhD, and Jan Segnitz, MD

BACKGROUND: Postpartum hemorrhage is the leading cause of maternal mortality worldwide. Vacuum-induced uterine tamponade is a possible alternative approach to balloon tamponade systems for the treatment of postpartum hemorrhage resulting from atony.

METHOD: In a prospective proof-of-concept investigation of 10 women with vaginal deliveries in a hospital setting who failed first-line therapies for postpartum hemorrhage, tamponade was used. Vacuum-induced uterine tamponade was created through a device inserted transvaginally into the uterine cavity. An occlusion balloon built into the device shaft was inflated at the level of the external cervical os to create a uterine seal. Negative pressure was created by attaching a self-contained, mobile, electrically powered, pressure-regulated vacuum pump with a sterile graduated canister.

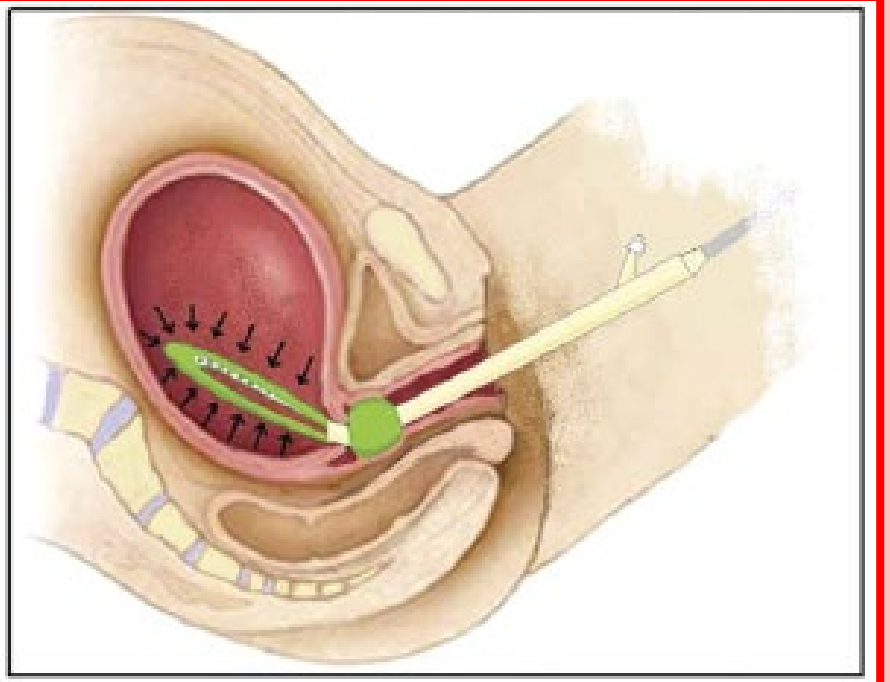
EXPERIENCE: In all 10 cases, the suction created an immediate seal at the cervical os, 50–250 mL of residual blood was evacuated from the uterine cavity, the uterus collapsed and regained tone within minutes, and hemorrhaging was controlled. The device remained in place for a minimum of 1 hour and up to 6.5 hours in one case while vaginal and perineal lacerations were easily repaired.

CONCLUSION: This preliminary investigation suggests that a device designed to create vacuum-induced uterine tamponade may be a reasonable alternative to other devices used to treat atonic postpartum hemorrhage.

(Obstet Gynecol 2016;128:33–6)
DOI: 10.1097/AOG.0000000000001473

Postpartum hemorrhage is the leading cause of maternal mortality worldwide. The global prevalence of postpartum hemorrhage is 6%. In Africa and Asia, where most maternal deaths occur, postpartum hemorrhage accounts for more than 30% of all maternal deaths.[1,2] Even developed countries are challenged by this life-threatening complication of childbirth, causing 10.6% of maternal deaths in the United Kingdom and 12% of maternal deaths in the United States.[3]

Primary postpartum hemorrhage is the most common form of major obstetric hemorrhage and approximately 75% of primary postpartum hemorrhage is the result of uterine atony. The traditional definition for primary postpartum hemorrhage is blood loss from the genital tract of greater than 500 mL or that which



- Pilotstudie 10 patienter
- Enkel och billig

What's New in Obstetric Anesthesia? The 2017 Gerard W. Ostheimer Lecture

Ashraf S. Habib, MBBCh, MSc, MHSc, FRCA

The "What's New in Obstetric A
ing of the Society for Obstetri
1975 to update the membersh
ceding calendar year. In 1995,
of Gerard W. Ostheimer, an obs
with significant contributions i
2017 that were presented in th
anesthesia for external cephali
A proposed list of action items
2019;129:168–75)

Table. Proposed Action Items Based on the 2017 Literature

1. Reduce and individualize postdischarge opioid prescriptions. Focus on patient's education with regards to postcesarean delivery analgesia.
2. Use neuraxial techniques to facilitate external cephalic version. Consider adjusting the dose of intrathecal bupivacaine according to obstetric plan following the version.
3. Consider the dural puncture epidural technique for labor analgesia and study it because more data are needed about this technique.
4. Use bromocriptine in women with peripartum cardiomyopathy.
5. Incorporate tranexamic acid as an adjunct in your transfusion protocol.
6. Work with your obstetric and nursing colleagues to institute safety bundles on your labor and delivery unit.

Effect of Intrathecal Bupivacaine Dose on the Success of External Cephalic Version for Breech Presentation

A Prospective, Randomized, Blinded Clinical Trial

Laurie A. Chalifoux, M.D., Jeanette R. Bauchat, M.D. M.S., Nicole Higgins, M.D.,
Paloma Toledo, M.D., M.P.H., Feyce M. Peralta, M.D., Jason Farrer, M.D., Susan E. Gerber, M.D., M.P.H.
Robert J. McCarthy, Pharm.D., John T. Sullivan, M.D., M.B.A.

ABSTRACT

Background: Breech presentation is a leading cause of cesarean delivery. The use of neuraxial anesthesia increases the success rate of external cephalic version procedures for breech presentation and reduces cesarean delivery rates for fetal malpresentation. Meta-analysis suggests that higher-dose neuraxial techniques increase external cephalic version success to a greater extent than lower-dose techniques, but no randomized study has evaluated the dose–response effect. We hypothesized that increasing the intrathecal bupivacaine dose would be associated with increased external cephalic version success.

Methods: We conducted a randomized, double-blind trial to assess the effect of four intrathecal bupivacaine doses (2.5, 5.0, 7.5, 10.0 mg) combined with fentanyl 15 μg on the success rate of external cephalic version for breech presentation. Secondary outcomes included mode of delivery, indication for cesarean delivery, and length of stay.

Results: A total of 240 subjects were enrolled, and 239 received the intervention. External cephalic version was successful in 123 (51.5%) of 239 patients. Compared with bupivacaine 2.5 mg, the odds (99% CI) for a successful version were 1.0 (0.4 to 2.6), 1.0 (0.4 to 2.7), and 0.9 (0.4 to 2.4) for bupivacaine 5.0, 7.5, and 10.0 mg, respectively ($P = 0.99$). There were no differences in the cesarean delivery rate ($P = 0.76$) or indication for cesarean delivery ($P = 0.82$). Time to discharge was increased 60 min (16 to 116 min) with bupivacaine 7.5 mg or higher as compared with 2.5 mg ($P = 0.004$).

Conclusions: A dose of intrathecal bupivacaine greater than 2.5 mg does not lead to an additional increase in external cephalic procedural success or a reduction in cesarean delivery. (ANESTHESIOLOGY 2017; 127:625-32)

Neuraxial analgesia to increase the success rate of external cephalic version: a systematic review and meta-analysis of randomized controlled trials

Elena Rita Magro-Malosso, MD; Gabriele Saccone, MD; Mariarosaria Di Tommaso, MD; Michele Mele, MD; Vincenzo Berghella, MD

BACKGROUND: External cephalic version is a medical procedure in which the fetus is externally manipulated to assume the cephalic presentation. The use of neuraxial analgesia for facilitating the version has been evaluated in several randomized clinical trials, but its potential effects are still controversial.
OBJECTIVE: The objective of the study was to evaluate the effectiveness of neuraxial analgesia as an intervention to increase the success rate of external cephalic version.
DATA SOURCES: Searches were performed in electronic databases with the use of a combination of text words related to external cephalic version and neuraxial analgesia from the inception of each database to January 2016.
STUDY ELIGIBILITY CRITERIA: We included all randomized clinical trials of women, with a gestational age ≥36 weeks and breech or transverse fetal presentation, undergoing external cephalic version who were randomized to neuraxial analgesia, including spinal, epidural, or combined spinal-epidural techniques (ie, intervention group) or to a control group (either intravenous analgesia or no treatment).
STUDY APPRAISAL AND SYNTHESIS METHODS: The primary outcome was the successful external cephalic version. The summary measures were reported as relative risk or as mean differences with a 95% confidence interval.
TABULATION, INTEGRATION, AND RESULTS: Nine randomized clinical trials (934 women) were included in this review. Women who received neuraxial analgesia had a significantly higher incidence of successful external cephalic version (58.4% vs 43.1%; relative risk, 1.44, 95% confidence interval, 1.27–1.64), cephalic presentation in labor (55.1% vs 40.2%; relative risk, 1.37, 95% confidence interval, 1.08–1.73), and vaginal delivery (54.0% vs 44.6%; relative risk, 1.21, 95% confidence interval, 1.04–1.41) compared with those who did not. Women who were randomized to the intervention group also had a significantly lower incidence of cesarean delivery (46.0% vs 55.3%; relative risk, 0.83, 95% confidence interval, 0.71–0.97), maternal discomfort (1.2% vs 9.3%; relative risk, 0.12, 95% confidence interval, 0.02–0.99), and lower pain, assessed by the visual analog scale pain score (mean difference, −4.52 points, 95% confidence interval, −5.35 to 3.69) compared with the control group. The incidences of emergency cesarean delivery (1.6% vs 2.5%; relative risk, 0.63, 95% confidence interval, 0.24–1.70), transient bradycardia (11.8% vs 8.3%
bradycardia, after
placentae (0.4%
CONCLUSION: Ad
women with malp
Key words: anest

- Sätesbjudning, en vanlig orsak till snitt
- Metaanalys: Spinal
  - Ökar lyckande frekvens
  - Minskar snittfrekvens.
- Randomiserad studie
  - Fentanyl 15 ug
  - Bupivakain 2,5 - 10 mg
- Ökande dos bupivakain påverkar ej lyckande frekvens
- Spinal för vändning:
  - Fentanyl 15 ug
  - Bupivakain 2,5 mg

Epidural Analgesia During the Second Stage of Labor

A Randomized Controlled Trial

XiaoFeng Shen, MD, Yunping Li, MD, ShiQin Xu, MD, N
Chunxiu Zhou, RN, and Philip E. Hess, MD

OBJECTIVE: To evaluate whether maintaining a motor-sparing epidural analgesia infusion affects the duration of the second stage of labor in nulliparous parturients compared with a placebo control.

METHODS: We conducted a double-blind, randomized, placebo-controlled trial involving nulliparous women with term cephalic singleton pregnancies who requested epidural analgesia. All women received epidural analgesia for the first stage of labor using 0.08% ropivacaine with 0.4 micrograms/mL sufentanil with patient-controlled epidural analgesia. At the onset of the second stage of labor, women were randomized to receive a blinded infusion of the same solution or placebo saline infusion. The primary outcome was the duration of the second stage of labor. A sample size of 200 per group (400 total) was planned to identify at least a 15% difference in duration.

RESULTS: Between March 2015 and September 2015, 560 patients were screened and 400 patients (200 in each group) completed the study. Using an intention-to-treat analysis, the duration of the second stage was similar between groups (epidural 52±27 minutes compared with saline 51±25 minutes, *P*=.52). The spontaneous vaginal [illegible] ported satisfaction scores of 8 or less (epidural 32 [16%] compared with saline 61 [30.5%], *P*=.001).

CONCLUSION: Maintaining the infusion of epidural medication had no effect on the duration of the second stage of labor compared with a placebo infusion. Maternal and neonatal outcomes were similar. A low concentration of epidural local anesthetic does not affect the duration of the second stage of labor.

CLINICAL TRIAL REGISTRATION: Chinese Clinical Trial Register, http://www.chictr.org.cn/enindex.aspx, ChiCTR-IOR-15005875.

(Obstet Gynecol 2017;130:1097–103)
DOI: 10.1097/AOG.0000000000002306

A longer duration of the second stage labor is associated with adverse outcomes, including chorioamnionitis, perineal laceration, and postpartum hemorrhage.[1] Thus, any treatment that affects the progress and outcome of the second stage of labor

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

- Randomiserad, dubbel blind
  - 200 / 200
  - NaCl / Ropivakain-Sufentanil
  - Under utdrivningsskedet
- Resultat
  - Ingen skillnad obstetrisk outcome
  - Duration 51 (25) / 52 (27)
  - NaCl **mindre nöjd score**

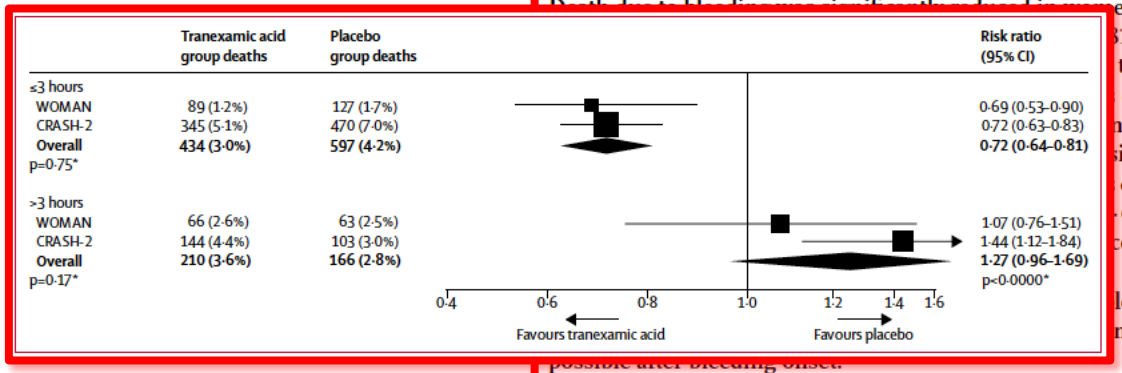
Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial

WOMAN Trial Collaborators*

	Tranexamic acid group (n=10 036)	Placebo group (n=9985)	RR (95% CI)	p value (two-sided)
Bleeding	155 (1·5%)	191 (1·9 %)	0·81 (0·65–1·00)	0·045
Pulmonary embolism	10 (0·1%)	11 (0·1)	0·90 (0·38–2·13)	0·82
Organ failure	25 (0·3%)	18 (0·2%)	1·38 (0·75–2·53)	0·29
Sepsis	15 (0·2%)	8 (0·1%)	1·87 (0·79–4·40)	0·15
Eclampsia	2 (0·02%)	8 (0·1%)	0·25 (0·05–1·17)	0·057
Other	20 (0·2%)	20 (0·2%)	0·99 (0·54–1·85)	0·99
Any cause of death	227 (2·3%)	256 (2·6%)	0·88 (0·74–1·05)	0·16

Data are n (%), unless otherwise indicated. RR=risk ratio.

Table 2: **Effect of tranexamic acid on maternal death**



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See Editorial page 2081
*Collaborators listed at end of the report
Correspondence to:
Clinical Trials Unit, London School of Hygiene & Tropical Medicine, London, UK

…e of maternal death worldwide. Early administration of …ients. We aimed to assess the effects of early administration …t outcomes in women with post-partum haemorrhage.

…d trial, we recruited women aged 16 years and older with a …birth or caesarean section from 193 hospitals in 21 countries. …us tranexamic acid or matching placebo in addition to usual …tarted within 24 h of the first dose, a second dose of 1 g of …gned by selection of a numbered treatment pack from a box …rom the pack number. Participants, care givers, and those … planned to enrol 15 000 women with a composite primary …2 days of giving birth. However, during the trial it became …often made at the same time as randomisation. Although …es, it could not affect the risk of hysterectomy. We therefore …rder to estimate the effect of tranexamic acid on the risk of …e on an intention-to-treat basis. This trial is regi…

ISRCTN76912190 (Dec 8, 2008); ClinicalTrials.gov, number NCT00872469; and PACTR201007000192283.

Findings Between March, 2010, and April, 2016, 20 060 women were enrolled and randomly assigned … tranexamic acid (n=10 051) or placebo (n=10 009), of whom 10 036 and 9985, respectively, were included in t… …en given tranexamic acid (155 [1·5%] of 10 036 pat… …1, 95% CI 0·65–1·00; p=0·045), especially in wo… tranexamic acid group *vs* 127 [1·7%] in the plac… of death did not differ significantly by group. Hy… …nts in the tranexamic acid group *vs* 351 [3·5%] in t… …ite primary endpoint of death from all causes or hy… or hysterectomies in the tranexamic acid group *vs* …65). Adverse events (including thromboembolic …cebo group.

…leeding in women with post-partum haemorrha… …m haemorrhage, tranexamic acid should be given … possible after bleeding onset.

- Randomiserad, dubbel blind
  - 20.000 patienter
  - 21 länder och 193 sjukhus
  - Tranexamsyra / NaCl
- Resultat ↓ mortalitet pga blödning
  - 1.5 %/1.9 %
    - RR 0.81 (p=0.045)
  - 1.2 %/1.7 % (< 3 timmar)
    - RR 0.69 (p=0.008)

BJA

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doi: 10.1093/bja/aex181
Advance Access Publication Date: 19 July 2017
Obstetrics

OBSTETRICS

Viscoelastometric-guided early fibrinogen concentrate replacement during postpartum haemorrhage: OBS2, a double-blind randomized controlled trial

P. W. Collins[1,*], R. Cannings-John[2], D. Bruynseels[3], S. Mallaiah[4], J. Dick[5], C. Elton[6], A. D. Weeks[7], J. Sanders[8], N. Aawar[2], J. Townson[2], K. Hood[2], J. E. Hall[9] and R. E. Collis[3] on behalf the OBS2 study team[†]

[1]Institute of Infection and Immunity, School of Medicine Cardiff University, UK, [2]Centre for Trials Research, College of Biomedical and Life Sciences, Cardiff University, UK, [3]Department of Anaesthetics and Pain Control, Cardiff and Vale University Health Board, UK, Hospital, Liverpool, UK, [5]Department of Anae Anaesthetics, Leicester Royal Infirmary, Leice Institute of Translational Medicine, Universit Cardiff University, Cardiff, UK and [9]Departme University, Heath Park, UK

*Corresponding author. E-mail: peter.collins@wales.nhs.uk
[†]The OBS2 study team is listed in the Acknowledgements secti

Abstract

Background: Postpartum haemorrhage (PPH) can be exacerbated by haemostatic failure. We hypothesized that early fibrinogen replacement, guided by viscoelastometric testing, reduces blood product usage and bleed size.
Methods: Women with PPH 1000–1500 ml were enrolled. If Fibtem A5 was ≤15 mm and bleeding continued, subjects were randomized to fibrinogen concentrate or placebo. The primary outcome compared the number of units of red blood cells, plasma, cryoprecipitate and platelets transfused.
Results: Of 663 women enrolled 55 were randomized. The adjusted incidence rate ratio (IRR) (95% CI) for the number of allogeneic units transfused in the fibrinogen group compared with placebo was 0.72 (0.3–1.7), P=0.45. In pre-specified subgroup analyses, subjects who had a Fibtem A5 ≤12 mm at the time of randomization and who received fibrinogen concentrate received a median (25th–75th centile) of 1 (0–4.5) unit of allogeneic blood products and had an additional 300 (100–350) ml blood loss whereas those who received placebo also received 3 (0–6) units of allogeneic blood products and had 700 (200–1550) ml additional blood loss; these differences were not statistically significantly different. There was one thrombotic event in each group.
Conclusions: Infusion of fibrinogen concentrate triggered by Fibtem A5 ≤15 mm did not improve outcomes in PPH. Pre-specified subgroup analyses suggest that fibrinogen replacement is not required if the Fibtem A5 is > 12 mm or Clauss fibrinogen >2 g litre^{-1}, but an effect below these levels cannot be excluded. The raised fibrinogen at term appears to be a physiological buffer rather than required for haemostasis.

- Randomiserad dubbel blind studie
- Inklusionskriterier
  - 1000-1500 ml blödning
  - FibTEM A5 </= 15 mm
- Fibrinogen / NaCl

	Fibrinogen (*n*=28)	Placebo (*n*=27)	Unadjusted* treatment effect estimate (95% CI)	P-value
Allogeneic blood products transfused between study drug completion and date of discharge				
No allogenic products transfused, *n* (%)	13 (46.4)	12 (44.4)	0.92† (0.32–2.67)	0.88
RBC transfusions				
Total number	37	38		
Mean transfusion rate (total transfusions/*n*)	1.32	1.41	0.94‡ (0.44–2.02)	0.87
Median (25th–75th centile)	1 (0–2)	1 (0–2)		
Range	0–9	0–8		
No RBC transfused, *n* (%)	13 (46.4)	13 (48.1)		
FFP transfusions				
Total number	18	33		
Mean transfusion rate (total transfusions/*n*)	0.64	1.22	0.53‡ (0.13–2.16)	0.37
Median (25th–75th centile)	0 (0–0)	0 (0–2)		
Range	0–4	0–8		
No FFP transfused, *n* (%)	22 (78.6)	19 (70.4)		
Platelet transfusions				
Total number	2	3		
No platelets transfused, *n* (%)	27 (96.4)	24 (88.9)	NA	
Cryoprecipitate transfusions				
Total number	1	1		
No cryoprecipitate transfused, *n* (%)	27 (96.4)	26 (96.3)	NA	
Measured abnormal blood loss (ml):				
Within 24 h of study medication				
Median (25th–75th centile)	225 (100–341.25)	300 (60–800)	−0.25§ (−1.35 to 0.85)	0.66
Range	0–1465	0–3000		
Between study medication and date of discharge	As above	As above		
Invasive procedures after study medication, *n* (%)				
Within 24 h of study medication	4 (14.3)	5 (18.5)	0.73† (0.17–3.08)	0.67
Between study medication and date of discharge	5 (17.9)	5 (18.5)	0.96† (0.24–3.77)	0.95
Level 2 care				
Admitted to level 2 care, *n* (%)	27 (96.4)	24 (88.9)	3.38† (0.33–34.65)	0.31
Length of stay (h), median (25th–75th centile)	16.0 (12.0–25.0)	20.5 (10.5–28.5)	−0.03§ (−0.48 to 0.42)	0.90
Range	2–152	1.5–88		
Level 3 care				
Admitted to level 3 care, *n* (%)	(7.1)	2 (7.4)	−0.003† (−0.14 to 0.13)	0.97
Length of hospital stay (days)				
Median (25th–75th centile)	3.0 (2.0–5.0)	3.0 (2.0–4.0)	0.23§ (−0.07 to 0.52)	0.13
Mean (SD)	2.89 (1.05)	4.50 (4.37)		
Range	1–23	1–6		
Breastfeeding at 6 week follow-up				
Ever breastfed, *n* (%)	17 (68.0)	19 (79.2)	0.56† (0.15–2.04)	0.38
Missing	3	3		
Breastfeeding/expressing at time of interview	10 (60.0)	12 (68.4)	1.00† (0.23–4.28)	1.00
Stopped breastfeeding	5 (40.0)	6 (31.6)		
Missing	2	1		
Duration of breastfeeding (days), median (25th–75th centile)	37 (0–46)	43 (0.5–60)	0.94§ (0.39–2.28)	0.89

Resultat
- Ingen skillnad primär outcome

OBSTETRICS

Reduction of severe maternal morbidity from hemorrhage using a state perinatal quality collaborative

Elliott K. Main, MD; Valerie Cape, BA; Anisha Abreo, MPH; Julie Vasher, DNP, RNC-OB, CNS; Amanda Andrew Carpenter, BA; Jeffrey B. Gould, MD, MPH

BACKGROUND: Obstetric hemorrhage is the leading cause of severe maternal morbidity and of preventable maternal mortality in the United States. The California Maternal Quality Care Collaborative developed a comprehensive quality improvement tool kit for hemorrhage based on the national patient safety bundle for obstetric hemorrhage and noted promising results in pilot implementation projects.

OBJECTIVE: We sought to determine whether these safety tools can be scaled up to reduce severe maternal morbidity in women with obstetric hemorrhage using a large maternal quality collaborative.

STUDY DESIGN: We report on 99 collaborative hospitals (256,541 annual births) using a before-and-after model with 48 noncollaborative comparison hospitals (81,089 annual births) used to detect any systemic trends. Both groups participated in the California Maternal Data Center providing baseline and rapid-cycle data. Baseline period was the 48 months from January 2011 through December 2014. The collaborative started in January 2015 and the postintervention period was the 6 months from October 2015 through March 2016. We modified the Institute for Healthcare Improvement collaborative model for achieving breakthrough improvement to include the mentor model whereby 20 pairs of nurse and physician mentors experienced in quality improvement gave additional support to small groups of 6-8 hospitals. The national hemorrhage safety bundle served as the template for quality improvement action. The main outcome measurement was the composite Centers for Disease Control and Prevention severe maternal morbidity measure, for both the target population of women with hemorrhage and the overall delivery population. The rate of adoption of bundle elements was used as an indicator of hospital engagement and intensity.

RESULTS: Compared to baseline period, wo collaborative hospitals experienced a 20.8% red morbidity while women in comparison hospital ($P < .0001$). Women in hospitals with prior h experience experienced an even larger 28.6% r with transfusions accounted for two thirds of the hospitals and fewer procedures and med remainder. The rate of severe maternal morbi collaborative hospitals was 11.7% lower and wor hemorrhage collaborative experience had a 17 outcomes for women were noted in all hospital small, health maintenance organization, and organization). Overall, 54% of hospitals comple ments, 76% reported regular unit-based drills, a posthemorrhage debriefs. Higher rate of bundle with improvement of maternal morbidity only in rates of severe maternal morbidity.

CONCLUSION: We used an innovative collaborative quality improvement approach (mentor model) to scale up implementation of the national hemorrhage bundle. Participation in the collaborative was strongly associated with reductions in severe maternal morbidity among hemorrhage patients. Women in hospitals in their second collaborative had an even greater reduction in morbidity than those approaching the bundle for the first time, reinforcing the concept that quality improvement is a long-term and cumulative process.

Key words: hemorrhage, maternal morbidity, outcomes, quality collaboratives, quality improvement, safety, safety bundles

TABLE 7
Rates of hemorrhage and severe maternal morbidity in entire obstetric population

California hospitals with CMQCC rapid-cycle maternal data center	Hospitals, N	Baseline (per 100 mothers)	Postintervention (per 100 mothers)	Decrease	Significance of reduction, *P* value
Rate of severe maternal morbidity among all obstetric patients					
Hospitals in CMQCC CPMS	99	1.71	1.51	11.7%	<.0001
Without prior hemorrhage collaborative experience	74	1.54	1.40	9.1%	.0030
With prior hemorrhage collaborative experience	25	2.06	1.70	17.5%	<.0001
Comparison group: hospitals not in collaborative and no prior CMQCC experience	48	1.53	1.46	4.5%	.2589
Rate of obstetric hemorrhage (see Table 1 for definition)					
Hospitals in CMQCC CPMS	99	5.9	6.7	−13.3%	<.0001
Without prior hemorrhage collaborative experience	74	5.2	6.1	−16.2%	<.0001
With prior hemorrhage collaborative experience	25	7.2	7.8	−8.6%	<.0001
Comparison group: hospitals not in collaborative and no prior CMQCC experience	48	4.2	4.3	−4.5%	.06

CMQCC, California Maternal Quality Care Collaborative; *CPMS*, California Partnership for Maternal Safety.
Main et al. Reduction of severe maternal morbidity from hemorrhage. Am J Obstet Gynecol 2017.

- Prospektiv studie PPH
- CMQCC, California Maternal Quality Care Collaborative
- Allvarlig maternell morbiditet ↓ 21%

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REVIEW ARTICLE

What's new in obstetric anesthesia in 2017?

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ABSTRACT
The Gerard W. Ostheimer lecture is delivered every year at the annual meeting of the Society for Obstetric Anesthesia and Perinatology. The lecture aims to provide the anesthesiologist who provides obstetric anesthesia care with a review of the most relevant articles that were published in the preceding calendar year. This article highlights the literature published in 2017 related to maternal mortality, maternal cardiac arrest, cesarean delivery and labor analgesia.

Cause	Women who survived (*n* = 37)	Women who died (*n* = 22)
Presumed premortem causes (*n* = 59)		
Cardiac tamponade	1	0
Hypoxia	4	0
Hypovolaemia	5	8
Venous thromboembolism	1	7
Toxic drug cause	1	0
Anaphylaxis	1	0
Sepsis	0	1
Anaesthetic cause	17	0
Amniotic fluid embolism	5	3
Cardiac cause	5	1
Intracerebral bleed	0	3
Aortic dissection	0	2
Asthma	0	1
Pulmonary artery rupture	0	1
Postmortem causes of collapse (*n* = 19)		
Amniotic fluid embolism		6
Vessel bleed/rupture		5
Thrombembolic		3
Cardiomyopathy		2
Other		3

Data were available for 59 women. Some women were suspected of having more than one cause, where this is the case both causes have been recorded.

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The CAPS Study: incidence, managemen outcomes of cardiac arrest in pregnancy UK: a prospective, descriptive study

VA Beckett,[a] M Knight,[b] P Sharpe[c]

d, UK [b] National Perinatal Epidemiology Unit, Univ
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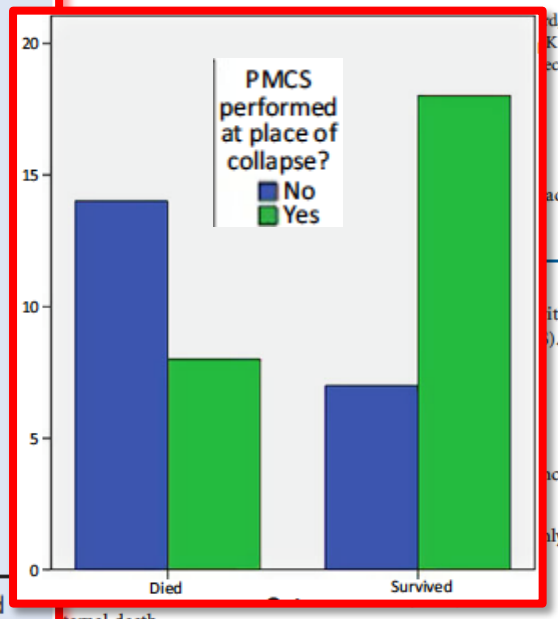
cology, Bradford Teaching Hospitals NHS Foundati



act available at https://vimeo.com/rcog/authorinsights14521.

ternal death.

sults There were 66 cardiac arrests in pregnancy, resulting in an idence of 2.78 per 100 000 maternities (1:36 000; 95% CI 2.2–). In all, 28 women died (case fatality rate 42%); 16 women arrested solely as a consequence of obstetric anaesthesia, 12 of whom were obese. Basic and advanced life support were rapidly delivered. Those who died were more likely to have collapsed at home. Perimortem caesarean section was performed in 49 women, 11 in the emergency department. The time from collapse to PMCS was significantly shorter in women who survived (median interval 3 versus 12 minutes, $P = 0.001$). Forty-six of 58 babies were born alive; 32 babies to surviving mothers and 14 to women who died.

Conclusion Cardiac arrest is rare in the pregnant UK population, however, nearly a quarter of cases are precipitated by obstetric anaesthesia, suggesting an opportunity to reduce the incidence further. Maternal survival rates of 58% were achieved with timely resuscitation, including PMCS, delay in which was associated with maternal death. Inpatient arrests were associated with higher survival rates than arrests that occurred outside the hospital setting.

Keywords Cardiac arrest, maternal morbidity, maternal mortality perimortem caesarean section, resuscitation.

Tweetable abstract 25% of cardiac arrest in pregnancy is caused by anaesthesia. Rapid perimortem section improves survival.

Linked article This article is commented on by JM Mhyre and Bateman, p. 1382 in this issue. To view this mini commentary visit https://doi.org/10.1111/1471-0528.14569. This article has journal club questions by BD Einerson, p. 1383 in this issue. To view these visit http://dx.doi.org/10.1111/1471-0528.14662.

Table 2. Time to emergency procedures in minutes, median (range), following maternal collapse

	Women who survived (*n* = 38)	Women who died (*n* = 28)	*P*-value
Collapse to BLS	0 (0–17)	0 (0–23)	0.28
Collapse to ALS	1 (0–36)	0 (0–24)	0.08
Collapse to PMCS	3 (0–39)	12 (0–67)	0.01

Mann–Whitney *U* tests for nonparametric data were applied.

- Prospektiv studie UK
- juli 2011 – juni 2014
- 66 st hjärtstopp
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- Överlevnad 58 %
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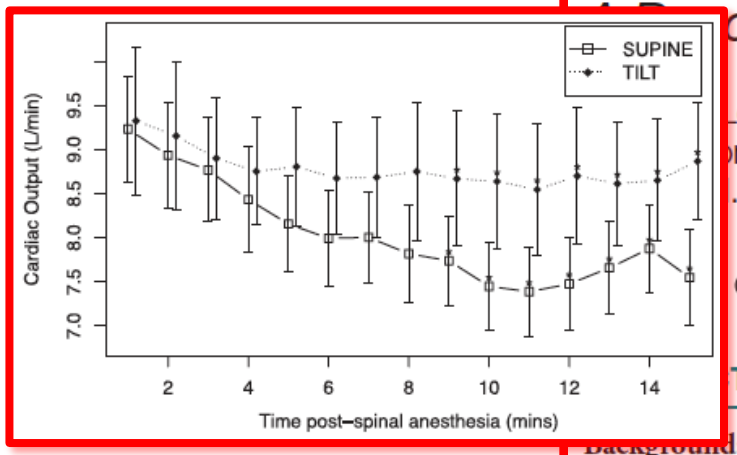
  - Perimortem snitt
  - Sjukhus

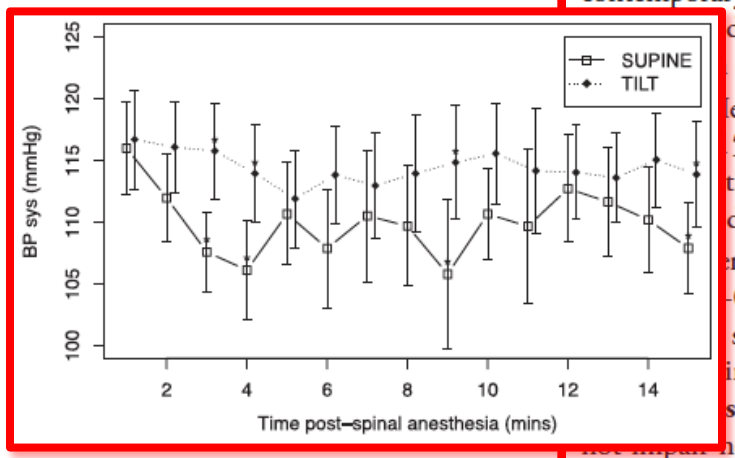
Left Lateral Table Tilt for Elective Cesarean Delivery under Spinal Anesthesia Has No Effect on Neonatal Acid–Base Status

A Randomized Controlled Trial

Lee, M.D., Ruth Landau, M.D., James L. Mattingly, C.R.N.A., Margaret
rradini, M.Sc., Shuang Wang, Ph.D., Stephanie R. Goodman, M.D.,
. Smiley, M.D., Ph.D.

This article has been selected for the ANESTHESIOLOGY CME Program. Lear
and disclosure and ordering information can be found in the CME sect
of this issue.





Background: Current recommendations for women undergoing cesarean delivery include 15° l
ment to prevent aortocaval compression, although this degree of tilt is practically never achieved. We hypothesized that under contemporary clinical practice, including a crystalloid coload and phenylephrine infusion targeted at maintaining baseline
d pressure, there would be no effect of maternal position on neonatal acid base status in women
delivery with spinal anesthesia.

ealthy women undergoing elective cesarean delivery were randomized (nonblinded) to supine ho
5° left tilt of the surgical table (tilt, n = 50) after spinal anesthesia (hyperbaric bupivacaine 12
tive-free morphine 150 μg). Lactated Ringer's 10 ml/kg and a phenylephrine infusion titrated t
d pressure were initiated with intrathecal injection. The primary outcome was umbilical artery b
re were no differences in umbilical artery base excess or pH between groups. The mean umbilical a
-0.5 mM (± 1.6) in the supine group (n = 50) *versus* –0.6 mM (± 1.5) in the tilt group (n = 47) (*P*
spinal anesthesia, mean phenylephrine requirement was greater (*P* = 0.002), and mean cardiac c
in the supine group.

s: Maternal supine position during elective cesarean delivery with spinal anesthesia in healthy term women does
eonatal acid–base status compared to 15° left tilt, when maternal systolic blood pressure is maintained with a coload and phenylephrine infusion. These findings may not be generalized to emergency situations or nonreassuring fetal status. (ANESTHESIOLOGY 2017; 127:241-9)

Table 2. Neonatal Acid–Base Status according to Maternal Position

	Supine Group	Tilt Group	*P* Value
UA blood gases	(n = 50)	(n = 47)	
pH	7.28 ± 0.05	7.28 ± 0.04	0.39
P_{CO_2} (mmHg)	55 ± 7	55 ± 11	0.69
P_{O_2} (mmHg)*	19 ± 3	19 ± 5	0.57
HCO_3 (mmol/l)	25 ± 1	25 ± 1	0.88
Base excess (mmol/l)	–0.5 ± 1.6	–0.6 ± 1.5	0.64
UV blood gases	(n = 49)	(n = 47)	
pH	7.33 ± 0.05	7.33 ± 0.04	0.49
P_{CO_2} (mmHg)	46 ± 6	46 ± 5	0.68
P_{O_2} (mmHg)	26 ± 5	26 ± 5	0.95
HCO_3 (mmol/l)	23 ± 1	24 ± 1	0.54
Base excess (mmol/l)	–1.7 ± 1.3	–1.6 ± 1.5	0.91

- Randomiserad studie
- Rygg / 15 graders vä
- Resultat
  - Neonatal blodgas →
  - Fenylefrin infusion ↑
  - CO ↓

Vid vilken nivå skulle du lägga spinal hos patient med svår preeklampsi?

Trombocyttal

1. 0 – 45
2. 46 – 49
3. 50 – 74
4. 75 – 99
5. 100 och över

Risk of Epidural Hematoma after Neuraxial Techniques in Thrombocytopenic Parturients

A Report from the Multicenter Perioperative Outcomes Group

Linden O. Lee, M.
Thomas T. Klumpr
Mark MacEachern
Melissa E. Bauer,

		Anesthetic Technique			Etiology of Thrombocytopenia				
Platelet Count, mm^{-3}	n	Epidural	Spinal	Combined Spinal–Epidural	HELLP Syndrome	Preeclampsia	ITP	Gestational Thrombocytopenia	Unspecified
0–49,000	15	10	5	0	5	2	1	0	7
50,000–69,000	36	19	15	2	5	7	1	1	22
70,000–100,000	522	298	180	44	21	58	23	33	387
Total	573	327	200	46	31	67	25	34	416

ABSTRACT

Platelet range, mm^{-3}	n (%)	Frequency of Epidural Hematoma Requiring Surgical Decompression	95% CI For Risk of Epidural Hematoma, %
0–49,000	15 (3)	0	0–20
50,000–69,000	36 (6)	0	0–8
70,000–99,000	522 (91)	0	0–0.6
Total	573 (100)	0	

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Group database
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Results: A total of 573 parturients with a platelet count less than 100,000 mm^{-3} who received a neu
14 institutions were identified in the Multicenter Perioperative Outcomes Group database, and a
ents were identified after combining the data from the systematic review. No cases of epidural hemat
decompression were observed. The upper bound of the 95% CI for the risk of epidural hematoma for
49,000 mm^{-3} is 11%, for 50,000 to 69,000 mm^{-3} is 3%, and for 70,000 to 100,000 mm^{-3} is 0.2%.
Conclusions: The number of thrombocytopenic parturients in the literature who received neuraxi
complication has been significantly increased. The risk of epidural hematoma associated with neura
turients at a platelet count less than 70,000 mm^{-3} remains poorly defined due to limited observatio
2017; 126:1053-64)

- Retrospektiv studie
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- Resultat
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SPECIAL ARTICLE

What Is New in Obstetric Anesthesia: The 2017 Gerard W. Ostheimer Lecture

Brian T. Bateman, MD, M

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What's New in Obstetric Anesthesia: a focus on maternal morbidity a

What's New in Obstetric Anesthesia? The 2017 W. Ostheimer Lecture

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REVIEW ARTICLE

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What's new in obstetric anesthesia in 2017?

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ABSTRACT
The Gerard W. Ostheimer lecture is delivered every year at the annual meeting of the Society for Obstetric Anesthesia and Perinatology. The lecture aims to provide the anesthesiologist who provides obstetric anesthesia care with a review of the most relevant articles that were published in the preceding calendar year. This article highlights the literature published in 2017 related to maternal mortality, maternal cardiac arrest, cesarean delivery and labor analgesia.