GENERAL ANESTHESIA FOR CESAREAN SECTION

Thierry Girard

Joy L. Hawkins, MD, Jeani Chang, MPH, Susan K. Palmer, MD, Charles P. Gibbs, MD, and William M. Callaghan, MD

Table 3. Case Fatality Rates and Rate Ratios of Anesthesia-Related Deaths During Cesarean Delivery by Type of Anesthesia, United States, 1979–2002

<table>
<thead>
<tr>
<th>Year of Death</th>
<th>General Anesthetic</th>
<th>Regional Anesthetic</th>
<th>Rate Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979–1984</td>
<td>20.0</td>
<td>8.6</td>
<td>2.3 (95% CI 1.9–2.9)</td>
</tr>
<tr>
<td>1985–1990</td>
<td>32.3</td>
<td>1.9</td>
<td><strong>16.7 (95% CI 12.9–21.8)</strong></td>
</tr>
<tr>
<td>1991–1996</td>
<td>16.8</td>
<td>2.5</td>
<td>6.7 (95% CI 3.0–14.9)</td>
</tr>
<tr>
<td>1997–2002</td>
<td>6.5</td>
<td>3.8</td>
<td>1.7 (95% CI 0.6–4.6)</td>
</tr>
</tbody>
</table>

CI, confidence interval.
* Deaths per million general or regional anesthetics.
CONTROVERSIES cont.


General anesthesia is unacceptable for elective cesarean section

Proposer: C.A. Wong
Department of Anesthesiology, Northwestern University Feinberg School of Medicine, Chicago, Illinois, USA

Opposer: Felicity Reynolds
St Thomas’ Hospital, London, UK
I would not for one moment deny that regional anesthesia is superior to general anesthesia for elective cesarean section. It is not only preferable as an experience for the mother who wishes to witness the birth of her baby and to share the experience with her partner, it is also safer in many respects. But this does not imply that general anesthesia is unacceptable. Such an idea must be a hangover from times when techniques were used that would, today, certainly be regarded as unacceptable. They were,
General anesthesia for cesarean delivery at a tertiary care hospital from 2000 to 2005: a retrospective analysis and 10-year update

A. Palanisamy, A.A. Mitani, L.C. Tsen

Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA
of this analysis from the same institution for the period 2000 to 2005, exactly one decade later, was to examine the elements responsible for the administration of GA in cesarean delivery patients, investigate potential trends during the study period, and analyze changes in practice between the two time epochs where data were available.

Methods

After Hospital Research Office/Institutional Review Board approval, the obstetric database at our institution was examined to determine the number of cesarean deliveries, both elective and emergent, and the type of anesthesia provided during six calendar years (January 1, 2000 through December 31, 2005). The medical records of all parturients who received general anesthesia were subsequently examined to collect personal details and data pertinent to the indications for cesarean delivery, indications for GA, mode of airway management and associated anesthetic complications. The time of administration of GA was recorded and subsequently allocated into one of two time shifts: 7:00 am to 3:00 pm and 3:00 pm to 7:00 am in accordance with prevailing work-shift designations and resource availability. The results were compared to similar data collected during six earlier calendar years (January 1, 1990 through December 31, 1995), which were reported previously.

Data were analyzed using Chi-square or Fisher’s exact test as appropriate with $P < 0.05$ accorded statistical significance.

Results

In the study years 2000 to 2005, the annual number of deliveries ranged from 8543 to 10091 (Table 1). The percentage of cesarean deliveries varied from 23.7% to 31.5%, with a progressive increase occurring in each subsequent year. Although the total number of deliveries remained relatively stable, the range of cesarean delivery rates was higher in the current, versus previous, study (23.7–31.5% vs. 21.2–23.7%; $P < 0.001$). Despite the increased number of cesarean deliveries, the average rate of administration of GA declined dramatically to a low of 0.6% from 4.5% (previous study; $P < 0.001$) with the majority being associated with emergency cesarean delivery (85.7%; Table 2).

The main indication for GA in all years was a perceived lack of time for neuraxial anesthesia, accounting for at least 50% of the cases each year (Table 3). Maternal contraindications to neuraxial anesthesia were the next major factor, comprising 28.6% of all cases. Failures of neuraxial techniques necessitating GA were few, consistently representing a range of 0–4% of cases. Among neuraxial techniques, there was only a single CSE failure that required GA during the entire study period. No specific trends could be discerned when neuraxial anesthesia failures were individually analyzed.

Analysis of indications for cesarean deliveries requiring GA demonstrated that true emergencies (non-reassuring fetal heart rate/bradycardia, placental abruption/previa and cord prolapse) were associated with 40% to 68.4% of all cases (Table 4). Maternal factors (preeclampsia, co-existing disease, failure to progress, previous cesarean delivery etc) were responsible for GA at rates ranging from 11.1% to 42.9%. Among maternal diseases, the continuum of severe preeclampsia, HELLP (hemolysis, elevated liver enzymes, and low platelets) syndrome and eclampsia was responsible for the majority of GA administered (Table 5). Isolated hematological, neurological and cardiac diseases were

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Table 1  Total number of all deliveries, cesarean deliveries (%), those cesarean deliveries that required general anesthesia (GA) and GA a percentage of the total number of cesarean deliveries

<table>
<thead>
<tr>
<th>Year</th>
<th>Total deliveries</th>
<th>Cesarean deliveries</th>
<th>Cesarean delivery rate (%)</th>
<th>Cesarean deliveries requiring GA</th>
<th>GA rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>9890</td>
<td>2339</td>
<td>23.7</td>
<td>24</td>
<td>1.0</td>
</tr>
<tr>
<td>2001</td>
<td>10091</td>
<td>2507</td>
<td>24.8</td>
<td>10</td>
<td>0.4</td>
</tr>
<tr>
<td>2002</td>
<td>10065</td>
<td>2579</td>
<td>25.6</td>
<td>9</td>
<td>0.4</td>
</tr>
<tr>
<td>2003</td>
<td>9444</td>
<td>2695</td>
<td>28.5</td>
<td>14</td>
<td>0.5</td>
</tr>
<tr>
<td>2004</td>
<td>8904</td>
<td>2656</td>
<td>29.8</td>
<td>19</td>
<td>0.7</td>
</tr>
<tr>
<td>2005</td>
<td>8543</td>
<td>2692</td>
<td>31.5</td>
<td>22</td>
<td>0.8</td>
</tr>
</tbody>
</table>
The obstetric airway: things are seldom as they seem

M. Joanne Douglas, MD · Roanne L. Preston, MD

in a high-risk patient. It is our view that the situational arena is probably the greatest key to our success or failure in managing the airway.

used in the general operating room. If ever there were a place for crisis resource management or use of simulation, it is in the setting of GA for the obstetric emergency.
Zusammenfassung Sectio
Medikamente

Pabal (Carbetocin): Amp 1 ml à 100 µg
- Dosis: 100 µg als einmaliger Bolus über ca. 15 Sek. i.v. bei Sectio (anzuschliessend kein routinemässiges Synto ad inf.)
- Standort: Kühlschrank Vorbereitung W8

Syntocinon (Oxytocin) Amp 1 ml à 5 IE
- Ind: Uterusatonie (Sectio), zervikales Priming
- Dos: 5 IE in 100 ml NaCl 0.9% als Kurzinfusion (100ml) i.v. und 10-20 IE ad 1000 ml RL über 4-6 Std.
- Standort: Kühlschrank Vorbereitung W8

Nitroglycerin
- 100 – 200 µg (bis 500 µg fraktioniert) i.v. bei Sectio zur Uterusrelaxation bei schwieriger (> 45 sek.) Kindsentwicklung

Phenylephrin
- 50-100 µg -weise i.v.
- first-line Medikament bei Hypotonie während Sectio, evtl. zusätzlich Ephedrin: 2.5-5 mg weise i.v. (Puls < 45)

MgSO4
- Aufsättigung: 4 g in 100 ml NaCl 0,9% über 15-20 min., dann Spiegelkontrolle
- Erhaltungsdosis: 1-2 g/h (= 12.5-25 ml/h bzw. 4-8 Trpfl./min)

Trandate
- 10-20 mg-weise i.v., max. 300 mg i.v.
- 400 mg 6 stdl. p.o., max. 2400 mg.
- Standort: blauer Mediwagen Vorbereitung W8

Nepresol
- 5 mg-weise i.v., max. 25 mg i.v.
- Standort: blauer Mediwagen Vorbereitung W8

Remifentanil (Ultiva®) bei Sectio
- 1 µg/kg als langsamer Bolus über 30s, dann 0.05 - 0.15 µg/kg/min (bei 20 µg/ml => 10 - 16 ml/h)

Tranexamsäure (Cyclocapron®)
- 1-2 g i.v. bei postpartaler Blutung
- Standort: blauer Mediwagen Vorbereitung W8

Lido 2% -CO2 mit Adrenalin 1:200'000
- Mischung 1:200'000 = 1ml (=0.1mg) Adrenalin in 20 ml Lido 2% -CO2

Morphin 0.2 mg/ml i 10ml Ampullen
- 0.5 ml = 100 µg spinal.
- 10 ml = 2mg epidural

Aspirationsprophylaxe

1. 30 ml Natrium-Citrat per os
2. 50 mg Zanic i.v.
3. 10 mg Papaverin i.v.

Anästhesieverfahren zur Sectio

Regional-Niveau: immer mind. T4 für Sectio

Stufe I:
elektiv
Stufe II:
< 30 min.
Stufe III: < 10min
"roter Knopf"

Regionalanästhesie
- 8-12.5 mg Bupivacain 0.5% (gute Analgesie bis 24h postop)
- Epiduralanästhesie: Morphin 2mg epidural (gute Analgesie bis 24h postop)
- Epiduralkatheter nach Sectio entfernen ! (Ausnahme Gerinnungsstörung, z.B. Tc-Penie bei HELLP oder bei medianer Laparotomie)

Postoperative Analgesie

Morphin Tropfen und Brufen per os gemäss Standardverordnungen
KEIN Novalgin
AWR: Morphin 2mg weise i.v.

Spinalanästhesie
Morphin 100 - 200 µg (gute Analgesie bis 24h postop)

Epiduralanästhesie:
Morphin 2mg epidural (gute Analgesie bis 24h postop)
Epiduralkatheter nach Sectio entfernen ! (Ausnahme Gerinnungsstörung, z.B. Tc-Penie bei HELLP oder bei medianer Laparotomie)

Stufe III in Allgemeinanästhesie
bei z.B persistierender kindlicher Bradykardie < 60, Uterusruptur, massiver Hypovolämie. RSI/ITN im Sectiosaal W8:

- Präoxygениerung
- Thiopental 4-7 mg/kg Succinylcholin ca. 0.7 mg/kg
- intubation
- Fentanyl 2-3 µg/kg
- Midazolam 0.5 mg
- esmeron 0.1 mg/kg
- Extubation
- Wach, Schutzreflexe
- keine Restrelaxation

Stufe III in Allgemeinanästhesie
bei z.B persistierender kindlicher Bradykardie < 60, Uterusruptur, massiver Hypovolämie. RSI/ITN im Sectiosaal W8:

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- Extubation
- Wach, Schutzreflexe
- keine Restrelaxation

Telefonnummern

Ana-AA 86600 OA Ana Gebs 181-9011
Ana-PI (Sectio) 86450 GIT 86460
Ana-OA West 86546 Geb 59049/50
Ana-OA Ost 86300 AA-Gebs 87600
OIB 87300/87200 AA-Gyn 87200
Wochenbett 59093/86450 AA-Gyn 87200
Gyn 4 OG 59231 Labor Hämat. 54260
Rohrpost Gebs 2540 Blut bestellen 52091

Th. Girard, Oktober 2011

Dienstag, 27. März 2012
Preoxygenation

- Thiopental 4-7 mg/kg
- Succinylcholine ca. 0.7 mg/kg
- Cricoid pressure, Apnea

Intubation

- check position (CO2 !)

Incision

- Sevo or. Isofl. max 1 MAC (N2O 60%)

- cord clamping

- Fentanyl 2-3 µg/kg
- Midazolam 3-5 mg
evtl. Esmerone 0.3mg/kg

Extubation

- awake, reflexes !
- no curarisation!

Preeclampsia, cardiovasc disease:
Remifentanil 1 µg./kg slow bolus, then 10-36 ml/h

Dienstag, 27. März 2012
Preoxygenation

Thiopental 4-7 mg/kg
Succinylcholine ca. 0.7 mg/kg
Cricoid pressure, Apnea
Intubation
check position (CO2 !)
Incision
Sevo or. Isofl. max 1 MAC (N2O 60%)
cord
clamping
Fentanyl 2-3 µg/kg
Midazolam 3-5 mg
evtl. Esmerone 0.3mg/kg
Extubation
awake, reflexes !
no curarisation !

Preoxygenation

allergy ?
prev. anesthesia ?
weight ?

Dienstag, 27. März 2012
Pre-oxygenation in the obese patient: effects of position on tolerance to apnoea


SaO₂ 90% 214 vs. 162 s
Preoxygenation

- Thiopental 4-7 mg/kg
- Succinylcholine ca. 0.7 mg/kg
- Cricoid pressure, Apnea

Intubation

Incision

Sevo or Isofl. max 1 MAC (N2O 60%)

cord clamping

Fentanyl 2-3 µg/kg

Midazolam 3-5 mg
evtl. Esmerone 0.3mg/kg

Extubation

awake, reflexes!

no curarisation!

Dienstag, 27. März 2012

Preeclampsia, cardiovasc
disease:

Remifentanil 1 \( \mu \)g./kg slow bolus, then 10-36 ml/h
Difficult and failed intubation in obstetric anaesthesia: an observational study of airway management and complications associated with general anaesthesia for caesarean section

N. J. McDonnell, M. J. Paech, O. M. Clavisi, K. L. Scott, the ANZCA Trials Group

The School of Medicine and Pharmacology, The University of Western Australia and the Department of Anaesthesia and Pain Medicine, King Edward Memorial Hospital for Women, Perth, Western Australia, Australia
Tracheal intubation was the planned airway management method for all patients. A rapid-sequence induction using cricoid pressure and suxamethonium was used in 97% of cases, with 22 of 1092 (2%) having a modified rapid-sequence induction using rocuronium, 2 (0.2%) a gaseous induction and 1 (0.1%) an elective awake fibreoptic intubation. Laryngoscopic views are
Correspondence

European Journal of Anaesthesiology 2011, 28:000–000

General anaesthesia for caesarean sections: are anaesthetists dealing with exaggerated fear?
Muhammad Ajmal

From the Department of Anaesthesia, Letterkenny General Hospital, Letterkenny, Ireland
The patient’s head was stabilised on a sand bag in sniffing position and the body was placed in a slight reverse-Trendelenburg position. Each patient was given metclopramide 10 mg intravenously followed by preoxygenation for 3 min, a sleeping dose of thiopentone (4–6 mg kg\(^{-1}\) body weight) and suxamethonium (1.5 mg kg\(^{-1}\) body weight) to intubate the trachea. No cricoid pressure was applied and lungs were gently mask ventilated until full relaxation was achieved. No other device except a laryngoscope and a gum-elastic stylet was available for airway management. Occurrence of clinical and sub-
Preoxygenation

Thiopental 4-7 mg/kg
Succinylcholine ca. 0.7 mg/kg
Cricoid pressure, Apnea

Intubation
check position (CO2 !)

Incision
Sevo or. Isofl. max 1 MAC
(N2O 60%)
cord
clamp

Fentanyl 2-3 µg/kg
Midazolam 3-5 mg
evtl. Esmerone 0.3mg/kg

Extubation
awake, reflexes !
no curarisation !

Dienstag, 27. März 2012
Which Induction Drug for Cesarean Section? A Comparison of Thiopental Sodium, Propofol, and Midazolam

Danilo Celleno, MD,* Giorgio Capogna, MD,* Marco Emanuelli, MD,* Giustino Varrassi, MD,† Fabio Muratori, MD,‡ Paolo Costantino, MD,‡ Massimo Sebastiani, MD†

....may risk awareness and potential neonatal depression....
Placental transfer and neonatal effects of propofol in caesarean section

A. Sánchez-Alcaraz, M. B. Quintana and M. Laguarda*

Department of Pharmacy, Arnau de Vilanova Hospital, Valencia and *Department of Anaesthesiology, Maternal La Fe Hospital, Valencia, Spain

Figure 1. Relationship between propofol plasma levels in maternal and umbilical cord blood at the time of delivery.

Apgar scores were higher with shorter incision to delivery times.

UV/MV ratio: 0.65 (0.56-0.74)
Drug shortage delays US executions

14:39 25 January 2011 by Ferris Jabr

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Sodium thiopental – an anaesthetic used in US executions – is no longer to be made in the country. Last week, Hospira, the sole US manufacturer of the drug, announced that it will stop production. New Scientist looks at the implications for the death penalty and the research surrounding lethal injection.

Why has Hospira stopped producing sodium thiopental?

Hospira stopped making the drug in North Carolina late last year because of difficulties obtaining raw materials. The firm intended to resume production in Italy, but ultimately capitulated to Italian authorities, who do not want a drug exported from their country to be used in capital punishment. The company said it would not take the risk that it would be held liable by the Italian authorities if its product became a tool for execution. Hospira claims it has never condoned the use of sodium thiopental in lethal injection – although it refuses to guarantee the drug will not be used for this purpose. No other US manufacturer produces it.
Preoxygenation

Thiopental 4-7 mg/kg
Succinylcholine ca. 0.7 mg/kg
Cricoid pressure, Apnea

Intubation
check position (CO2 !)

Incision
Sevo or. Isofl. max 1 MAC
(N2O 60%)
cord
clamping

Fentanyl 2-3 µg/kg
Midazolam 3-5 mg
evtl. Esmerone 0.3 mg/kg

Extubation
awake, reflexes !
no curarisation !
The “Intubating Dose” of Succinylcholine

The Effect of Decreasing Doses on Recovery Time

Aaron F. Kopman, M.D.,* Bledi Zhaku, B.A.,† Kane S. Lai, M.D.‡

Background: The usually cited “intubation dose” of succinylcholine is 1.0 mg/kg. In the majority of patients, this dose will produce apnoea of sufficient duration that significant hemoglobin desaturation may occur before neuromuscular recovery takes place in those whose ventilation is not assisted. This study was undertaken to examine the extent to which reducing this

Recently, second thoughts have been expressed regarding the use of succine

Anesthesiology 2003;99:1050-4
The duration of action (at the adductor pollicis) of succinylcholine-induced block that we report is virtually identical to the observations of Viby-Mogensen and is quite similar to the observations of other investigators (Table 3).

In a recent letter in the Journal, we suggested that the usually cited 1.0-mg/kg "intubation dose" of succinylcholine was unnecessarily large. It was hypothesized that a smaller dose (0.50 – 0.60 mg/kg) might enhance overall patient safety if this reduced dose resulted in a significant reduction in the duration of succinylcholine-induced apnea. Previously published data (Table 3) suggested that reducing the dose of succinylcholine from 1.0 to 0.5 mg/kg should decrease the duration of neuromuscular block by more than 4 min.

Although all recovery intervals (T<sub>10</sub> through T<sub>90</sub>) that we measured were shorter after 0.60 mg/kg succinylcholine compared to the 1.0 mg/kg dose, the magnitude of these differences was less than we anticipated. A 40% decrease in dose does not result in a comparable reduction in the drug's duration of effect.

![Graph](image)

**Fig. 1.** Twitch height (TI) as a percent of control at the adductor pollicis versus time from initial drug bolus for three different doses of succinylcholine.
Anästhesiologisches Management der Sectio caesarea

Deutschlandweite Umfrage

Preoxygenation

Thiopental 4-7 mg/kg
Succinylcholine ca. 0.7 mg/kg
Cricoid pressure, Apnea

Intubation
check position (CO₂ !)

Incision
Sevo or. Isofl. max 1 MAC
(N₂O 60%)
cord
clamping

Fentanyl 2-3 µg/kg
Midazolam 3-5 mg
evtl. Esmerone 0.3mg/kg

Extubation
awake, reflexes !
no curarisation !

Downward pressure is applied to the cricoid which is transferred to the oesophagus

Oesophagus is closed off
Reversal of Profound Neuromuscular Block by Sugammadex Administered Three Minutes after Rocuronium

A Comparison with Spontaneous Recovery from Succinylcholine

Chingmuh Lee, M.D.,* Jonathan S. Jahr, M.D.,† Keith A. Candiotti, M.D.,‡ Brian Warriner, M.D.,§ Mark H. Zornow, M.D.,|| Mohamed Naguib, M.D.#
neuromuscular recovery

Dienstag, 27. März 2012
Rocuronium and sugammadex for rapid sequence induction of obstetric general anaesthesia

R. M. WILLIAMSON, S. MALLIAH and P. BARCLAY
Liverpool Women’s Hospital, Liverpool, UK
onset time
Rocuronium and sugammadex for rapid sequence induction of obstetric general anaesthesia

decreasing the quality of the intubating conditions or necessitating a second dose of suxamethonium with the attendant risk of bradycardia. With rocuronium, multiple intubation attempts can occur without any deterioration of the intubating conditions. It has also been demonstrated that rocuronium 1.2 mg/kg can be immediately reversed with sugammadex if required, albeit at a higher dose of 16 mg/kg. This results in a return of neuromuscular function in 2.9 min from the administration of sugammadex, faster than the spontaneous offset of suxamethonium (10.9 min).20
Rapid sequence induction and intubation with rocuronium–sugammadex compared with succinylcholine: a randomized trial

M. K. Sørensen¹*, C. Bretlau², M. R. Gätke², A. M. Sørensen¹ and L. S. Rasmussen¹

* Corresponding author. E-mail: martin@kryspin.dk

1 Department of Anaesthesiology, Copenhagen University Hospital, Herlev Hospital, Herlev Ringvej 75, 2730 Herlev, Denmark

2 Department of Anaesthesia, Centre of Head and Orthopaedics, Copenhagen University Hospital, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen, Denmark

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INTUBATION CONDITIONS

- Succinylcholin
- Rocuronium

Dienstag, 27. März 2012
Rapid sequence induction in obstetrics revisited
Lisa M. Sharp\textsuperscript{a} and David M. Levy\textsuperscript{b}

Curr Opin Anaesthesiol 22:357–361

It might be expected that the mass of rocuronium transferred across the placenta will be broadly proportional to the maternal dose; it is uncertain whether the fraction of 1.2 mg/kg transferred in the event of protracted surgical delivery is innocuous.
Preoxygenation

Thiopental 4-7 mg/kg
Succinylcholine ca. 0.7 mg/kg
Cricoid pressure, Apnea

Preeclampsia, cardiovasc
disease:
Remifentanil 1 μg./kg slow
bolus, then 10-36 ml/h

Dienstag, 27. März 2012
Recent findings advocate treatment of systolic blood pressures above 160 mmHg or at induction of general anaesthesia. If general anaesthesia cannot be avoided due to clotting disorders, haemodynamic changes in early-onset preeclampsia may be the method of choice in preeclampsia due to the significant increases in maternal blood pressure. Although this is well tolerated by healthy parturients, it may be detrimental in preeclampsia or cardiovascular disease. In the most recent Enquiries into Maternal Death the future.

Cerebral haemorrhage is the major cause of maternal mortality in preeclampsia and any significant increases in maternal blood pressure. Although this is well tolerated by healthy parturients, it may be detrimental in preeclampsia or cardiovascular disease. In the most recent Enquiries into Maternal Death at least two cases of intracerebral haemorrhage in preeclampsia were attributed to intubation [7**]. One of the key learning points was that the anaesthesiologist should be given enough time to prevent pressure responses of intubation independent of reasons for imminent foetal delivery. Several drugs have been successfully applied. A
Dose-related attenuation of cardiovascular responses to tracheal intubation by intravenous remifentanil bolus in severe pre-eclamptic patients undergoing Caesarean delivery

B. Y. Park¹, C. W. Jeong¹, E. A. Jang¹, S. J. Kim¹, S. T. Jeong¹, M. H. Shin², J. Lee³ and K. Y. Yoo¹*

¹ Department of Anaesthesiology and Pain Medicine, ² Department of Preventive Medicine, and ³ Department of Physiology, Chonnam National University Medical School, 8 Hak-dong, Gwangju 501-190, Republic of Korea
Results

Among 55 subjects initially enrolled in the study, seven were excluded: four due to patient refusal, one due to maternal heart disease, and two due to a failure of establishment of an arterial line. The resultant 48 subjects were randomized in equal numbers to the two groups and completed the study without protocol violations (Fig. 1). There were no differences between the groups with respect to maternal age, weight, height, gestational age, amount of blood loss, surgical characteristics, or incidence of MgSO$_4$ and hydralazine therapy (Table 1). Ephedrine was administered to three subjects (12.5%) in the R1.0 group and none in the R0.5 group for the treatment of hypotension (SAP, 90 mm Hg).

Baseline SAP and HR did not significantly differ between the groups. SAP decreased significantly after induction of anaesthesia and increased after intubation ($P$, 0.05 compared with pre-intubation). The magnitude of increases was greater in the R0.5 group [28 (24) mm Hg] than in the R1.0 group [15 (20) mm Hg] ($P$, 0.032); however, SAP did not exceed baseline values in either group (Fig. 2).

Maternal plasma concentrations of catecholamines are shown in Table 2. Baseline norepinephrine and epinephrine concentrations did not differ between the groups. Norepinephrine concentrations remained unchanged by intubation.
Consent of subjects for general anaesthetic in Caesarean section

Editor—We read with interest the paper by Park and colleagues on neura- 
sarean delivery. Moreover, we feel that the incidence of aspiration pneumonia during general anaesthesia for Caesarean delivery is lower compared with Western countries. In fact, neuraxial anaesthesia is not considered safer than general anaesthesia for elective Caesarean delivery in our country.
Preoxygenation

- Thiopental 4-7 mg/kg
- Succinylcholine ca. 0.7 mg/kg
- Cricoid pressure, Apnea

Preeclampsia, cardiovasc disease:
- Remifentanil 1 µg./kg slow bolus, then 10-36 ml/h

Intubation
- check position (CO2 !)

Evacuation

Dienstag, 27. März 2012
A single death is a tragedy; a million deaths is a statistic (Kurt Tucholsky: Französischer Witz, 1932).

The individual stories of maternal death, documented in Confidential Enquiries into Maternal Deaths, are tragic and compelling, and have informed many recommendations in the past half-century that have improved maternal and neonatal outcomes in the UK and probably, around the world. The individual stories continue with the recent publication of the Eighth Report of the Confidential Enquiries into Maternal Deaths in the UK, ‘Saving Mothers’ Lives: Reviewing Maternal Deaths to Make Motherhood Safer—2006–08’ (hereafter referred to as the Report).

In this month’s issue of the British Journal of Anaesthesia, Drs McClure, Cooper, and Clutton-Brock, on behalf of the Centre for Maternal and Child Enquiries, have summarized the findings of the Eighth Report.

Between 2006 and 2008, 261 maternal deaths were reported; 331 existing children and 147 live-born newborns lost their mothers. The good news is that the overall maternal risk ratio (MMR) decreased compared with the 2003–5 report. Since 1985, there is a significant downward trend in the MMR due to direct causes (deaths resulting from obstetric complications). The decrease from the previous triennium is primarily due to a decrease in deaths from pulmonary embolus, and to a lesser extent, obstetric haemorrhage. In all likelihood, this decrease is attributable to the development of protocols to prevent embolism and treat haemorrhage that were developed and implemented after previous reports.

A worrying change is the increase in deaths from genital tract infection.

According to the latest World Health Organization (WHO) data, the MMR has decreased worldwide by 34% since 1990. Still, an estimated 358 000 women died of pregnancy-related disease in 2008. This rate equates to more than 1000 deaths per day or 42 deaths per hour. The vast majority of these deaths occur in developing countries. The WHO 2000 Millennium Development Goal Five (MDG5) is to reduce MMR by 75% between 1990 and 2015. Unfortunately, at the current rate of decline (2.5% per year), we are making insufficient progress towards this goal. In fact, the MMR is increasing in some countries, including the USA.

Better data collection may explain some, but not all of this increase.

Despite the improved MMR observed in the UK, there is no room for complacency. The MMR trend for indirect deaths (deaths resulting from pre-existing disease, or disease that developed during or was aggravated by pregnancy) is increasing. Of equal concern is the number of cases in which substandard care was judged to be present. For direct deaths, the proportion has hovered between 60% and 70% for the past decade. For the first time, the proportion of indirect deaths in which care was substandard was 50%.

The UK is not alone in this regard. The French National Expert Committee on Maternal Mortality (CNEMM) recently published a report summarizing maternal mortality in France from 2001 to 2006, using techniques similar to the Confidential Enquiries. Almost half (46%) of deaths were judged avoidable. In the Netherlands between 1993
Patients do not die from a ‘failure to intubate’. They die either from failure to stop trying to intubate or from undiagnosed oesophageal intubation.

Bruce Scott 1986²
Preoxygenation
Thiopental 4-7 mg/kg
Succinylcholine ca. 0.7 mg/kg
Cricoid pressure, Apnea

Intubation
check position (CO2 !)

Incision

Sevo or. Isofl. max 1 MAC
(N2O 60%)
cord clamping

Fentanyl 2-3 µg/kg
Midazolam 3-5 mg
evtl. Esmerone 0.3mg/kg

Extubation
awake, reflexes !
no curarisation !

Preeclampsia, cardiovasc
disease:
Remifentanil 1 µg./kg slow bolus, then 10-36 ml/h

Dienstag, 27. März 2012