

Anaesthesia outcome of non-elective caesarean section

”...or how to meet the golden standard”

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Conflicts of interest: NONE

About our hospital

- * Women's hospital/University of Helsinki Central Hospital
- * Tertiary referral centre and teaching hospital
- * 5609 deliveries during IX/2011-VIII/2012
- * 1366 (24.4 %) caesarean deliveries
 - * 842 were emergency deliveries
- * 87.4 % of parturients had either epidural or combined spinal epidural (CSE) analgesia for intended vaginal delivery

In this presentation...

- * The current recommendations of "institutional best practise" for caesarean section anaesthesia
- * Background data on anaesthesia outcome of emergency caesarean sections
- * Some data gathered from audit of all emergency caesareans during 12 months in our institution
- * Discussion on the feasibility of recommendations

Spinal/epidural anaesthesia is the anaesthesia of choice for caesarean delivery

- * Safer
 - * Upto 17 times lower risk for life-threatening complications
 - * Less airway problems
- * Less postoperative pain
- * Shorter hospital stay
- * Higher patient satisfaction rate
- * Preferred by patients

Fassoulaki et al J Ob Gynaecol 30:818-821; 2010

Saving Mothers' Lives; BJOG 118, 2011

Royal college of anaesthetists (RCA) ”standards for best practise”

- * Urgency classification for caesarean delivery
 - * Cat 1 Maternal or fetal compromise; immediate threat to life of woman or fetus
 - * Cat 2 Maternal or fetal compromise, no immediate threat to life of woman or fetus
 - * Cat 3 No maternal or fetal compromise, requires early delivery
 - * Cat 4 Elective section

Royal college of anaesthetists (RCA) ”standards for best practise”

* Urgency classification for caesarean delivery

| | | | |
|-----------|-------|---|--|
| Immediate | Cat 1 | Maternal or fetal compromise; -20 min | immediate threat to life of woman or fetus |
| 30 min | Cat 2 | Maternal or fetal compromise, no 60+ min | immediate threat to life of woman or fetus |
| 60+ min | Cat 3 | No maternal or fetal compromise, requires early delivery | |
| Elective | Cat 4 | Elective section | |

Royal college of anaesthetists (RCA) "standards for best practise"

HUCH/Women's hospital

vs St Michael's, Brighton, UK

| | | | | |
|-----------|-------|-----|---------|-----|
| Immediate | 8min | 7% | } Cat 1 | 8% |
| -20 min | 26min | 8% | | |
| 30 min | 42min | 23% | Cat 2 | 25% |
| 60+ min | | 23% | Cat 3 | 28% |
| Elective | | 38% | Cat 4 | 39% |

Modern requirements for anaesthetic management of CS are tough!

Royal college of anaesthetists (RCA) "standards for best practise":

| | Cat. 4 | Cat. 1-3 | Cat. 1 |
|-------------------------|--------|----------|--------|
| CS carried out using RA | > 95% | > 85% | > 50 % |
| Pain during CS | < 5 % | < 15 % | < 20 % |
| RA to GA conversion | < 1 % | < 5 % | < 15 % |

Purva M, Russell IF, Kinsella M. Caesarean section anaesthesia: technique and failure rate. In: Raising the standard. A compendium of audit recipes, 3rd edn. London: Royal College of Anaesthetists, 2012: 36-7.

Modern requirements for anaesthetic management of CS are tough!

Royal college of anaesthetists (RCA)
”standards for best practise”:

ANY NEEDLE INSERTION INTO PARTURIENT’S BACK
WITH THE INTENT OF PLACING EPIDURAL OR SPINAL
ANALGESIA OR ANAESTHESIA FOR LABOUR IS
CONSIDERED A REGIONAL ANAESTHESIA ATTEMPT

Potential problems with spinal/epidural (neuraxial) anaesthesia

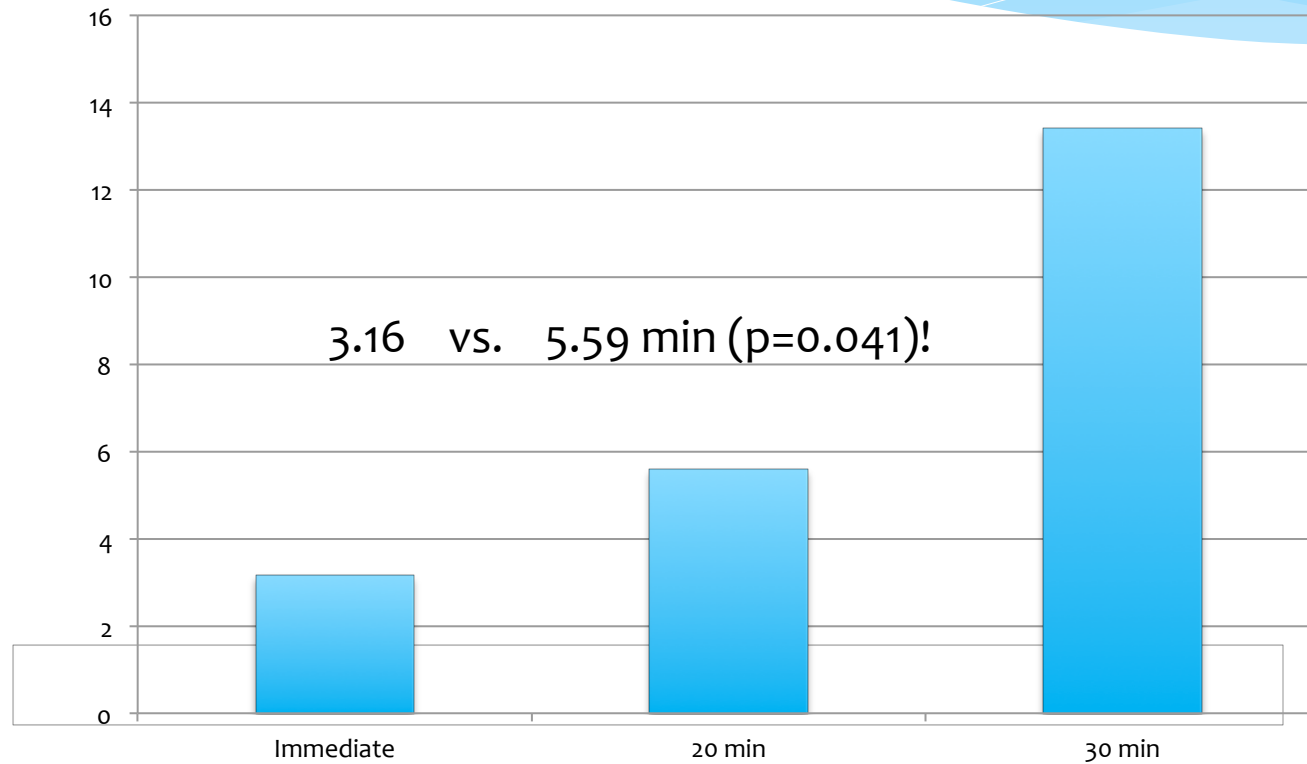
- * Urgency to deliver the fetus
- * Failure of neuraxial anaesthesia
- * Perioperative pain
- * Maternal contraindications for neuraxial anaesthesia
- * Institutional protocols and practices
- * Insufficient maternal information
- * Surgical difficulties, prolonged operation time

Time

- * General anaesthesia can be considered the golden standard timewise
- * Decision to delivery times (DDI) vary greatly between studies; particularly when epidural top-up is used
 - * "Depth" of epidural analgesia for labour
 - * Drugs used for top-up
 - * Lidocaine+NaBic+Epinephrine vs bupivacaine
 - * Time and place for initiation of epidural top-up
 - * Monitoring during transport to operating room?!?
- * Staffing, resources, logistics, communication, staff experience etc...

Time

Transfer time from labour room to operating theatre after C-section decision.



Time

Decision to delivery times min (range)

HUCH/Women's hospital

"Cat 1" = immediate and 20 min

| Intended anaesthesia | n | % | Time (min, range) | GA conv | GA (n) |
|--------------------------|-----|----|-------------------|-----------|--------|
| Epid top-up attempt | 84 | 40 | 24 (14-39) | 14 (1-29) | 6 |
| CSE attempt | 33 | 16 | 31 (22-53) | 25 (5-33) | 4 |
| General anaesthesia (GA) | 91 | 44 | 9 (0-39) | NA | 91 |
| total | 208 | | | | |

Royal Women's hospital, Victoria, Australia

Cat 1

| | | | |
|--------------------------|-----|----|----|
| Epid top-up | 106 | 28 | 19 |
| Spinal | 66 | 17 | 26 |
| General anaesthesia (GA) | 206 | 54 | 17 |
| total | 378 | | |

Failure of regional anaesthesia

- * Rate highly dependent on definition of "failure"
 - * Conversion to general anaesthesia
 - * To other type of regional anaesthesia
 - * Incidence of pain perioperatively

Failure of regional anaesthesia

Kinsella et al., Anaesthesia 63:822-832; 2008:

- * Prospective audit of 5080 caesareans in the U.K.
- * Conversion rate from spinal to general anaesthesia 1.3 %
- * Conversion from epidural top-up to general anaesthesia 5.0 %
- * Risk for perioperative pain is greater with epidural top-up compared to CSE or spinal anaesthesia (24 % vs 18 % vs 6 %)

Factors associated with spinal anaesthesia failure

Table 5 Logistic regression analysis of factors associated with spinal failure. Pre-operative failure includes conversion to another anaesthetic or failure to achieve a satisfactory block; intra-operative failure includes unsatisfactory anaesthesia that required treatment.

| Pre-operative | | Odds ratio | 95% CI | Chi-square | p value | Intra-operative | | Odds ratio | 95% CI | Chi-square | p value |
|---|---|------------|--------------|------------|---------|--------------------------------|---|------------|--------------|------------|---------|
| Opioid | | | | 7.8 | 0.005 | Duration of operation (min) | | | | 35.7 | <0.001 |
| No | → | 5.51 | [1.99–15.27] | | | 0–60 | | 1.00 | | | |
| Yes | | 1.00 | | | | 61–90 | | 2.41 | [0.81–7.16] | | |
| Indication for Caesarean – acute fetal distress (including cord prolapse) | | | | 5.4 | 0.020 | >90 | → | 9.10 | [3.12–26.56] | | |
| No | | 1.00 | | | | Unknown | | 2.93 | [1.03–8.35] | | |
| Yes | → | 1.78 | [1.12–2.84] | | | Block adequate pre-operatively | | | | 26.5 | <0.001 |
| Indication for Caesarean – preterm | | | | 10.3 | 0.001 | No | → | 11.71 | [5.36–25.6] | | |
| No | | 1.00 | | | | Yes | | 1.00 | | | |
| Yes | → | 3.09 | [1.67–5.71] | | | | | | | | |
| Parity | | | | 6.7 | 0.035 | | | | | | |
| 0 | | 1.00 | | | | | | | | | |
| 1 | | 0.59 | [0.37–0.95] | | | | | | | | |
| 2+ | | 0.56 | [0.31–1.00] | | | | | | | | |

Factors associated with epidural anaesthesia failure

Table 6 Logistic regression analysis of factors associated with epidural failure. Pre-operative failure includes conversion to another anaesthetic or failure to achieve a satisfactory block; intra-operative failure includes unsatisfactory anaesthesia that required treatment.

| Pre-operative | Odds ratio | 95% CI | Chi-square | p value | Intra-operative | Odds ratio | 95% CI | Chi-square | p value | | |
|---|------------|-------------|------------|---------|--|-------------|--------------|-------------|---------|--------|--|
| Local anaesthetic volume; ml | | | | | Use of adrenaline | | | | | | |
| 0–14 | 0.75 | [0.38–1.45] | 43.6 | <0.001 | No | 1.00 | [0.40–0.84] | 8.6 | 0.003 | | |
| 15–19 | 0.40 | [0.23–0.68] | | | Yes | 0.58 | | | | | |
| 20–24 | 1.00 | [1.97–4.87] | | | Duration of operation; min | | | | | | |
| ≥25 | → 3.10 | | | | 0–60 | 1.00 | 39.9 | | | <0.001 | |
| Use of adrenaline | | | | | 61–90 | 1.35 | | [0.77–2.34] | | | |
| No | 1.00 | [0.39–0.75] | 14.2 | <0.001 | >90 | → 6.01 | [3.25–11.12] | | | | |
| Yes | → 0.54 | | | | Unknown | 2.21 | [1.30–3.77] | | | | |
| Indication for CS – failure to progress in labour | | | | | Block adequate pre-operatively | | | | | | |
| No | 1.00 | [0.37–0.70] | 17.3 | <0.001 | No | → 6.04 | [3.32–11.00] | 30.9 | <0.001 | | |
| Yes | → 0.51 | | | | Yes | 1.00 | | | | | |
| Maternal weight; kg | | | | | Indication for CS–failed instrumental delivery | | | | | | |
| ≤59 | 0.69 | [0.42–1.13] | 13.8 | 0.008 | No | 1.00 | [0.26–1.02] | 4.1 | 0.044 | | |
| 60–66 | 1.00 | [0.92–2.18] | | | Yes | 0.51 | | | | | |
| 67–77 | 1.41 | | | | ≥78 | 0.87 | [0.54–1.40] | | | | |
| ≥78 | 0.87 | Unknown | | | 0.56 | [0.30–1.06] | | | | | |
| | | | | | Baby's weight; g | | | | | | |
| | | | | | ≤3000 | 1.31 | [0.76–2.24] | 8.4 | 0.039 | | |
| | | | | | 3001–3400 | 0.76 | [0.47–1.25] | | | | |
| | | | | | 3401–3800 | 1.00 | [0.39–0.98] | | | | |
| | | | | | >3800 | 0.61 | | | | | |

Recipe for "success"

- * Enough time for anaesthesia
- * Enough drugs
- * Anaesthetics injected where intended
- * Full term patient
- * Operation time kept under 60 minutes

How did we manage our caesareans?

| HUCH/Women's hospital ALL n=842 | | Outcome anaesthesia mode switch | | | | |
|------------------------------------|-------------|---------------------------------|--------|-----|-------|------|
| | | Epid top-up | Spinal | GA | any % | GA % |
| Intended anesthesia mode | Epid top-up | 370 | 6 | 19 | 6.3 | 4.8 |
| | CSE(spinal) | 36 | 299 | 12 | 13.8 | 3.5 |
| | GA | 0 | 0 | 100 | 0.0 | NA |
| | TOTAL | 406 | 305 | 131 | | |
| Perioperative pain (%) | | 9.9 | 6.3 | 1.5 | | |

| Outcome % (95% CI) | Urgency | |
|---------------------|---------------------------|------------------------------|
| | Cat. 1-3 (=all non elect) | Cat. 1 (=immediate & 20 min) |
| CS under RA | 84.4 % (82.0-86.9) | 51.7 % (44.9-58.5) |
| Pain during CS | 8.3 % (6.4-10.2) | 3.7 % (1.1-6.3) |
| RA to GA conversion | 4.2 % (2.9-5.6) | 8.5 % (4.7-12.3) |

Looks quite good against the RCA standard in the operating room...

| RCA Target % | Urgency | |
|------------------------|---------------------------|--------|
| | Cat. 1-3 (=all non elect) | Cat. 1 |
| CS under RA | > 85 % | > 50 % |
| Pain during CS | < 15 % | < 20 % |
| RA to GA conversion | < 5 % | < 15 % |

| HUCH/Women's hosp Outcome %(95% CI) | Urgency | |
|--|---------------------------|------------------------------|
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However...

- * RCA standard considers any neuraxial **analgesia** an attempted regional anaesthesia for CS
- * 55/92 (60 %) of parturients coming for "immediate" caesarean had epidural catheters in place
- * If we count these general anaesthesia -cases as regional anaesthesia failures, our regional anaesthesia failure rate is much higher (4.2 % -> 10.7 %) vs. recommended 5 %

Action needed to meet the standard...

- * Put less epidurals for parturients...
- * Ask the obstetricians for less immediate CS....
- * Thrash the RCA standard?

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