Category 1 caesarean delivery; general anaesthesia vs. rapid sequence spinal anaesthesia; the final countdown – improving safety or cutting corners?

Mike Kinsella
St Michael's Hospital, Bristol
13th November 2013
The 3 – 6 – 9 – 12 – 15 min. ‘rule’ for immediate CS - prolonged bradycardia (< 80 bpm for > 3 min)

- Exclude abruption, etc 3
- Clinical details – fetal reserve, bleeding & etc 6
- Check preceding FHR 9
- No recovery by 9 min → decision for CS → theatre 12
- Delivery 15
Bradycardia

Surgical time

Anaesthetic and surgical time

0 3 6 9 12 15 min
Urgency of cesarean delivery for fetal bradycardia

- 236 cases, 16% had irreversible cause

**A Irreversible:**
- placental abruption
- cord prolapse
- uterine rupture
- preeclampsia
- failed instrumental delivery

**B Potentially reversible:**
- iatrogenic uterine hyperstimulation
- hypotension after epidural
- after ECV (no abruption)
- aortocaval compression

**C Unknown cause**

- “….. the understanding that speedy delivery is probably only useful in reducing adverse fetal outcome in those cases with irreversible causes would enable the clinician to make a more logical decision ….based on the actual clinical situation.”

Urgency of cesarean delivery for fetal bradycardia

- 236 cases, 16% had irreversible cause

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Anaesthetic mortality and morbidity

Table 3. Case Fatality Rates and Rate Ratios of Anesthesia-Related Deaths During Cesarean Delivery by Type of Anesthesia in the 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>
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<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>16.7 (95% CI 12.9–21.8)</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.

Shibli & Russell IJOA 2000;9:160
Hawkins et al. Obstet Gynecol 2011;117:69
Sentinel Audit (NSCSA) 2001
NOAD 2004, 2007
Life threatening incidents

- 28,900 spinal
- 11 GA conversion
  - 7 high spinal
  - 2 severe maternal bradycardia
  - 1 faint
  - 1 thiopentone instead of antibiotic
- 13,300 GA
- 38 life threat incidents
  - 15 failed intubation [1 hypoxic cardiac arrest]
  - 10 difficult intubation
  - 10 bronch/laryngospasm [1 hypoxic cardiac arrest]
  - 3 anaphylaxis
Category 1 CS:

? Time for spinal attempt
  Yes
  ? Mother will accept awake surgery
    Yes
    ? Specific contraindication to spinal
      Yes
      Start spinal
      Delay in achieving satisfactory spinal
      GA
    No
    Start spinal
  No
  Yes
  No
  Start spinal
  Delay in achieving satisfactory spinal
  GA

Intrauterine resuscitation:

92% of category 1 CS have risk factors.
Time to provide anaesthesia

- ‘Code Green’ CS
- Mean Decision-Delivery Interval (DDI)  26 min spinal,  17 min GA

Popham et al. Anaesth Int Care 2007;35:74
Teamwork
Prepare for GA
No touch technique
Fentanyl +/-
Skin infiltration +/-
One attempt unless obvious correction allows a second
Start before T4 block
Results

RSS

- DDI 23 (6) min
- Procedure 2 [1-7]
- Block 4 [2-7]
- Total 8 [6-8]

Literature

- DDI 26 (9)
  Popham
- Procedure 3 [1-4]
- Block 6 [2-14]
- Total 9 [4-17]
  Kathirgamanathan
Results

RSS

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- DDI 26 (9)
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  Kathirgamanathan
No touch technique
Infection

- I am concerned about the potential compromise of aseptic precautions in this technique…..not convinced that a single wipe of 0.5% chlorhexidine over the intended insertion site allows satisfactory decontamination…
  
  Williamson. Anaesthesia 2010;65:1142

- Patient’s back and anaesthetist’s hands cleaned with methylated spirit-soaked cotton swab
- No drape
- No touch spinal
- 3,690 patients between 1991 and 1999
- No infections

Antiseptic toxicity

• The sting in the tail: antiseptics and the neuraxis revisited.
  Bogod. Anaesthesia 2012; 67: 1305
  – use 0.5% chlorhexidine, consider spray, avoid contact with equipment

Evans et al. Anaesthesia 2013;68:Early View

• As early as possible
• Leave to dry / wipe dry
Pain / opinions / consent

- Rapid sequence spinal anaesthesia are we serious?
  - If one were to propose a new anaesthetic technique with a rate of awareness of pain starting at 10%, one would not expect to be taken seriously; nor would one expect to get ethical approval to study it (not in my hospital anyway). Add to that, not bothering to scrub up and not adding an opioid to the local anaesthetic; the 'no win, no fee' lawyers must be getting quite excited.

  Knox. Anaesthesia 2010;65:1144
**Pain / opinions / consent**

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<th>Cat 4</th>
<th>Cat 1–3</th>
<th>Cat 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS carried out with RA</td>
<td>&gt; 95%</td>
<td>&gt; 85%</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td>Pain during CS</td>
<td>&lt; 5%</td>
<td>&lt; 15%</td>
<td>&lt; 20%</td>
</tr>
<tr>
<td>RA to GA conversion</td>
<td>&lt; 1%</td>
<td>&lt; 5%</td>
<td>&lt; 15%</td>
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- 3/25 failed spinal placement / GA conversion pre-op
- 3/25 discomfort / pain (no treatment)
• Rapid sequence spinal anaesthesia are we serious?
  – If one were to propose a new anaesthetic technique with a rate of awareness of pain starting at 10%, one would not expect to be taken seriously; nor would one expect to get ethical approval to study it (not in my hospital anyway). Add to that, not bothering to scrub up and not adding an opioid to the local anaesthetic; the 'no win, no fee' lawyers must be getting quite excited.
  – we could even ask women what they think. They have been known to have opinions of their own!

  Knox. Anaesthesia 2010;65:1144

• How can a woman facing the emotional and physical distress around a category 1 caesarean section be expected to give informed consent to a rapid spinal anaesthetic?

• …trauma …bonding….

  East. Anaesthesia 2010 online

  http://www.respond2articles.com/ANA/forums/645/ShowThread.aspx#645
Pain / opinions / consent

- Sentinel Audit 2001 – 2,500 women
  - Birth preference
  - Safe for baby 67%
  - Safe for me 9%
  - Pain free 14%

- “We are going to give you an anaesthetic with a 7x risk of morbidity and a 2x risk of dying, but you will have no choice in the matter...”

  Hawkins et al. Obstet Gynecol 2011;117:69
Wonderful when they work. A really useful tool to have. An additional method to use.

In patients with easy anatomy it was about as quick as doing a GA.


I think the name can put some people off.

Not happy with the level of asepsis involved - i.e. no touch technique. Either a quick spinal or a GA.

Dangerous practise in my opinion - if anyone did it on my wife - would take them to court.

Hurford & De Zoysa. Anaesthesia 2012;67:1284

- 20 positive (including multi-disciplinary), 12 neutral, 11 negative
Summary: Category 1 CS – the place for RSS / spinal?

- SMH: per year
- 5,800 deliveries
- 1,330 CS
- 230 Cat 1 CS
  - 1y GA 36
- RSS
  - 2010 - 24 cases in 25 months 2007-2009
  - 2012 - 19 cases in 32 months 2009-2012

- GA likely to be needed for CS in the presence of permanent interruption of placental function:
  - major placental abruption
  - fetal bleed – vasa praevia
  - cord prolapse with bradycardia
  - uterine rupture with extrusion

- extra 5-6 min
  - consider RSS
Category 1 caesarean delivery; general anaesthesia vs. rapid sequence spinal anaesthesia; the final countdown – improving safety by cutting corners?

? Time for spinal attempt
  Yes → ? Does mother want awake surgery
    Yes → ? Specific contraindication to spinal
      No → Start spinal
      Yes → Delay in achieving satisfactory spinal
  No → No

GA