The adverse effects of obstetric anaesthesia and analgesia on the baby

Dr Bernard J Norman
November 2011
• Neuraxial Analgesia In Labour
• Breastfeeding
• Nitrous Oxide
• Pethidine / Remifentanil
• Spinals / Sympathomimetics for CS

Felicity Reynolds
2011
Neuroaxial Analgesia in Labour (1)

- Hypotension
- Fever (sympathetic block decreases sweat or ?infection)
- Oxytocin / prolonged second stage / instrumental delivery

Lieberman et al, 2000

<table>
<thead>
<tr>
<th>Lieberman et al 2000</th>
<th>Pyrexia</th>
<th>No pyrexia</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Initial Apgar score &lt; 7</td>
<td>23</td>
<td>18</td>
</tr>
<tr>
<td>% Hypotension</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>% Oxygen therapy</td>
<td>8.2</td>
<td>1.3</td>
</tr>
<tr>
<td>% Neonatal seizures</td>
<td>3.3</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Fig. 2. Mean (SE) tympanic temperatures of opioid (■) groups. P < 0.01; **compared with pre-extraction.
Neuroaxial Analgesia in Labour (1)

- Hypotension
- Fever (sympathetic block decreases sweat or ?infection)
- Oxytocin / prolonged second stage / instrumental delivery

- Reduced maternal stress hormones (metabolic acidosis)
- Reduced hyperventilation (uterine artery vasoconstriction)
- Better umbilical artery pH (probably independent of not having pethidine)
- Better Apgar scores (maybe just a pethidine sparing effect)
- CTG: ? Loss of short-term variability, decelerations, major bradycardias – not significantly in a 2002 meta-analysis
- Reduced perinatal mortality
Neuroaxial Analgesia in Labour (2)

Perinatal mortality per 1000 births in Cardiff in 1976
David & Rosen, Anaesthesia, 1976

<table>
<thead>
<tr>
<th></th>
<th>No Epidural</th>
<th>Epidural</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>19.2</td>
<td>14.8</td>
<td>NS</td>
</tr>
<tr>
<td>Intrapartum</td>
<td>1.3</td>
<td>1.3</td>
<td>NS</td>
</tr>
<tr>
<td>1st Week</td>
<td>10.3</td>
<td>1.1</td>
<td>0.02</td>
</tr>
<tr>
<td>More than 2.5kg</td>
<td>3.1</td>
<td>1.2</td>
<td>NS</td>
</tr>
<tr>
<td>Less than 2.5kg</td>
<td>99</td>
<td>0</td>
<td>0.02</td>
</tr>
</tbody>
</table>
“...the newborn is not destined to suffer as a result of neuroaxial analgesia in labour”

- Oxytocin infusion and instrumental delivery are not surrogates for neonatal outcome
- Beneficial effects of epidurals on fetal pH are overlooked
- Neonatal outcome depends on the balance of these opposing forces
Neuroaxial Analgesia in Labour (4)

The CSEs and fetal heart rate abnormalities debate
Loubert et al, Anaesthesia, 2011

- More FHR abnormalities after CSEs than epidurals
- CSE is an independent predictor of uterine hypertonus
- A meta-analysis suggested spinal opioids responsible
- Is it because their analgesic effect reduces plasma adrenaline (adrenaline reduces uterine hypertonus)?
- No! Cos the initial analgesia is no better with spinal opiates
- Therefore avoid spinal opiates in CSEs
- In any case why would you want to use them?
  - Low dose spinal LA alone (2.5mg bupivacaine) provides good initial analgesia
  - Saves drawing up a controlled drug
  - And so reduces the wait for analgesia - (almost) the whole point of a CSE for labour
Breastfeeding

Fentanyl

Epidurals hamper breastfeeding BBC News
Epidural drug turns babies off breastfeeding Sunday Times
Epidurals lead to breastfeeding troubles Times
• Confounding variables
• Un-randomized
• Observational
• Retrospective
• Small

Wilson et al 2010
• Large, prospective, randomised
• Epidural +/- fentanyl +/-CSE
• Non-epidural +/- pethidine comparisons
• Only pethidine affected breast-feeding

Loubert et al 2011
• “…epidural labour analgesia and neuroaxial fentanyl do not significantly affect breastfeeding.”
Metronidazole

Passmore C et al
Metronidazole excretion in human milk and its effect on the suckling neonate.
Br J Clin Pharmacology 1988, 26: 45-51
Nitrous oxide
Pethidine / Remifentanil

**Pethidine**
- 3-4 hours half life
- Norpethidine even longer
- Fetal exposure greater if > 3hrs before delivery
- Infant im naloxone
- ↓ Apgars, resps, feeding

**Remifentanil**
- 3-4 minute half life
- In adult and baby
- No adverse CTG effects
- No effect after birth
- Blair 2005, Volikas 2005
Spinals / Sympathomimetics for CS

• Are spinals for CS bad for the baby?
• Probably only if you significantly drop the blood pressure
• Fetal acidosis: phenylephrine v ephedrine
<table>
<thead>
<tr>
<th></th>
<th>Phenylephrine</th>
<th>Ephedrine</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>98%</td>
<td>100%</td>
</tr>
<tr>
<td>HR</td>
<td>88%</td>
<td>107%</td>
</tr>
<tr>
<td>pH &lt; 7.20</td>
<td>2%</td>
<td>21%</td>
</tr>
<tr>
<td>Nausea</td>
<td>17%</td>
<td>66%</td>
</tr>
<tr>
<td>Vomiting</td>
<td>None</td>
<td>36%</td>
</tr>
</tbody>
</table>
Synopsis so far

• **Neuroaxial Analgesia** – omit spinal opiate
• **Breastfeeding** – no significant effect
• **Nitrous oxide** – B12 a problem?
• **Pethidine / Remifentanil** – avoid pethidine
• **Spinals for CS** – use phenylephrine
The adverse effects of obstetric anaesthesia and analgesia on the baby - from CSEs to remifentanil, the evidence

Hypoxic-ischaemic encephalopathy (perinatal hypoxic brain damage)
- due to anaesthetic delay
- and/or poor communication
Hypoxic-ischaemic encephalopathy

Figure 5.1 Diagramatic representation of primary and secondary apnoea following the onset of acute total asphyxia at time 0.
All women get right to caesareans
Case X

“Much less than 30 minutes”
“17 minutes (IQR 12 - 26 minutes)”
“30 minute rule” – can and should be faster

Do not top up epidural and wait 15 minutes for it to work
Case Y

Average BP over previous 5 hours: 158/95 (mean 116 mmHg)

Fell to mean of 67 (42% drop) after spinal

No CTG monitoring after spinal
No fluid bolus
No sympathomimetic

Arterial umbilical cord pH 6.8
Floppy, prolonged resuscitation, NICU

In pre-eclampsia don’t allow BP to fall by more than 20% after a spinal
Case Z

- Age 22, first baby, 99.4kg (BMI 36) but MP1
- Scoliosis since RTA as child, didn’t want an epidural
- CTG abnormal decelerations & meconium
- Decision to deliver by CS at 13.30 (?urgency)
- No record of consent to spinal
- “I was forced into a fetal position… 7 attempts to place spinal needle over 30 minutes while I screamed in pain… I said ‘get the f**k off my legs’.”
- “After the spinal they started cutting me and I told them to stop. I could feel the knife. They said I couldn’t, it was in my head and cut again. I shouted ‘tell that f**ker to let go of my legs. Then they knocked me out.”
- No record of the level of block: “Numbness in her legs but feels touch and pinch. Able to move legs ➔ GA”
- After uneventful GA at 14.30, delivery at 14.40
Case Z

- No consent for spinal?
- Assault?
- Pain at start of caesarean?
  - No warning of failure
  - No adequate testing of block
- Hypoxic-ischaemic encephalopathy
- No FBS before birth
- No monitoring of CTG during attempted placement of spinal
  - Indeed CTG discontinued at 13.38 and not restarted
- Delivery at 14.40
- No cord gases or consistently recorded Apgars
- Floppy at birth, NICU, diagnosis of HIE
- Developmental delay and microcephaly
Synopsis

Synopsis so far

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- Spinals for CS – use phenylephrine

Don’t forget the fetus!
References

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