Initiation and Maintenance of Labour Analgesia:
Epidural or CSE, Bolus or Infusion?

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Genesis 3:16

- God said to Eve

“...I will make your pains in childbearing very severe; with painful labour you will give birth to children”

- >1800 years religious opposition to labour analgesia
Journey of analgesia in obstetrics:

- 19th century increased use of chloroform and ether
- Various techniques for obstetric regional analgesia (RA) described 1900-1930
- Continuous RA (caudal) – Hingson and Edwards, 1943
- 1950s-present: Lumbar epidural and CSE
Modern Labour Analgesia:

- When?
- How?
- With what?
Initiation of RA for labour: when?

- Increased CS rate with early initiation
- >1200 women randomised to receive epidural analgesia at 1 or 4 cm dilatation
- No effect on progress or outcome of labour
- RA should be established at maternal request including in latent phase

Initiation of labour analgesia: how?

- Lumbar epidural – 20 ml x LDM (0.1% B + 40 mcg F)
- Combined spinal-epidural technique
  - needle-through-needle
  - separate space
  - 2.5 mg B + 15-25 mcg F / 2 ml LDM
Common indications for CSE

- Severe maternal distress regardless of cervical dilatation
- Rapid analgesia in late first stage and second stage of labour
- Anaesthesia for delivery (2nd stage)
- Anaesthesia for artificial rupture of membranes (ARM)
- Multiparae in established labour
- Previous suboptimal analgesia with lumbar epidural
- Difficult back
Disadvantages of CSE for labour analgesia?

- No evidence for increased risk of infection with scrupulous asepsis
- CSE no higher than L3/4 interspace to avoid neurotrauma
- No increase in postdural puncture headache (PDPH)
- Untested epidural catheter
Disadvantages of CSE: intrathecal opioid

- Increased pruritus
- ? Fetal heart rate abnormalities
  - decrease in adrenaline / B-endorphin
  - no decrease noradrenaline / oxytocin
  => vasoconstriction + hypertony
- ? Avoid when CTG abnormality
Initiation of Labour Analgesia: CSE or Epidural?

- "No conclusive evidence to recommend one technique over another..."
  

- Mother’s needs
- Safety
- Expertise in unit
Maintenance of Labour Analgesia: Low dose mixtures

- 1970s: use of low concentration LA in large volumes
- 1980s: addition of opioid prolonged duration and improved quality of analgesia
- Minimal motor block
- No effect on progress of labour
Maintenance of labour analgesia: Choice of Local Anaesthetic

- Bupivacaine vs levobupivacaine vs ropivacaine
- MLAC Bupivacaine > levobupivacaine /ropivacaine
- Greater safety of single enantiomers
- Choice of LA does not appear to affect outcome of labour

Maintenance of labour analgesia: the ideal technique

- Continuous, uninterrupted and safe analgesia
- Titration of dose to progress of labour and pain
- Allow maternal ambulation
- Allow effective pushing in 2\textsuperscript{nd} stage
- No breakthrough pain
- Decrease total anaesthetic dose
- Decrease physician workload
Techniques available:

- “Interrupted”
  - Manual top ups (midwife/anaesthetist)
  - Patient controlled epidural analgesia (PCEA)

- “Continuous”
  - Continuous epidural infusion (CEI)
  - PCEA with background infusion
  - Automated Intermittent Mandatory Boluses (AMB)
  - Programmed Intermittent Boluses (PIB)
  - Computer integrated PCEA (CI-PCEA)
Intermittent epidural bolus (midwife top-up):

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tr>
<td>● Titrate dose and volume to progress of labour and severity of pain in individual</td>
<td>● Pain free intervals only</td>
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<tr>
<td>● Less frequent motor block</td>
<td>● Time to re-establish analgesia</td>
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<tr>
<td>● Less LA consumption</td>
<td>● Delay in receiving top up if clinician delivered</td>
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<td>● Increased workload</td>
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## PCEA:

### Pros:
- Autonomy
- Titratability
- Reduced workload
- Safe

### Cons:
- ?Ideal bolus/lockout regimen
- Patient experiences intermittent pain
- Maternal cultural/psychological factors and expectations
- Technical problems with pumps
- Disengages midwife
Continuous Epidural Infusion (CEI):

**Advantages**
- True continuous pain relief
- Can be individualised and titrated
- Avoids block regression
- ? More CVS stability

**Disadvantages**
- “Automatic pilot”
- Breakthrough pain
- Increased motor block
- Increased urinary catheterisation
- Increased LA consumption
Maintenance of labour analgesia: Continuous infusion vs intermittent (top-up)

Spread dependent on:

- Volume of injectate
- Speed of injection
- Pressure applied
- Single or multiport catheter
## PCEA plus background infusion:

<table>
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<tr>
<td>- Decreased breakthrough pain</td>
<td>- Increased LA consumption</td>
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<tr>
<td>- =&gt; decreased workload</td>
<td>- Increased motor block</td>
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<td>- No clear evidence of improvement in maternal analgesia and satisfaction</td>
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PCEA + Automated Mandatory Bolus (AMB) or Programmed Intermittent Bolus (PIB):

**AMB:**
- Variant of PCEA+CEI
- Infusion dose given as bolus at set intervals
- Double pump system
- Decreased motor block
- Decreased instrumental delivery
- Decreased need for self boluses

**PIB:**
- Fixed preprogrammed epidural bolus at regular intervals with PCEA/clinician bolus for breakthrough pain
- Smart pump technology
- Fewer PCEA/manual boluses
- Decreased total LA used
Evolution of pump technology:
Are We There Yet??

- Computer Integrated PCEA
- Software programme and pump in development based on new clinical algorithm
- Target is to adjust background infusion rate according to frequency of earlier demands
- Matches basal infusion rate to patient’s analgesic needs
In summary:

CSE or Epidural?  Bolus or infusion?
Queen Charlotte’s and Chelsea Hospital

- CSEs for initiation
- Boluses for maintenance
THANK YOU!
Troubleshooting epidurals in labour

- Failure rate 9-12%
- Commonly poor insertion technique, inadequate dose, catheter migration, rapid labour progression
- Anatomical factors (spinal surgery)
- Patient expectations
Rescue plan:

- History from patient – pain score, location of pain, description
- Examination – position of catheter, sensory/motor block
- Optimise patient position
- Assess effectiveness of bolus dose +/- catheter manipulation
- If no improvement, resite epidural catheter
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