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# Current Management of Labour Analgesia – Epidural or CSE, Bolus or Infusions?



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# 2 kangaroos and counting.....



Can I have more kangaroos please?



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# Keeping perspective...

- ALL techniques for initiation and maintenance of neuraxial analgesia in labour work...  
...really well!  
...really often!
  - So not surprising that showing differences between techniques is challenging and hence there is wide variation in practice
  - In such areas 'best evidence' may fail to give you the answers to help define all your practice
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# History of CSE for labour analgesia

- From a time of 'traditional' epidurals
- Concern about obstetric intervention – slowing labour, oxytocin augmentation, instrumental delivery, Caesarean section rate
- Mobilisation in labour was perceived as desirable and worthwhile
- 'Low dose' epidural solutions worked fine *without the spinal component* and were *mobile* – this helped define new epidural standard

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# So what are we actually comparing?

- CSE - bupivacaine (up to 2.5mg) with fentanyl (up to 25mcg) then bupivacaine 0.1% with fentanyl 2mcg/ml (LDM) epidurally by infusion/bolus
  - Epidural - up to 20 mls LDM then as above
  - Much confusion exists over claimed *benefits* of CSE and over *risks* - both have been *exaggerated*
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# CSE has some clear advantages

- Faster onset - is 5 minutes is clinically important?
  - Fewer early failures - where epidural has higher failure rate such as scoliosis, obesity, poor LOR or for the inexperienced epiduralist
  - Reliable sacral analgesia - when sacral blockade is required or for rapidly progressing labour
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CSE might have other benefits but many are inconsistently demonstrated in studies

- Fewer rescue top-ups?
  - Reduced need for late resiting of epidural?
  - Fewer failures when topping up for Caesarean?
  
  - Less motor block??
  - Higher maternal satisfaction??
  
  - Anaesthetist satisfaction?
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# CSE has some clear disadvantages

- Pruritis more frequent and severe
- Early fetal bradycardia more frequently seen

Both are associated with spinal opioid, and possibly dose-related.

- Dural Puncture Epidural - CSE with no spinal injection
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# CSE might have other theoretical or potential problems but evidence lacking

- Higher risk of post dural puncture headache?
  - Higher risk of meningitis?
  
  - More maternal hypotension??
  - Conus damage??
  - Drug error or contamination??
  - 'Untested' epidural catheter??
  - Higher risk of neurological injury??
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NAP3: 3rd National Audit of the RCOA

# NAP 3

The 3rd National Audit Project of  
The Royal College of Anaesthetists

MAJOR COMPLICATIONS OF CENTRAL NEURAXIAL BLOCK IN THE UK

## MAJOR COMPLICATIONS OF CENTRAL NEURAXIAL BLOCK IN THE UNITED KINGDOM

Report and findings Jan 2009

REPORT AND FINDINGS  
JANUARY 2009



## NAP 3 – what should I conclude?

- *‘Considering the relatively small number of combined spinal epidurals performed the number of associated reports of harm is concerning’*
- *‘Two of the deaths followed its use’*
- 4 of the 30 ‘pessimistic’ permanent harm cases followed CSE, and only 4 of the 30 were obstetric (2 after CSE classified as 1 nerve injury and 1 miscellaneous)
- Epidural 0-3.4 vs CSE 1-22 (or 0-11.8 optimistic) harm events per 100,000 in obstetrics based on 161,000 and 25,000 cases
- 1 death due to iv bupivacaine administered on ICU
- The other death followed a bupivacaine ‘epidural’ infusion running on an unmonitored patient after inadvertent dural tap

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# Maintenance – bolus or infusions?

- Dilute local anaesthetic solutions with opioid reduce negative impacts on labour/obstetric outcome
  - Intermittent top-ups (boluses) were used first
  - Infusions then followed in USA - no midwife top-ups!
  - Technology then allowed parturient controlled epidural drug administration, with increasing sophistication now including automated boluses and computer control
  
  - No single method or regimen been shown to be clearly 'superior' to another so wide variation in practice
  - What is 'superior' depends on your goals!
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# Physical characteristics of infusion dosing

- Infusions deliver more drug through the proximal hole of multiport catheters
  - Uniport catheters are associated with a greater incidence of inadequate analgesia and unilateral blockade
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# Simulated epidural spread: continuous infusion vs 'intermittent infusion' i.e. bolus



Continuous Infusion



Intermittent Infusion

1 inch

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# Intermittent Top-ups (vs Infusions)

## Pros:

- Midwife involved
- Dose-sparing
- Less motor block

## Cons:

- Time-consuming for midwife or anesthesiologist
  - Drug error potential
  - Concerns about controlled drug access
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# Physical characteristics of bolus dosing

- Infusions deliver more drug through the proximal hole of multiport catheters
  - Uniport catheters are associated with a greater incidence of inadequate analgesia and unilateral blockade
  - But intermittent top-ups are a declining method of maintenance for various reasons including midwifery workload, controlled drug issues and suggested benefits of newer methods like PCEA
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# What are UK departments using?

- Postal survey in 1999:
    - 41% top-ups, 48% infusions, 3% PCEA
  - London telephone survey in 2004:
    - 60% top-ups, 29% infusions, 11% PCEA
  - OAA survey in 2007:
    - 20% PCEA
  - OAA survey in 2012:
    - 50% PCEA
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# Maintenance – bolus or infusions?

- Many regimens:
    - Parturient Bolus: 3 to 10 mls
    - Lockout: 5 to 20 mins
    - Background Infusion: 0 to 10 mls/hr
    - Hourly Maximum: 20 to 30 mls
  - Background infusion *may* reduce rescue, and some studies support larger bolus volumes
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# Maintenance - programmed intermittent epidural bolus or background infusions?

- Many regimens:
    - Parturient Bolus: 3 to 10 mls
    - Lockout: 5 to 20 mins
    - Background Infusion: 0 to 10 mls/hr
    - Programmed Intermittent Bolus: 0 to 10 mls
    - Hourly Maximum: 20 to 30 mls
  - Background infusion *may* reduce rescue, and some studies support larger bolus volumes
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# Smiths CADD-Solis Pump



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## ‘PCEA plus’

- Programmed intermittent epidural boluses (aka: automated mandatory boluses)
  - Small reduction in bupivacaine dosing compared to background infusion
  - Higher maternal satisfaction
  - Fewer rescue top-ups?
  - Reduction in motor block?
  - No consistent effect on obstetric outcome (yet?)
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# What is your ultimate goal?

- 'Standard' care few can criticise?
  - Individualised care which demands
    - greater knowledge, experience and understanding
    - a flexible approach
    - a willingness to take a fresh look at risk and benefit for each patient or unit
    - a preparedness to defend a 'guideline not protocol' approach
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# What are my conclusions?

- Initiate with CSE in selected parturients
  - Maintain by midwife bolus or PCEA with generous volume bolus by parturient and pump
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# Thank you for your attention.

- Initiate with CSE in selected parturients
  - Maintain by midwife bolus or PCEA with generous volume bolus by parturient and pump
  - Further reading:
    - references (including the most recent and relevant meta-analyses and reviews\*) follow
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