

CME Article

Dispelling the myths of epidural pain relief in childbirth

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Epidural analgesia is the most effective method of pain relief for labour and many consider it the “gold standard” for pain relief in labour⁽¹⁾. Epidural analgesia has been safely and effectively used since the 1960s⁽²⁾. In the last few years, we have seen the increasing use of the combined spinal epidural technique to initiate labour epidural analgesia⁽³⁾. The introduction of low-dose epidural

local anaesthetics to maintain labour as well as the use of patient-controlled epidural analgesia intra-partum has reduced the use of local anaesthetics and minimised its side effects. This article discusses some of the recent advances in labour epidural analgesia and its effects on caesarean section, instrumental delivery, duration of labour and backache.

ADVANCES IN LABOUR EPIDURAL ANALGESIA

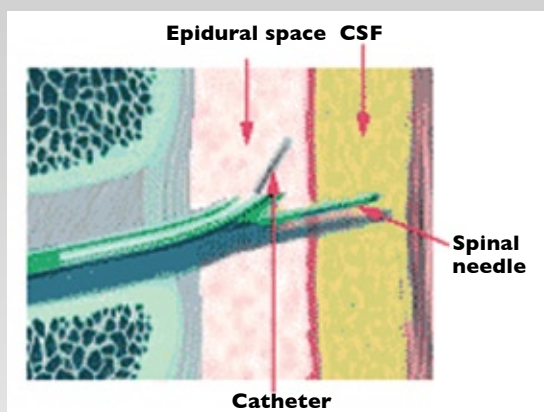
Combined spinal epidural analgesia

Combined spinal epidural (CSE) involves using an epidural needle to localise the epidural space. Prior to inserting the epidural catheter, a spinal needle is introduced through the epidural needle into the subarachnoid space and a small intrathecal dose of local anaesthetics and/or opioid is administered. In a review of 1,532 patients over a six-month period in our centre, CSE accounted for 80% of all neuraxial blocks performed for labour analgesia (versus epidural 20%)⁽⁴⁾.

The CSE technique decreased the need for supplemental analgesics, decreased the incidence of breakthrough pain, increased the duration of labour pain relief, decreased the risk of post-block neural deficits and increased patient satisfaction without increasing the risk complications such as dural puncture headache⁽⁴⁻⁶⁾. The use of intrathecal opioids and the decreased dose of local anaesthetic required to initiate pain relief has shown to decrease motor block and can potentially facilitate ambulatory epidural analgesia^(7,8). Ambulatory epidural analgesia, however, has not been associated with better obstetrical outcomes⁽⁷⁾.

Low-dose local anaesthetic epidural solution

Traditionally, a high concentration (0.2%-0.25%) of local anaesthetic has been used to maintain labour epidural analgesia. In the last decade, the concentration of local anaesthetic used to maintain labour epidural analgesia has been decreasing (0.0625%-0.125%). The use of low concentration of local anaesthetic has reduced the total dose of local anaesthetic used, as well as the side effects, such as motor blockade^(8,9). In a large randomised trial involving 1,054 patients, the introduction of a low dose of epidural infusion was associated with a 25% decrease in instrumental vaginal delivery. Low-dose epidural analgesia has resulted in significantly more vaginal delivery⁽¹⁰⁾.



The combined spinal epidural technique.

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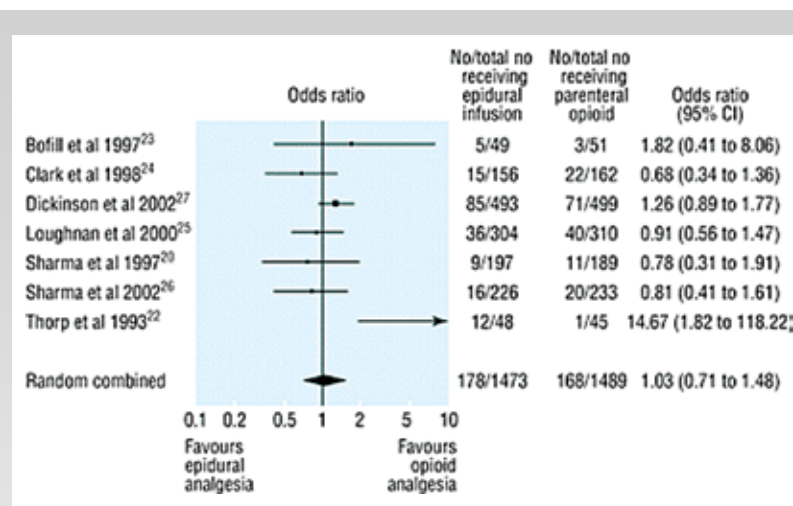
Patient-controlled epidural analgesia

Patient-controlled epidural analgesia (PCEA) is a mode of delivery of local anaesthetic solution to the epidural space. PCEA allows patients to self-administer a pre set amount of local anaesthetic and/or opioid epidurally to meet their own requirements via a patient-controlled analgesia device, thus maintaining the neuraxial block within an effective therapeutic range.

In a review of 18 randomised trials which used PCEA in labour analgesia, PCEA has been shown to offer several advantages over both intermittent nurse-administered dosing and continuous infusion techniques. The advantages of PCEA over continuous epidural infusion include reduced local anaesthetic used, less motor blockade, lower pain scores, improved maternal satisfaction and less anaesthetic interventions with possible decrease in staff workload⁽¹¹⁾.



A patient-controlled epidural analgesia pump.



Rates of caesarean section in trials of nulliparous women receiving low-dose epidural analgesia or parenteral opioids. Reproduced with permission from Liu EHC and Sia ATH. Rates of caesarean section and instrumental vaginal delivery in nulliparous women after low concentration epidural infusions or opioid analgesia: systematic review. *BMJ* 2004; 328:1410.

these retrospective trials were that the patients who requested for epidural usually have an associated increased risk of cephalopelvic disproportion or foetal malposition, both of which increased the risk of caesarean delivery.

Despite earlier confusion, subsequent population-based studies demonstrated that the introduction of epidural analgesia service did not result in an increased caesarean section rate in the hospitals⁽¹³⁾. These suggested that women selected for intrapartum epidural already represent a population with an increased risk of an unfavourable course of labour.

In several subsequent randomised trials, there has been a decrease in caesarean rates despite increased use of epidural analgesia⁽¹³⁾. A large randomised trial involving 11,259 patients showed that there was no difference in caesarean rates in patients who received epidural analgesia and those who did not. Moreover, in two different meta-analyses of randomised trials comparing patients with and without epidural, caesarean delivery was clearly not associated with epidural analgesia which showed that there is no direct relationship of epidural with increased caesarean section^(9,14).

DOES LABOUR EPIDURAL INCREASE THE RISK OF CAESAREAN SECTION?

In reviewing the effects of epidural on caesarean delivery, it must be borne in mind that many factors affect the mode of delivery. These factors include the patient's ability to bear down, the position of the foetus and the obstetrician's labour management plan⁽¹²⁾. In the late 1980s and early 1990s, several retrospective trials demonstrated an association between the use of epidural and increased caesarean rate⁽¹³⁾. The main pitfalls of

DOES LABOUR EPIDURAL PROLONG LABOUR AND INCREASE THE RISK OF INSTRUMENTAL DELIVERY?

The negative effects of epidural anaesthesia on the progress of labour and on women's ability to have a spontaneous unassisted vaginal birth have been documented⁽¹⁵⁾. It is believed that the resulting motor blockade and numbness cause the inability of the patient to push, and subsequently prolong labour and/or require instrumental delivery⁽¹⁶⁾. The rate of instrumental vaginal delivery appears higher in several randomised controlled trials⁽¹⁴⁾. However, in a review of 336,189 women studying the association of epidural analgesia on instrumental delivery over a seven-year period, rates of instrumental births did not rise despite increases in use of epidural analgesia. Instrumental births declined over time from 26% to 22% among primiparas, and 5% to 4% among multiparas⁽¹⁷⁾. Although instrumental birth was strongly associated with epidural analgesia, the strength of the association declined over the study period. The investigators postulate that this decline in the strength of association between epidural analgesia and instrumental birth may reflect improved epidural techniques and management of epidural labour, and recognition of the adverse maternal outcomes associated with forceps and vacuum births⁽¹⁷⁾.

In a randomised trial involving 2,703 women, Sharma and Leveno demonstrated an increase in instrumental delivery and a 15-minute increase in duration of the second stage in women on epidural analgesia⁽¹³⁾. However, many factors including physiology and labour management practices influence labour outcome, and the evaluation of the literature examining association of epidural analgesia with delivery outcome, is complex. The use of PCEA and a dilute local anaesthetic epidural solution to decrease the motor block have been proposed to minimise the effects of epidurals on labour progress in the second stage⁽¹⁸⁾. With CSE, and its resultant benefits of decreased motor block, a recent study demonstrated a decreased duration of first-stage labour with CSE compared to conventional epidural analgesia⁽¹⁹⁾.

DOES LABOUR EPIDURAL CAUSE CHRONIC BACKACHE?

Previous retrospective studies have suggested an association between epidural analgesia during labour and low back pain. In 1990, MacArthur et al conducted a retrospective survey of 11,701 patients using postal questionnaires. They showed that 10.5% of the patients who had epidural, and 8.9% of the patients who had other forms of analgesia, reported backache at six weeks postpartum⁽²⁰⁾. This survey was retrospective and had several pitfalls. Primarily, the survey was conducted on women who had delivered one to nine years earlier and recall bias might have affected the results. It was suggested that mothers receiving epidural analgesia adopted positions stressful to the lower back for prolonged periods and this, combined with muscle weakness and immobility, resulted in postnatal back pains. However, when this theory was tested in prospective studies, neither motor block nor the use of epidural analgesia was associated with the development of chronic backache^(21,22). These prospective studies have not shown any causal relationship between epidural analgesia and backache. In retrospective studies, antenatal backache was reported to be 9%-25%^(20,23). However, in prospective randomised studies, antenatal backache was reported in 53%-89% of the patients^(21,24). It seems that when retrospective surveys were performed months or years after delivery, response rates for these retrospective trials tended to be low, 40%-67%^(20,23,25), and many women were unable to recall or have forgotten that they suffered backache before delivery and instead chose to attribute it to the epidural, producing bias in data collection.

In two recent randomised trials, there were no significant differences in the incidence of long-term back pain between women who received epidural pain relief and women who received other forms of pain relief^(21,26). Back pain after pregnancy is common and has been attributed to the mechanical and structural changes in the spine as a result of normal physiological changes of pregnancy⁽²⁷⁾.

However, there is enough evidence to show that there is no difference in the incidence of long-term back pain between women who received epidural pain relief and women who received other forms of pain relief.

Physiological mechanisms of pregnancy contributing to back pain:

- Posture: weight gain of pregnancy results in increased lordotic posture.
- Changes in total body water content: change in hormone levels results in fluid retention, particularly of connective tissues around vertebral column and pelvis, increasing laxity around the joints.
- Endocrine changes: secretion of relaxin results in softening of ligaments around the pelvic joints.
- Engorgement of epidural veins: hypervolaemia and engorgement of epidural venous system may result in metabolic disturbance of nerves.

SUMMARY

1. The recent introduction of:
 - combined spinal epidural (CSE) technique
 - low-dose epidural local anaesthetic infusion
 - patient-controlled epidural analgesia (PCEA) for labour epidural analgesia
 has enabled us to minimise pain of childbirth with minimal effects on the labour outcome.
2. Several randomised controlled trials and meta-analyses have demonstrated that there is no causal relationship between epidural for labour pain relief and increased risk of caesarean section.
3. There seems to be sufficient evidence to conclude that epidural is associated with lower rate of spontaneous vaginal delivery and higher rate of instrumental births.
4. With obstetricians being more aware of the risks of instrumental delivery and modifying the obstetric management plan for patients on epidural for labour, this association may be weakening.
5. The association between chronic back pain and labour epidural has not been proven.

“There is no other circumstance where it is considered acceptable for a person to experience severe pain, amenable to safe intervention, while under a physician’s care. Maternal request is a sufficient justification for pain relief during labor.”

Joint statement of the American Society of Anesthesiologists and the American College of Obstetricians and Gynecologists

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SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME

Multiple Choice Questions (Code SMJ 200612B)

True False

Question 1: The use of combined spinal epidural technique to initiate labour analgesia:

- | | | |
|---|--------------------------|--------------------------|
| (a) Involves using an epidural needle to localise the epidural space and administering a small dose of local anaesthetics and/or opioid epidurally. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Decreases the incidence of breakthrough pain in patients. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Increases patient satisfaction. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Increases the risk of dural puncture headache in patients. | <input type="checkbox"/> | <input type="checkbox"/> |

Question 2: Patient-controlled epidural analgesia for patients on labour epidural pain relief has been shown to:

- | | | |
|---|--------------------------|--------------------------|
| (a) Allow the patients and the midwives to administer a pre-set amount of local anaesthetic and/or opioid epidurally. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Decrease motor blockade. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Reduce the amount of local anaesthetic used. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Improve maternal satisfaction. | <input type="checkbox"/> | <input type="checkbox"/> |

Question 3: The use of low concentration of local anaesthetic for epidural analgesia has:

- | | | |
|--|--------------------------|--------------------------|
| (a) Reduced the total dose of local anaesthetic. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Reduced motor blockade. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Increased in instrumental vaginal deliveries. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Resulted in significantly more vaginal deliveries. | <input type="checkbox"/> | <input type="checkbox"/> |

Question 4: Labour epidural analgesia:

- | | | |
|---|--------------------------|--------------------------|
| (a) Increase the duration of first-stage labour. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) May prolong the duration of second stage of labour. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Resulted in an increased in caesarean section rates when introduced in hospitals. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) May increase the risk of instrumental delivery. | <input type="checkbox"/> | <input type="checkbox"/> |

Question 5: Regarding chronic backache in patients:

- | | | |
|---|--------------------------|--------------------------|
| (a) Only retrospective trials have demonstrated an association between the use of epidural and increased incidence of chronic backache. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Retrospective surveys studying the association between epidural pain relief and backache suffer from recall bias. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Randomised trials showed association between the use of epidural and increased incidence of chronic backache. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Antenatal backache occurs in more than 50% of the patients. | <input type="checkbox"/> | <input type="checkbox"/> |

Doctor's particulars:

Name in full: _____

MCR number: _____ Specialty: _____

Email address: _____

Submission instructions:

A. Using this answer form

1. Photocopy this answer form.
2. Indicate your responses by marking the "True" or "False" box
3. Fill in your professional particulars.
4. Post the answer form to the SMJ at 2 College Road, Singapore 169850.

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1. Log on at the SMJ website: URL <<http://www.sma.org.sg/cme/smj>> and select the appropriate set of questions.
2. Select your answers and provide your name, email address and MCR number. Click on "Submit answers" to submit.

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1. Answers will be published in the SMJ February 2007 issue.
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3. All online submissions will receive an automatic email acknowledgment.
4. Passing mark is 60%. No mark will be deducted for incorrect answers.
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