

Epidural Analgesia in Obstetrics

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Abstract

An ideal analgesic for labour would preferably be non-invasive, as effective as spinals and epidurals without their attendant complications and is safe to mother and child and should not complicate the labour process.

Analgesia for labouring women ranges from the use of opioid injections to invasive methods, chiefly epidural injections. Each has its advantages and drawbacks.

This article provides a review of analgesic methods and techniques for labouring women. It focuses mainly on the role of epidurals, how it is utilised by anaesthetists and the differing methods of drug delivery through the epidural route. It discusses various concoctions of local anaesthetics and adjuvants used.

The epidural route is probably the most effective and most commonly used invasive route for achieving analgesia during labour. Local anaesthetics of varying concentrations are administered as intermittent boluses or as a continuous infusion. Adjuvant drugs are able to enhance the quality and duration of the analgesia. Opioids including fentanyl and sufentanil, and clonidine are discussed. The use of patient-controlled epidural analgesia and combined spinal-epidural analgesia are reviewed.

Ambulatory or mobile epidurals are increasingly popular. They are known to improve maternal satisfaction because of preservation of motor power. Ambulation may help with cervical dilatation and engagement, and abolition of backpain, among other advantages. This article describes the methods of establishing mobile epidurals and offers guidelines on safe ambulation and contraindications to its use.

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Introduction

Most obstetric anaesthetists have their favourite epidural concoction for use in labour. This paper surveys the variation in techniques of drug delivery and types of drugs used in labour epidurals. It reviews the techniques of intermittent bolus delivery of local anaesthesia, continuous infusions using local anaesthesia and various types of opioids and the controversial use of drugs like clonidine. Patient-controlled epidural analgesia or PCEA is also discussed. Combined spinal-epidural (CSE) analgesia is reviewed and the trend towards ambulation with labour epidural is discussed. Ultimately, the principles of achieving a safe outcome for mother and child, maternal satisfaction and an unimpeded labour are what matters.

Objectives when Establishing Labour Epidurals

Establishing an obstetric epidural should result in rapid and reliable pain relief for the labouring patient, achieving a sensory block from T10 to S5.¹ The ability to

sense uterine contractions without pain, a lack of sensation of rectal pressure and absence of pain during second stage are the main aims. A successful epidural should be effective irrespective of the cervical dilatation when it is sited and it should remain effective however rapid or slow the progress of labour.²

Physiology

During the first stage of labour, pain is mainly visceral in nature, arising from the uterus and cervix via the T10 to T12 nerves, while during the second stage, the perceived pain is somatic and is well localised to the perineal region. The pain impulses traverse lumbar and sacral spinal segments.³

Methods of Pain Relief in Labour

There is great variation in pain thresholds⁴ and various methods of pain relief are available including the following:

a) Non pharmacological means such as the use of hyp-

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- nosis, acupuncture and homeopathic methods.
- b) Systemic administration of opioids such as pethidine and diamorphine which have the attendant side effects of neonatal respiratory depression and depressed suckling response,⁵ in addition to maternal side effects. According to the National Birthday Trust survey, mothers rate pethidine as no better than transcutaneous electrical nerve stimulation (TENS).⁶
 - c) Entonox is the mainstay of inhalational analgesia. Its effectiveness may be enhanced by the addition of a volatile agent⁷ like isoflurane. It is certainly a more effective analgesic than either TENS or pethidine though it is still rated as poor by women in labour.⁸
 - d) The invasive methods of pain relief include the use of epidurals analgesia, spinal anaesthesia and the combined spinal-epidural technique. These are most effective and also more reliable.^{4,9}

Epidural Analgesia

The use of labour epidurals is widespread yet there is much diversity of practice both in terms of the types of drugs used and the method of delivery of these agents through the epidural. Advances have seen clinical practice progress from the use of intermittent boluses of local anaesthetic to infusions of low concentration of local anaesthetics, either alone or in combination with opioids. Patient-controlled epidural analgesia¹⁰ and the use of epidural opioids alone in the first instance, have also been developed. These new techniques have resulted in positive outcomes such as a lower incidence of hypotension, better maternal mobility due to reduced motor block and a lower incidence of operative delivery.

Intermittent local anaesthetic agent "top-ups" may result in periods of breakthrough pain if the anaesthetist or midwife certified to administer top-up doses are held up with other tasks, which is not uncommon in busy departments. Top-ups may also result in marked changes in maternal cardiovascular function."

The disadvantages caused by delays in top-ups are avoided with the use of continuous infusions of different bupivacaine concentrations e.g. 0.25% and haemodynamic stability is also improved.^{12,13} The number of top-ups was found to be reduced when epidural infusions were used to deliver the local anaesthetic.¹⁴

There were concerns about accidental intravascular injections of bupivacaine, accidental dural puncture or migration of the epidural catheter during the use of continuous infusions. Compromise between safety and efficacy saw a trend towards using a lower concentration of local anaesthetic.^{5,11}

Li et al found that the optimum infusion rate was 0.125% bupivacaine at 10 ml/h with fewer women requiring 0.25% bupivacaine top-ups. The top-ups were also required less frequently but, interestingly enough, increasing the rate of infusion to 15 ml/h did not im-

prove results. The concentration of bupivacaine in mother and baby at delivery was well within the safety range of 1.5 to 2.3 µg/ml.⁵ Bader et al¹⁵ also found that maternal and neonatal drug concentrations were independent of duration of infusion, which varied from 1 to 15 hours.

Kenepp et al¹⁶ showed that with the same total dose of infused bupivacaine, a 0.125% solution was able to block more dermatomes than a 0.25% or 0.5% solution. This was presumed to be because of the larger volume infused with a 0.125% solution.

Ropivacaine 0.25% when compared with bupivacaine 0.25% as continuous infusions in labour demonstrated that onset of pain relief and intensity and duration of motor block did not differ significantly between the two groups. The authors also suggested that ropivacaine 0.25% may have an advantage over bupivacaine regarding neonatal neurobehavioural performance during the first few hours after delivery.¹⁷

As painful intervals between top-ups are avoided, a continuous infusion delivers a more stable level of sensory analgesia and also increased cardiovascular stability. In terms of patient safety, it has a lower risk of maternal hypotension, less risk of systemic toxicity and less risk of creating a total spinal. With less handling of the epidural catheter as compared with administering top-ups, there is also less risk of infection and is more convenient to the care-provider in a busy department.¹⁸ The absence of an anaesthetist while the local anaesthesia is being delivered is a negative point considered important by some and it is also difficult to individualise patient's needs. Another disadvantage is that continuous infusions result in an increased incidence of motor block.¹⁹

Epidural Opioids

Several opioids have been tried through the epidural route during labour and are especially useful for visceral discomfort in the first stage.

Epidural morphine for labour provides only mediocre pain relief.²⁰ At doses of up to 10 mg, it provided unreliable analgesia which was accompanied by side effects like nausea and pruritus. The onset of analgesia was also slow.²¹

Epidural pethidine 100 mg provides good but brief analgesia.²²

The use of epidural alfentanil, administered as a bolus of 30 µg/kg followed by 30 µg/kg/h infusion²³ resulted in unsatisfactory analgesia and poor neuro-behavioural outcome of the baby as a result of hypotonus.²⁴

Fentanyl via the epidural route resulted in brief but satisfactory analgesia with few side effects²⁵ and with a swift onset of 5 to 10 minutes. The use of epidural fentanyl, alone or together with local anaesthesia has been beneficial in awkward situations such as intracta-

ble rectal or back pain and for enhancing the quality of analgesia, especially if surgical intervention is required.

Sufentanil, a potent, lipid-soluble opioid with a rapid onset of action²⁶ provided about one hour of analgesia at low doses of 5 to 15 µg via the epidural route. Its use is widespread in the United States and in Europe.²⁷

Epidural Opioids with Local Anaesthesia

The benefit derived from the use of epidural opioid in labour is maximised by combining it with a local anaesthesia.²⁸ There exists a combined and synergistic mechanism of effective pain relief when using low doses of local anaesthesia and low doses of opioids. The site of action of local anaesthesia is at the nerve axon and the opioid, at the spinal opioid receptors located at the substantia gelatinosa.^{29,30} In combination, these drugs relieve pain for a longer period than either alone, and usually at doses so low that by themselves, have little effect on pain.

By adding short-acting lipid soluble opioids like fentanyl or sufentanil to bupivacaine and administering it as an infusion, requirements for local anaesthesia^{31,32} is diminished without the quality of analgesia being compromised.³³ There were no adverse effects on the neonates attributable to fentanyl and the patients were twice as likely to have normal deliveries.

Maternal satisfaction was higher in women given 0.1% epidural bupivacaine and fentanyl 2 µg/ml, mainly because of lower incidence of leg weakness and numbness. Using even lower concentrations of local anaesthesia, for example 0.0625% bupivacaine and 2 µg/ml of fentanyl at 10 ml/h, resulted in excellent analgesia for the first and second stages of labour. The most significant advantage with such a regime was the lack of motor blockade, permitting pain-free delivery,³⁴ with the ability to move the lower limbs.

Combining bupivacaine with sufentanil increased both quality and duration of analgesia^{35,36} which is superior to that produced with fentanyl and alfentanil alone. Flow velocimetry of umbilical and uterine arteries showed no detrimental effects with the use of both drugs.³⁷

Bieyaert et al³⁸ used 0.125% bupivacaine and epinephrine 1:800 000, resulting in minimal motor block and safe maternal and neonatal plasma levels. By adding 10 µg of sufentanil to the above solution, better quality analgesia of longer duration was achieved and less bupivacaine was used.³⁹

Using sufentanil 17.5 µg or 15 µg with 10 ml of 0.125% bupivacaine with adrenaline resulted in shortened onset and increased duration and intensity of analgesia compared with using bupivacaine and adrenaline alone.³⁹ With sufentanil doses of 30 µg or more, reports of neonatal depression surfaced.⁴⁰

Enever et al⁴¹ showed that a traditionally used opioid

in non obstetric epidurals, like diamorphine 0.0025% with 0.125% bupivacaine as a continuous infusion, provided longer lasting pain relief and was more effective especially during the most intense pain at the second stage of labour when compared with fentanyl 0.0002% with 0.125% bupivacaine.

Clonidine

Experiments in animal models showed that a multitude of agents including benzodiazepines, calcitonin, somatostatin and alpha-agonists like clonidine, when injected via the epidural route, were able to produce analgesia.

Clonidine produces hypotension by centrally acting at the post-synaptic alpha-2 receptors in the vasomotor centre in the medulla. Epidural administration of clonidine can give rise to maternal hypotension and bradycardia.⁴² When used in pregnant ewes, there were no foetal side effects.⁴³

Cigarini et al⁴⁴ showed that adding 75 µg clonidine to 0.125% bupivacaine did not result in any cases of maternal bradycardia and falls in blood pressure were similar in the group receiving bupivacaine alone and the group receiving clonidine and bupivacaine. Foetal bradycardia occurred in the clonidine group at the first top up. There were no differences in APGAR scores. Analgesia was improved.

The following contribute to the merits of using epidural clonidine: It does not interfere with proprioception or result in motor blockade. It does not engender respiratory depression.⁴⁵ It does not potentiate morphine and avoids the opioid-induced side effects like nausea, vomiting and pruritus, although it does cause sedation.^{46,47}

O'Meara and Gin⁴⁸ added 120 µg clonidine to 0.125% bupivacaine and showed better analgesia of a longer duration. These patients had higher sedation scores and maternal heart rates were lower than baseline values. They found no effect on foetal heart rate.

Chassard et al⁴⁹ noted that 150 µg of epidural clonidine increased the foetal heart rate which placed the foetus "at risk" during labour. Changes also included variable or late deceleration, bradycardia or changes in baseline variability and such suspicious patterns were seen in up to 65% of normal parturients given epidural clonidine.

By adding an opioid to the clonidine-local anaesthesia mixture, even more prolonged analgesia is achieved. Celleno et al⁵⁰ added 75 µg clonidine to fentanyl 100 µg with 0.125% bupivacaine, prolonging analgesia considerably to 177 minutes.

Chassard et al⁴⁹ showed that adding clonidine 100 µg and 150 µg to 10 µg of sufentanil, with 0.0625% bupivacaine and adrenaline significantly improved the duration of analgesia in the first stage, 130 to 140 min-

utes longer than that observed with 0.125% bupivacaine and clonidine alone.

The important setback of foetal heart rate pattern abnormality has resulted in cautious and limited use of epidural clonidine in obstetric analgesia. Few would welcome the additive side effects of clonidine (which seem to be dose dependent), an opioid and a local anaesthesia used in combination, despite an improved analgesic duration, as this could, in any case, be attained by other traditional and established combinations.

The risk of acute withdrawal and rebound hypertension is well known after acutely stopping systemically administered clonidine.⁵¹ No such reports were made with regard to epidurally administered clonidine until Fitzgibbon et al⁵² reported a case of rebound hypertension and acute withdrawal associated with discontinuation of an infusion of epidural bupivacaine, morphine and clonidine. In this instance, the patient had been on prolonged continuous infusion for malignant pain. It is unlikely to occur with an infusion used for a relatively short period during labour.

Patient-controlled Epidural Analgesia (PCEA)

Epidural analgesia during labour can be delivered under the patient's control. Its use minimises periods of pain⁵³ as well as periods of over medication and inadequate analgesia. It allows individual titration of drug delivery.

PCEA can be used with either opioids or bupivacaine or a combination of both. It can be administered by demand dosing alone or as a combination of demand dosing and a continuous infusion. Its use resulted in reduced consumption of local anaesthesia, particularly as the second stage approached.

The agents used are ideally of fast onset which avoids transient increases in patient demands. It should be of intermediate duration since an agent of short duration generates a larger number of patient demands, while agents of longer duration cause cumulative and adverse ill-effects. The optimal local anaesthesia or opioid or combination for PCEA has yet to be found.⁵⁴

Enhanced PCEA safety is achieved by using a low basal infusion, small on-demand bolus and dilute local anaesthesia solutions.

Ferrante et al⁵⁵ found that using 33% of the maximum hourly demand dose as a background infusion (i.e. 6 ml/h of 0.125% bupivacaine with 2 µg/ml of fentanyl) resulted in fewer physician-administered supplemental bupivacaine top-ups. There was a 35% cumulative hourly dose sparing effect in contrast with a continuous epidural infusion.

Effective labour analgesia with less risks of systemic toxicity may be achieved with the use of low basal infusion (6 ml/h) of a diluted bupivacaine solution of

0.125% with 1 or 2 µg/ml fentanyl. The addition of fentanyl decreased the patients' analgesic requirements. Small boluses of 4 ml on demand with a 10 minute lockout period and a 20 ml hourly limit were used by Lysak et al.⁵⁶

Accidental epidural catheter migration into the subarachnoid space is a complication feared by the labour ward staff with the use of PCEA. It is reassuring to note that every bolus serves as a subarachnoid test dose, and the resultant abrupt rise in sensory level in the event of a subarachnoid catheter migration actually acts to enhance the safety of this technique.⁵⁷

New technology and techniques are not always eagerly embraced by labour ward staff. Despite the advantages of PCEA, those unfamiliar with its mechanics and details are understandably perplexed by it and would rule against it in favour of a simpler continuous epidural infusion. Problems with methodology in the study of its effectiveness have created sceptics.

Combined-spinal Epidural (CSE) Techniques

This technique combines the rapidity, density and reliability of a spinal anaesthesia with the flexibility of a continuous epidural to extend the duration, and if necessary, the extent of analgesia.

It is especially useful for Caesarean deliveries where the spinal component provides a suitable block for surgery while the epidural component is used for fine-tuning the block height and even better, it provides postoperative pain relief.

In labour pains, the spinal achieves rapid analgesia while awaiting the epidural to take effect. It also has a role in establishing an epidural suitable for mobilisation, as elaborated later.

The combined-spinal epidural technique allows for smaller doses of local anaesthesia to be used, hence resulting in lower blood concentrations in mother and child. It reduces the disadvantages of spinal and epidural procedures but combines their advantages. It swiftly and effectively blocks the sacral nerve roots.⁵⁸

Disadvantages of Epidural Analgesia

Apart from the usual risks of accidental dural puncture and hypotension, other disadvantages include:

- 1) the lack of an urge to bear down, and a feeling of numbness of the lower body and perineum are some reasons cited as causes of maternal dissatisfaction with epidurals,²
- 2) being confined to bed,
- 3) possible prolongation of the second stage,
- 4) possible increased incidence of assisted delivery,
- 5) delayed onset of sacral analgesia,²
- 6) the encumbrance of an intravenous infusion, and

- 7) the need for electronic continuous foetal heart rate monitoring.

Mobile or ambulatory epidurals were developed to address some of the disadvantages of conventional epidurals.

Mobile Epidurals

There are distinct advantages of adopting an upright posture, in contrast to a recumbent posture during labour, apart from a known maternal preference for an upright posture and mobility.^{10,33} Upright posture seems to be associated with less pain, a shorter labour, and less difficulty bearing down. In addition, a better foetal heart rate pattern has been observed,^{59,60} with improved APGAR scores.

Advocates for mobility during labour have cited these theoretical advantages:

- 1) being upright decreases the incidence of aorto-caval compression, resulting in the birth of a newborn in a better condition,⁶⁰
- 2) moving the pelvis encourages engagement, correct positioning of the foetal head and improves the rate of spontaneous delivery,
- 3) the rate of cervical dilatation may be affected by the effect of gravity, _
- 4) a lower incidence of long-term backache is reported.⁶¹ Both abdominal and back pain with contractions were less with vertical (sitting or standing) positions,⁶²
- 5) with increased intensity but decreased frequency of contraction, a shorter first stage labour is achieved. There are also fewer operative vaginal deliveries reported⁶³⁻⁶⁶ as well as a lower incidence of Caesarean section,
- 6) with the patient being able to move her legs, there is a reduced need to catheterise the bladder. Not having to nurse a patient with a dense block is an advantage to the midwife, and
- 7) as pregnancy is a hypercoagulable state, avoidance of prolonged immobility and being able to change postures or move, is a distinct advantage in women at risk of developing pulmonary embolism.*

Establishing Mobile Epidurals

To achieve epidural analgesia without anaesthesia and minimal loss of motor power, the hourly rate of bupivacaine usage must be reduced. Two methods are available to achieve this:

- 1) Combined spinal-epidural technique to administer opioids and local anaesthesia. A spinal opioid alone or in combination with a local anaesthesia is administered into the subarachnoid space. This initial analgesia dose of opioid alone or opioid with bupivacaine provides between 30 and 90 minutes of analgesia with little or no bupivacaine.⁶⁷

A spinal injection of 25 µg of fentanyl or 5 to 10 µg of sufentanil resulted in profound rapid analgesia free of any local anaesthesia side effects, such as motor blockade and hypotension. 12.5 µg of sufentanil intrathecally caused a case of respiratory arrest 20 minutes after administration as reported by Baker and Sarner.⁶⁸

This initial injection of opioids alone will result in a reduction of bupivacaine requirement throughout labour to less than half that needed when using epidural injections of bupivacaine alone.^{69,70}

After this initial spinal injection, local anaesthesia alone or with an opioid is given epidurally. Combined spinal-epidural technique with ambulation has been shown to be associated with a lower risk of Caesarean section than a conventional epidural.⁷¹

A subarachnoid dose of 2.5 mg bupivacaine with 25 µg of fentanyl followed by epidural bolus of 10 to 15 ml 0.1% bupivacaine with 0.002% fentanyl achieved rapid, reliable analgesia and a consumption of less than 10 mg bupivacaine each hour throughout labour.^{72,73}

Camann and Abouleish⁷⁴ felt that the use of 2.5 mg of spinal bupivacaine do not add much pain relief but instead increased the risk of falling if ambulation is allowed.

In contrast to using epidural infusions, maintaining epidural analgesia with intermittent top-ups or PCEA have, interestingly, a 35% dose sparing effect.⁵⁵

- 2) The use of epidural opioids alone. Breen et al⁹ used a 75 µg bolus of epidural fentanyl followed by an infusion of 2.5 µg/ml at 15 ml/h, resulting in 70% patients ambulating. There was no incidence of hip flexion weakness or orthostatic hypotension, both of which precludes ambulation.

The disadvantage of this technique is a shorter duration of effective analgesia and less maternal satisfaction as compared to patients having local anaesthesia-fentanyl infusions as the response time by the staff to the patient's pain recurrence was slow.

Problems with Mobile Epidurals

The risk of falls after the establishment of ambulatory epidurals is a factor against its widespread use. Falls may result from dizziness which may occur after the use of high dose spinal opioids. It may also result from hypotension.

Hypotension is a known side effect of spinal and epidural injections⁷⁴ though Shennan et al⁷⁵ showed it not to be a problem when low dose bupivacaine mixtures were used.

It was during the first 30 minutes after a spinal injection that blood pressure falls occurred but during mobilisation or subsequent epidural top-ups, there were no important blood pressure changes as the sympathetic

blockade is very limited with a very low dose of bupivacaine. There is little requirement for intravenous fluids after an initial pre-loading.

The loss of proprioception may account for falls since it is an important component to enable normal walking. Buggy et al⁷⁶ used 0.1% bupivacaine 15 ml with fentanyl 2 µg/ml and showed preservation of power, coordination and reflexes in all lower limb muscle groups. Sixty-six per cent of their study group had abnormal distal proprioception and forty-four per cent had a positive Romberg's. Forty-four per cent of the patients did not feel confident walking unaccompanied, claiming their legs felt funny. The authors concluded that a safer option may indeed be standing or sitting rather than walking.

Some patients with neurological diseases affecting proprioception are not averse to walking¹ but then, accidents from a medically-induced cause have important medico-legal consequences.

Where a spinal injection was given to establish analgesia, the use of fine-gauge needles like 27 gauge Whitacre reduced the incidence of post-dural puncture headaches e.g. 7 out of 300 patients (about 2.3%) in a series conducted by Queen Charlotte's Hospital had post-dural puncture headaches.⁷³ There was a mere 0.13% incidence in their next series of 1565 patients and even then, this occurred after 2 or more dural punctures.²

The need for foetal heart monitoring must be considered. If continuous monitoring is needed, patients can be upright within the limits of the foetal monitor or sit in a chair.⁷³ Using intermittent monitoring allows greater patient mobility but only to walk in the company of the midwife and within the labour suites. Continuous monitoring using telemetry, if available, would be ideal. In all situations, it is deemed wise to be in consultation with the obstetrician.

The risks of maternal respiratory depression after the use of subarachnoid or epidural opioids is an area for concern. Some practitioners advocate that the combined spinal-epidural technique with opioids as part of the injectate, should be contraindicated if intra-muscular opioids had been given within the previous four hours.

Neonatal respiratory depression was not observed in the Queen Charlotte's series.¹

Other risks of subarachnoid and epidural injections include backpain, aseptic meningitis with subarachnoid blocks and rarely, neurological deficits.

The discomfort caused by pruritus from the use of opioids may present a problem despite having established successful labour analgesia.

Guidelines for Safe Ambulation

Guidelines must be available in the labour suite for the obstetric and anaesthetic team regarding suitability of

patients for ambulatory epidurals.

There must be no obstetric and anaesthetic contraindication to mobilisation.

Bromage score testing must establish normal leg strength before allowing ambulation. Ability to perform partial knee bends gave greater reassurances to a group of investigators.⁹

The presence of orthostatic hypotension contraindicates mobilisation.

There must be an accompanying person with the ambulating mother who must be kept in the confines of the labour ward.

The anaesthetist must be readily available to make frequent assessments of the sensory level, motor block and fitness to ambulate, although this can be done by the midwives where strict protocols are available.

Some anaesthetists prefer to omit the spinal injection component if rapid analgesia is not essential, and just allow for the epidural injection to establish analgesia. This seems reasonable since the complications of subarachnoid injections contribute to morbidity. It also subjects patients to the risks of both spinal and an epidural technique.

Hence, some practitioners use the epidural alone for analgesia and keep the combined spinal-epidural technique for patients who need a Caesarean section or who require a rapid onset of analgesia.

Conclusion

Labour epidural is an established form of effective analgesia which provides for a comfortable period during a painful time. In some medical conditions like pre-eclampsia, it is considered a necessity, providing, of course, that there is no coagulopathy present.

Many techniques of drug delivery through the epidural have been discussed, from simple "top-ups" to continuous infusions and patient-controlled epidural analgesia. Adjuvant drugs added to local anaesthetics to enhance the quality and duration of analgesia were also discussed. Clonidine, which prolonged the duration of analgesia had a dreaded tendency to cause abnormal foetal heart rate patterns in addition to maternal hypotension and sedation. Fentanyl and sufentanil are the favoured opioids in combination with low concentrations of local anaesthesia as they enhanced the quality of analgesia and reduced local anaesthesia usage.

The methods of establishing analgesia for ambulatory epidurals were discussed. The preservation of motor power improved maternal satisfaction and may help with cervical dilatation and engagement of the foetal head. Abolition of backpain may result from an upright posture. The guidelines for allowing patients to ambu-

late were mentioned.

The search continues for the ideal analgesic which is preferably non-invasive and safe, as effective as spinal and epidurals and does not complicate the labour process and is entirely acceptable to the mother. It is a difficult quest.

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