

Non-neuraxial analgesia in labour

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SAJAA 2008; 14(1): 98-100

ABSTRACT

Neuraxial analgesia remains the gold standard for achieving analgesia in labour. Many women, however, prefer to employ less invasive techniques to relieve pain during labour. Most non-neuraxial methods of analgesia will never provide complete pain relief during labour, but at best, represent techniques that allow a woman 'to cope' with her labour pain.

Introduction

Although neuraxial analgesia remains the gold standard for achieving analgesia in labour, many women prefer to employ less invasive techniques to relieve pain during labour. Factors influencing women's decisions range from the influence of natural childbirth training and anxiety about the adverse effects of neuraxial analgesia, to a genuine desire to have a medication-free delivery. In addition, neuraxial techniques may be contraindicated in specific medical/obstetric conditions.

It must be appreciated, and this fact needs to be emphasised to women, that most non-neuraxial methods of analgesia will never provide complete pain relief during labour, but at best represent techniques that allow a woman 'to cope' with her labour pain.

Women's views and experiences of pain and pain relief in childbirth

In a systematic review, Hodnett specifically addressed the issue of women's views on the experience of childbirth in relation to their intrapartum analgesia.¹ Women in labour, with no medical or obstetric complications, were studied. The most common method of assessment of satisfaction was a single visual analogue scale (VAS) score, usually made in the immediate postnatal period.

Analysis of the evidence from all the reviewed papers led to the conclusion that four factors were critical to women's experience of childbirth:

- Personal expectations
- The amount of support from caregivers
- The quality of the caregiver-patient relationship
- The involvement in decision making

These factors appear to be so important that they override the influence of age, socioeconomic status, ethnicity, childbirth preparation, medical interventions and pain when women evaluate their childbirth experience.

With respect to analgesia in labour, women are more satisfied with pain relief when their expectations of the pain and its relief are met. Failure of a chosen analgesic technique can result in dissatisfaction with the labour and delivery.

Simple analgesic techniques

Support during labour

A Cochrane review has specifically addressed the effect of continuous support for women during childbirth.² Fifteen trials involving 12 791 women in 11 countries were evaluated in the review. The review points out that, historically, women were looked after and supported by other women during labour and delivery. However, the move to hospital births, at least in the developed world, has altered the role of caregivers during

labour. The conclusion of the review is that women who had continuous one-to-one support during labour were more likely to have a spontaneous vaginal birth, less likely to require analgesia and less likely to report dissatisfaction with their childbirth experience.

Breathing and relaxation

One controlled trial of breathing and relaxation techniques was described in a systematic review³ of complementary therapies⁴ used during labour. Women were randomised into an experimental group that received 'respiratory autogenic training' (progressive muscle relaxation and focussed slow breathing) and a control group that attended a 'traditional psychoprophylactic course'. Although a significant reduction in reported intrapartum pain was noted for women in the experimental group, this was only found after adjusting for women who were very anxious during pregnancy. Postnatal reports of labour pain and labour experience did not differ significantly between the two groups. Therefore there is a lack of evidence that breathing and relaxation techniques reduce measured pain in labour. Whilst further, larger studies are required to prove efficacy, women should not be discouraged from using breathing and relaxation techniques during labour.

Touch and massage

A prospective cohort study, conducted in the US, examined the effect of therapeutic touch during labour (N=90). Women in the experimental group received touch from the midwife (e.g. handholding) for a period of five to ten seconds after each verbal expression of anxiety. The study was carried out during a 30-minute intervention period at the end of the first stage of labour (8 to 10 cm dilation). The control group received 'usual care'. Despite the seemingly short duration of the intervention, maternal anxiety (as measured by blood pressure, verbal expressions of anxiety and anxiety scores reported by the mother in the early postnatal period) was found to be significantly reduced ($p < 0.05$) in the experimental group compared with the control group.

The limited available evidence suggests that massage reduces a woman's measured pain and expressed anxieties during labour.

Hydrotherapy

"All maternity units should provide women with the option to labour and deliver in water. Election manifesto." - Tony Blair; 2005. UK.

There has been one major systematic review of the effects of immersion in water during labour.⁵ This systematic review included eight trials and indicated that the use of water in the first stage of labour reduced the use of regional analgesia. The review also found no difference in the duration of the first and second stages of labour, the operative vaginal delivery rate and the caesarean section rate. All maternity units should therefore provide women with the facilities to spend part or even most of their labour in an appropriate birthing pool.

Complementary and alternative therapies

Acupuncture

Acupuncture is not in widespread use in China as a means of relieving pain in childbirth and, perhaps significantly, no acupuncture points are described in traditional Chinese literature for pain relief in labour! In the Western world, early reports on the use of acupuncture for pain relief in labour indicated that, whilst mothers were enthusiastic, pain relief was minimal. More recently, some randomised controlled trials RCTs have tried to evaluate the use of acupuncture as an analgesic in labour. These RCTs suggested that acupuncture improved pain scores and reduced the use of both parenteral opioid and epidural analgesia. However, some of these RCTs had serious flaws. For example, in some of the studies the midwife performing the acupuncture was also clinically responsible for the patient and the patient only received other analgesics if "thought appropriate by the midwife".⁶

Current evidence suggests that, in most women, acupuncture does not provide adequate analgesia throughout labour. It can be cumbersome to use and requires the presence of a trained acupuncturist. However, before a definite conclusion can be reached, further high-quality RCTs, which should include sham acupuncture, should be undertaken.

Non-pharmacological analgesic techniques

Transcutaneous electrical nerve stimulation (TENS)

TENS is a technique whereby low-voltage electrical impulses are administered through electrodes that, for the relief of labour pain, are usually sited in the lower lumbar area. A systematic review on the efficacy of TENS was conducted in 1997.⁷ Articles included in this review were required to be full journal publications, to have documented pain outcomes, and to have included at least 10 patients in each treatment group. The review included 10 RCTs, among which three RCTs compared TENS with no TENS, seven compared TENS with sham TENS, and one of the RCTs did both. The 10 studies involved 877 women, of which 436 had received active TENS and 441 acted as controls (sham TENS or no treatment). None of the studies recorded any difference in pain intensity or pain relief scores between TENS and the controls. No differences were found in the need for additional analgesic interventions.

There is no evidence that TENS has any beneficial effect on labour pain, but, on the plus side, the technique showed no adverse side effects.

Sterile water blocks

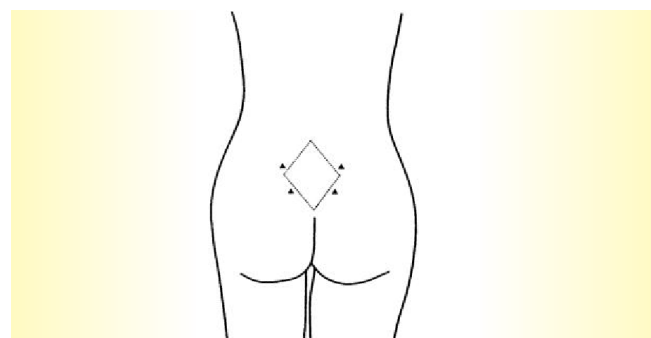
The sterile water blocks technique involves intracutaneous injections (shallow injections *within* the dermis) of sterile water in the lumbosacral area (see Figure 1). The mode of action is unknown, but it is probably a form of counter-irritation, invoking the gate control theory of pain. There have been two systematic reviews of this technique, both of which reviewed the same four published RCTs.^{4,5} In all four trials, back pain was significantly reduced for 45 to 90 minutes following the intradermal injections of sterile water as measured by a visual analogue scale (VAS). In three of the trials, despite the reported pain relief, there was no difference in the subsequent use of analgesia between the experimental and the control groups. Indeed, in one trial the use of subsequent analgesia was higher in the experimental group than in the control group. Intradermal water blocks do not reduce the use of analgesics during labour, probably because they do not relieve the significant abdominal component of labour pain. Also, one of the main disadvantages of this method of pain relief is the intense stinging pain that is experienced by many women during the administration of the intradermal injections.

Pharmacological analgesia in labour

Inhalational analgesia

Inhalational analgesia is provided by the inhalation of sub-anaesthetic concentrations of volatile agents, the aim being that the mother should remain conscious and her laryngeal reflexes

Figure 1: Sites in lumbosacral area for intracutaneous injections



be preserved. The technique first achieved fame and later gained widespread acceptance when John Snow administered chloroform to Queen Victoria for the birth of her eighth and ninth children in 1853 and 1857. A variety of agents have been employed over the years, including trilene, methoxyflurane and isoflurane, but all have been abandoned. Sevoflurane has recently been evaluated as an analgesic in labour. However, the only agent that has really survived the test of time is nitrous oxide, which is most commonly administered as Entonox[®] (a 50:50 oxygen:nitrous oxide mixture). It is notable that the use of Entonox is more widespread in the UK than in the USA.

The administration of nitrous oxide is usually via a demand valve connected to a facemask or mouthpiece. This demand valve only opens when the user applies negative pressure by inspiring through a mouthpiece or a properly applied facemask. The demand valve means that there is no flow from the system when the device is not in use.

A systematic review on the efficacy of N₂O was published in 2002 and indicated that there was a moderate level of evidence to support the use of N₂O in labour, in that N₂O is effective for some women and is associated with no apparent adverse outcomes for either mother or baby.⁸

Systemic opioid analgesia

Systemic opioids are the main analgesics used during labour worldwide. This is because opioids are readily available, cheap and easy to administer. Even in the USA, where epidural analgesia is universally available, opioids are still the most widely used form of analgesia in labour. Unfortunately, studies consistently show that the analgesia provided by systemic opioids, by whatever route or technique, is poor and there are concerns about their detrimental effects on the newborn.

Since its introduction into obstetrics during the 1940s, without any trials, pethidine has been the chief opioid employed during labour. Its perceived analgesic efficacy probably owes as much to its sedative as its analgesic effects. It was initially believed that meperidine caused little respiratory depression and that the effect on the foetus was minimal. Later studies demonstrated that the effect on the foetus was significant, with both respiratory depression and neurobehavioural changes.

Pethidine vs placebo

A double-blind RCT, conducted in Hong Kong, compared intramuscular (IM) meperidine with an IM placebo.⁹ Ethical considerations demanded that the initial study period (after which rescue analgesia would be available) would be limited to 30 minutes to minimise the period during which patients would be exposed to a placebo. A significant reduction in VAS pain score, 30 minutes post-administration, was found in the women who received pethidine (N=25) compared to those who had received the placebo (N=25). Eight women in the group that received pethidine required no further analgesia, compared with one in the control group (p=0.01). Thirty minutes after drug administration, the women were also asked to rate on a

five-point scale how satisfied they were with their analgesia (1 = totally dissatisfied, 5 = totally satisfied). Scores were significantly higher for women in the pethidine group, although neither had very high scores (the median was two in the pethidine group and one in the placebo group). Eight percent of the women in the pethidine group were totally dissatisfied (score = 1) with the pain relief received, compared with 60% in the control group.

Pethidine vs morphine

Olofsson et al studied IV morphine and pethidine in nulliparous women during active labour. All of the women were given three doses of IV morphine (0.05 mg/kg) or pethidine (0.15 mg/kg). Pain intensity and level of sedation were measured using a 10 cm VAS scale and were assessed before drug administration, and immediately after the first three contractions following each administration of morphine or pethidine. They found that very high pain scores were maintained in both groups and 15 of the 20 patients studied requested epidural analgesia. The parturients were all significantly sedated and several fell asleep, but they were awakened by pain during the contractions.

Pethidine and butorphanol

An RCT conducted in the US was designed to test whether a combination of meperidine and the kappa receptor agonist, butorphanol, was more effective than either drug alone.¹⁰ The study compared 1 mg butorphanol, 50 mg pethidine or both drugs in combination (0.5 mg butorphanol + 25 mg pethidine). The study was powered to observe a 30% reduction in pain intensity, which is the smallest reduction proposed to represent meaningful pain relief. Fifteen women were randomly allocated to each treatment group. Pain intensity, level of sedation and nausea were assessed using a 0 to 10 verbal scale just before drug administration and between the sixth and seventh contraction post administration. The women were also asked to choose words from a pain affective magnitude checklist to describe the pain of the previous two contractions. All three treatments reduced pain intensity by an average of 25 to 35% and, overall, only 29% of the women exhibited clinically meaningful pain relief. Sedation increased after all drug treatments and was similar in the three groups. Therefore, the poor efficacy of systemic opioids during labour (less than 30% of women will achieve meaningful analgesia during labour), combined with their effects on the neonate, suggests that women should not be encouraged to use these agents during labour.

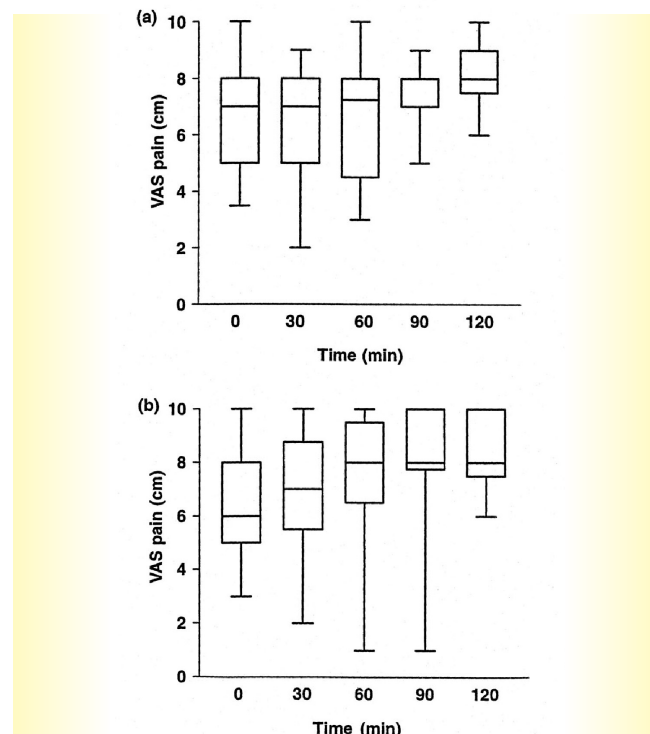
Remifentanyl

Neuraxial analgesia is contraindicated in some women and not desired by others, thus remifentanyl, a short-acting μ -opioid agonist, could be the opioid of choice for such women. The pharmacokinetics of remifentanyl has been investigated in babies under two months and the half-life is similar to that found in adults. Several small trials have evaluated the use of remifentanyl in labour.¹¹

In one RCT, women received either remifentanyl 40 g with a two-minute lockout (n=20) or pethidine 15 mg with a ten-minute lockout (n=20). Pain intensity (10 cm VAS), sedation scores (five-point scale), maternal satisfaction (ten-point VAS), vital signs, nausea and anxiety were evaluated at 30-minute intervals. Pulse oximetry and continuous foetal heart rate (FHR) monitoring were also performed. Eighteen women in the remifentanyl group continued to use the patient controlled analgesia (PCA) up to and during birth, compared with 14 women in the pethidine group. Almost all the women in both groups used Entonox[®] as well as IV PCA. No significant differences were noted for the mean pain intensity scores between the two groups, (see Figure 2; a = remifentanyl, b = meperidine). There were also no significant differences in nausea, sedation or oxygen saturations below 94% or below 90%. Satisfaction scores at 60 minutes were significantly higher for remifentanyl than meperidine. No significant differences were noted in the FHR, Apgar scores or cord blood pH.

Unfortunately, some studies have shown that remifentanyl can cause significant respiratory depression in women in labour and currently its use mandates one-to-one nursing and monitoring with maternal pulse oximetry and foetal cardiotocography (CTG). Further large-scale RCTs are required before remifentanyl can

Figure 2: Comparison of mean pain intensity scores experienced by patients on (a) remifentanyl and (b) meperidine



routinely be recommended as an analgesic in labour, although it may have a place in women in whom regional analgesia is contraindicated.

Delays in effective analgesic intervention

Many women, whether because they have a less painful labour or a higher pain threshold, do not require neuraxial analgesia. They merely need some help to deal with the pain of labour and any of the techniques described above could be adequate for such women. However, it is sometimes observed, particularly among the more radical midwives and doulas, that these techniques are offered in an attempt to delay and ultimately refuse neuraxial analgesia. Such behaviour must be resisted by ensuring that women are provided with clear information regarding the efficacy of all treatments used to achieve analgesia in labour. **SAJAA**

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