

## Remifentanil – use in labour

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Remifentanil is the first of a new class of ultra-short acting opioids. It is a potent  $\mu$ -opioid agonist with unique pharmacokinetics attributable to its ester structure. This labile ester linkage is hydrolysed by nonspecific plasma and tissue esterases. Of significance in obstetric anaesthesia is that these nonspecific esterases are present in normal levels from very early in fetal development. Remifentanil has a rapid onset of action, reaching a peak effect site concentration between 60 and 90 seconds. Subsequently it has a rapid and predictable offset of action with metabolism to inactive water soluble metabolites. The context sensitive half life is 3 minutes and is independent of organ function. The short half life remains constant even after repeated dosing or a constant infusion. Remifentanil does cross the placenta, but is rapidly metabolised by the neonate.

Epidural analgesia is, and probably will remain the “gold standard” for providing pain relief in labour. However there are situations where epidural analgesia is contraindicated or declined by some women. Inhaled nitrous oxide, intermittent intramuscular opioids and intravenous PCA opioids are alternatives currently used. All have limitations and untoward side effects for mother, neonate or both. Remifentanil has the advantage of rapid onset and offset of action which can be timed to coincide with the onset and offset of contractions. As with nitrous oxide this timing is critical and requires understanding by the mother. Remifentanil can be viewed as analogous to “iv nitrous”, but provides better analgesia. In keeping with the  $\mu$ -agonist nature of remifentanil, side effects in the mother include pruritus, nausea and vomiting and of most significance, respiratory depression, albeit transient. This mandates continual SpO<sub>2</sub> monitoring and the use of supplemental oxygen.

A good way of looking at what is currently known about remifentanil PCA is from the perspective of the questions prospective users ask –“FAQs”

### 1. Will remifentanil affect my baby?

Remifentanil is known to cross the placenta readily, but also to be rapidly metabolised by the fetus.<sup>1</sup> When remifentanil is used as part of a general anaesthetic technique for Caesarean section, there is commonly a requirement for short term respiratory support in the neonate.<sup>2</sup> However the doses of remifentanil used in this setting are much higher than that used for PCA in labour. There have been no reports of similar neonatal effects when remifentanil has been used for labour analgesia. There is improved neonatal outcome (neurobehavioural scores) when PCA remifentanil is compared with pethidine for labour analgesia.<sup>3</sup>

### 2. Will it affect me?

Troublesome nausea and vomiting, and pruritus are no more or less common than with other opioids and are reported in at least half of women using PCA in labour. Of more concern is the potential for opioid induced maternal sedation and respiratory depression. When all the studies which report respiratory effects are taken together, 78 out of 228 patients using remifentanil (32%) demonstrated some degree of respiratory depression.<sup>4</sup> Interestingly, even for women who have no analgesia it is quite common to see episodes of desaturation. In a study by Griffin and Reynolds, 46% of women who had no analgesia at all desaturated below 90% for between 30 seconds and 6 minutes per hour during the second stage of labour.<sup>5</sup> Nonetheless, at this stage it is recommended that women using PCA remifentanil should receive supplemental oxygen and be monitored with continuous pulse oximetry.

### 3. Will it work?

It certainly won't be as good as an epidural, but variable reductions in mean Visual Analogue Scores (VAS) of up to 30mm are reported.<sup>6</sup>

### 4. Will it increase the risk of instrumentation?

At this stage there are no prospective data to say if remifentanil PCA alters the likelihood of obstetric intervention one way or another.

## Summary

- PCA remifentanil is an imperfect, but useful means of providing first stage analgesia in labour.
- It is less effective than epidural analgesia, but may be useful where regional techniques are contraindicated or declined by the mother.
- There is a real risk of maternal respiratory depression with the use of PCA remifentanil.
- Neonatal effects are minimal or non-existent if the PCA use is ceased prior to delivery.
- Prospective data regarding the effects of remifentanil on labour outcome are lacking.

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## Specific References

- 1 Kan RE, Hughes SC, Rosen MA, Kessin C, Preston PG, Lobo EP. Intravenous remifentanil: placental transfer, maternal and neonatal effects. *Anesthesiology* 1998; 88:1467-74.
- 2 Van de Velde M, Teukens A, Kuypers M, Dewinter T, Vandermeersch E. General anesthesia with target controlled infusion of propofol for planned caesarean section: maternal and neonatal effects of a remifentanil-based technique. *Int J Obstet Anesth* 2004;13:153-8.
- 3 Blair JM, Dobson GT, Hill DA. Patient controlled analgesia for labour: a comparison of remifentanil with pethidine. *Anaesthesia* 2005; 60:22-7.
- 4 Van de Velde M. Opposer – debate. Remifentanil patient-controlled analgesia should be routinely available for use in labour. *Int J Obstet Anesth* 2008;17:339-41.
- 5 Griffin RP, Reynolds F. Maternal hypoxaemia during labour and delivery: the influence of analgesia and effect on neonatal outcome. *Anaesthesia* 1995; 50:151-56.
- 6 Volmanen P, Akural E, Raudaskoski T, Alahuhta S. Remifentanil in obstetric analgesia: a dose finding study. *Anesth Analg* 2002; 94:913-17.

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General Reference

David Hill. Remifentanil in obstetrics. *Current Opinion in Anaesthesiology* 2008; 21:270-74.