# OBSTETRIC REMIFENTANIL PCA

<table>
<thead>
<tr>
<th>Operations Directorate:</th>
<th>Maternity and Children’s Service</th>
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<tbody>
<tr>
<td>Name of Guideline:</td>
<td>OBSTETRIC REMIFENTANIL PCA</td>
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<tr>
<td>Guideline No:</td>
<td>254</td>
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</tbody>
</table>
| Author/Reviewed by:    | Jon Danks, Consultant Anaesthetist  
                           | Adrian Jennings, SPR             |
| Version:                | 1                                |
| Ward/Department:        | Maternity Unit                   |
| Replacing Document:     | N/A                              |
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| Related Guidelines:     | Obstetric Anaesthetic guidelines  |
| Key Words (search)      | Pain relief                      |
| Guidelines and Policies checklist: | Appendix 4 |
1. INTRODUCTION

Remifentanil is a short acting opioid analgesic drug. It provides effective labour analgesia following intravenous administration via a patient controlled analgesia (PCA) pump, acting within 1-2 minutes. In common with other opioids (e.g. intramuscular diamorphine), it may cause maternal sedation, respiratory depression, pruritus and nausea and vomiting. Remifentanil freely crosses the placenta, but has no clinically significant neonatal depressant effects at doses commonly used. Its use in labour is widespread but unlicensed.

2. INDICATIONS

There are very few women for whom remifentanil PCA is indicated. Remifentanil PCA may be considered for analgesia in labour when epidural analgesia is contraindicated or not wanted, and pethidine is unsuitable. Use of remifentanil PCA should be agreed by the anaesthetic and obstetric teams.

Examples of times when it may be appropriate include:

- coagulopathy, thrombocytopenia or full anticoagulation
- metalwork or anatomical deformity of the lumbar spine
- sepsis
- certain neurological diseases e.g. demyelination
- morbid obesity when epidural may be technically difficult

3. CONTRAINDICATIONS

- Allergy to opioid drugs
- Other parenteral opioid administration within preceding four hours
- Adequate monitoring and staffing unavailable

4. RATIONALE FOR RECOMMENDATIONS

The intravenous administration of remifentanil via a patient controlled analgesia (PCA) device is advantageous for following reasons:

- It matches the time course of labour as it has a rapid onset and offset.
- It is non-cumulative and it has few maternal and neonatal side-effects.
- Transient loss of variability in CTG trace may occur in a small number of cases. However, they are much less frequent than those observed during systemic administration of other opioids, and rarely require intervention.
- Administering remifentanil by PCA is safe and minimises side-effects. When compared to PCA pethidine, PCA remifentanil has better pain scores, greater maternal satisfaction, less maternal desaturation and fewer CTG abnormalities.
- Maternal sedation and desaturation happens in a minority of women and is transient and self-limiting.

There is little doubt that epidural analgesia leads to superior pain relief. It seems that remifentanil produces clinically effective, but not complete, analgesia.
5. CRITERIA FOR USE

- A midwife must be assigned to give one to one care.
- Any woman requesting remifentanil PCA should be more than 36 completed weeks gestation and be in established labour.
- Remifentanil PCA may be considered for use at less than 36 weeks gestation following intrauterine death or termination of pregnancy for foetal abnormality.
- Entonox and/or TENS may be used in addition
- SpO₂ monitoring must be established before the woman starts using the PCA and must be monitored continuously while the remifentanil PCA is being used.

6 PROFESSIONAL ROLES

6.1 Patient Preparation

- The woman should be issued with and have read the remifentanil PCA patient information sheet.
- The woman should be informed of the common side effects, such as drowsiness, itch, nausea and dizziness.
- **Do not commence remifentanil PCA if baseline SpO₂ < 95%**.
- No other type of opiates should be administered simultaneously.
- **A dedicated intravenous cannula must be used with remifentanil PCA. Do not administer any other drugs or fluids through this cannula.**
- The patient should be shown how to use the PCA and should be told to press the button just before or at the start of a contraction
- Only the labouring woman can press the remifentanil PCA demand button. The demand button must not be pressed by non-anaesthetic staff or the birth partner.
- A pulse oximeter (oxygen saturation) probe must be attached before the PCA is started.
- **Oxygen must be administered via nasal cannula (2 litres/min) to all women (irrespective of SpO₂).**
- Ensure a bag & mask is available in the room.
- Complete the Remifentanil Labour Analgesia Proforma to ensure the correct procedures have been followed.

6.2 Equipment Required

- Syringe
- IVAC PCAM pump. This has been **pre-programmed** with the appropriate regime. No other type of pump is to be used. For your information, the regime used is bolus = 1 mL; delivery = stat; lockout = 2 min [no loading or background].
- Alaris MFX2258 extension set which has anti-syphon and anti-reflux valves (as used for syntocinon).
- Dedicated IV cannula (20G pink ideal)

6.3 Syringe Preparation

- **The anaesthetist is responsible for preparation of the syringe.** Non-anaesthetic staff must not prepare the syringe. The drug is kept in theatre.
- The drug must be prescribed on a 'PCA Infusion' prescription sheet by the anaesthetist.
- Remifentanil is stable for 24 hours at room temperature after reconstitution
• The strength of the mixture used is based on maternal booking weight. The protocol is as below:

<table>
<thead>
<tr>
<th>Mix A: Booking weight &lt;60 kg</th>
<th>Remifentanil 1 mg in 50 mL of Saline (concentration = 20 mcg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mix B: Booking weight 60-90 kg</td>
<td>Remifentanil 1.5 mg in 50 mL of Saline (concentration = 30 mcg/mL)</td>
</tr>
<tr>
<td>Mix C: Booking weight &gt;90 kg</td>
<td>Remifentanil 2 mg in 50 mL of Saline (concentration = 40 mcg/mL)</td>
</tr>
</tbody>
</table>

• The anaesthetist is responsible for ensuring the pump is correctly programmed and should attach the PCA to the patient.

7. MATERNAL INSTRUCTIONS

• Press the handset at the first subjective sign or in anticipation of labour contraction.
• It will take 20 seconds for the remifentanil to reach the brain and 1 minute to reach its peak effect.
• Do not use the handset in-between contractions.
• You alone should operate the handset. It is forbidden for partners/relatives or midwives to operate the pump on your behalf.

8. MONITORING

• An ‘Observation Chart for use with PCA pumps’ (Appendix 3) must be used for all women using remifentanil PCA.
• Baseline observations of maternal pulse, blood pressure, respiratory rate, SpO₂ and pain, pain and sedation scores should be measured before remifentanil PCA is commenced.
• SpO₂ monitoring must be used continuously during remifentanil PCA use.
• All other observations should be measured and recorded every 30 minutes.
• Continuous CTG monitoring.
• The integrity of the IV site, number of tries/good tries and volume remaining in syringe should also be recorded.
• The patient should not be left unattended for the first 30 mins of PCA use.

9. OXYGEN THERAPY

• Oxygen (2 litres/min) should be administered via nasal cannula to all women irrespective of SpO₂ and continued for the remainder of remifentanil PCA use.
• If SpO₂ remains < 90% despite oxygen therapy, contact the duty anaesthetist immediately and remove the handset from the patient so that they cannot continue with therapy.

10. INDICATIONS FOR CONTACTING THE ANAESTHETIST (bleep 1032)

• SpO₂ < 90% despite oxygen via nasal specs.
• Sedation score > 2 Moderate (frequently drowsy).
• Respiratory rate < 10 breaths per minute.
• PCA pump troubleshooting.
• Any other concerns.
11. POINTS OF SAFETY

- Always use a dedicated cannula
- Always flush the cannula after the PCA is removed with 5 ml saline
- Do not give any other drugs via the PCA cannula
- Only the patient is to use the PCA button
- The PCA button is not to be pressed by midwifery staff or the patient’s relatives
- The PCA can be used during delivery and for the repair or tears and episiotomies

12. REFERENCES

**APPENDIX 1: ADVICE ON EMERGENCY MANAGEMENT**

**Respiratory Depression**
Remifentanil is a potent respiratory depressant, although has a very short half life. It is vital to closely monitor respiratory rate and depth.

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| Respiratory rate less than 10 /minute or Pulse Oximetry less than 95% | Stop PCA pump  
Call anaesthetist (or MET team if unavailable)  
Change oxygen to face mask and increase to 15 L/min  
Awaken patient if possible  
Prepare 400 mcg naloxone |
| Respiratory arrest | Stop PCA pump  
Administer basic life support  
Call crash team on 2222 |

**Sedation**
Increasing sedation score is an important precursor to more serious side effects such as respiratory depression.

<table>
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<th>Emergency Management of Over-Sedation</th>
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| Sedation score = 3 (difficult to rouse) | Stop PCA pump  
Call anaesthetist (or MET team if unavailable)  
Change oxygen to face mask and increase to 15 L/min  
Prepare 400 mcg naloxone |
Remifentanil PCA for women in labour who cannot have an epidural

- **What is remifentanil PCA?**

Remifentanil PCA is the name given to a type of pain relief offered during labour. Remifentanil is a morphine-like drug, which has been shown to be useful in reducing the severity of pain during labour. Although remifentanil cannot provide complete relief of pain, many women find it helpful. Remifentanil is a very short acting drug, which must be given through a pump attached to a dedicated ‘drip’ in your hand or arm. It works very quickly as it is always given directly into the blood and then quickly travels to the brain to give pain relief.

- **Who can use remifentanil?**

Most women can use a remifentanil PCA for relief of pain during labour. If you have an allergy to morphine-related drugs we would recommend you did not use remifentanil PCA. This type of pain relief is also not suitable if your midwife has given you pethidine within the last 4 hours. Choosing remifentanil PCA does not restrict your choice of additional pain relief in labour. You may use gas and air (Entonox) at any time.

- **How is it given?**

We use a special electronic pump to give remifentanil during labour. This is called a PCA pump (or Patient Controlled Analgesia pump). This is connected to a cannula (“drip”) in your hand or arm. You will be given a button to press, which tells the machine to give you a dose of the medicine. The pain relieving effect is felt usually in 20 to 30 seconds, and wears off again within a few minutes. Press the button at the start or in anticipation of a contraction. It can take some time to learn how to time pressing the button. There is a safety feature built into the pump so that you can only get a safe amount of the drug. You can use the pump at any time right up to your delivery if you wish. The effects will still wear off very quickly when you stop using the pump after your baby has been born.

- **Are there any unwanted effects of remifentanil?**

Remifentanil can make you feel nauseous, dizzy and sleepy, especially between contractions. This will wear off very quickly if you decide to stop using the pump. Remifentanil may also cause the oxygen level in your blood stream to fall and therefore oxygen is given through to all women through nasal prongs. Your midwife will continuously measure your oxygen level using a small peg-like sensor placed your finger. Remifentanil has been shown to be safe for babies, with no other effects seen that don’t already occur with pethidine.

- **When can I ask for remifentanil?**

You can request remifentanil PCA at any time in your labour. Your midwife will call the duty anaesthetist to prepare the pump for you. This may take a few minutes, but once set up it will be ready to use almost immediately. Please ask if you have any questions or worries. Whether you have the remifentanil PCA is your decision but we will give you as much information as we can to help you to make it.
FURTHER INFORMATION FOR ANAESTHETISTS

Pharmacology

It is the responsibility of the anaesthetist to teach the woman in labour how to use the PCA device i.e. to press the handset at the first subjective sign or in anticipation of labour contraction to make it effective. It will take 20 seconds for the remifentanil to reach the brain (one brain-arm circulation time) and 1 minute to reach its peak effect (t ½ ke0: 1.3 min). Context sensitive half life is 3 min. The analgesic half-life is 6 min, thus allowing effective analgesia for several consecutive contractions. IV bolus dose delivered at the beginning of a contraction (lasting on average 70 s) is likely to provide analgesia for the following contraction.

Preparation

- Please complete the Remifentanil Labour Analgesia Proforma. This is a useful aide memoir to ensure the correct protocol has been followed.
- The correct syringe concentration is selected based on the patient’s booking weight.
- Only the 3 specified strengths should be used (Mix A, B and C).
- The drug is stored in the emergency theatre and the ODP will need to check the drug out with you. They should also act as the second ‘checked by’ signature on the red infusion label.
- The IVAC pumps have been pre-programmed with these 3 mixes and the anaesthetist must make the selection. It is not possible to re-programme the pump for safety reasons. The programme is Bolus = 1 mL ; Delivery = stat ; Lockout = 2 min [no loading or background]. The dose approximates to 0.3 – 0.5 mcg/kg.
- The PCA must be prescribed on the standard PCA prescription chart, amended for remifentanil.

Monitoring

- Oxygen is to be given to all women irrespective of baseline SpO2. This is to ensure a margin of safety.
- The mother must not be left unattended by the midwife for the first 30 mins.
- The anaesthetist should remain in the room with the patient for the first few tries to exclude adverse effects.

Dosing

- Should the bolus dose prove to be inadequate or excessive, the mix can be revised e.g. from A to B, or B to A, but must always be one of the 3 standard concentrations. It would be appropriate to discuss such changes with the on-call consultant. Non-standard mixes must not be used.

Adverse Effects

Respiratory depression, excessive sedation and bradycardia are potential hazards. Criteria for the midwife calling the anaesthetist are documented on the Remifentanil Labour Analgesia Proforma. Anaesthetic management of these emergencies is:

**Respiratory Depression**

- Attempt to awaken the patient.
- Administer naloxone up to 400 micrograms.
- Stop the use of PCA remifentanil temporarily until patient is fully awake and appropriately responsive.
- Consider reducing the strength of the mixture (e.g. if on mix B, use weaker mix A etc). DO NOT REPROGRAMME THE PUMP.
- If the episode of respiratory depression recurs despite using only 20 micrograms per bolus stop the use of PCA and discuss with a consultant.

**Excessive sedation:** i.e. sedation score ≥3

- Action: Similar to above.

Along with overdose of remifentanil, one should also rule out other causes if the sedation is refractory to above measures; i.e. hypoglycaemia, hypoxia, cerebrovascular event, etc.

**Bradycardia** (heart rate < 50 per minute) or **hypotension** (systolic B.P. decreased by >20 mmHg)

- Should be appropriately treated with glycopyrrolate and/or ephedrine.
Appendix 3
Dudley Group of Hospitals NHS Foundation Trust
REMIFENTANIL LABOUR ANALGESIA PROFORMA

Date.............................. Time...............................  
Anaesthetist .........................................................  
Signed........................... Weight...........................  

Indication(s) ........................................................ .....  
PMH........................... ........................... Drugs........................... ...........................Allergies...........................  

PREREQUISITES (all must be met)

• Patient info sheet given                   • Midwife available to give one-to-one care
• Baseline SpO₂ >95% on air                • >36 weeks gestation
• No pethidine in previous 4 hours          •

INDICATE MIXTURE TO BE USED

Mix A: Booking <60 kg: Remifentanil 1 mg in 50 mL of Normal Saline (concentration = 20 mcg/mL)
Mix B: Booking 60-90 kg: Remifentanil 1.5 mg in 50 mL of Normal Saline (concentration = 30 mcg/mL)
Mix C: Booking >90 kg: Remifentanil 2 mg in 50 mL of Normal Saline (concentration = 40 mcg/mL)

Syringe Preparation

• Separate dedicated IV cannula           • Appropriate programme selected on IVAC pump
• Alaris MFX2258 giving set              • ‘PCA Infusion’ prescription sheet complete

Monitoring

• Midwife to stay in room for first 30 mins • ‘Observation Chart for use with PCA pumps’ started
• O₂ 2 litres/min via nasal cannula for all patients • Monitoring available. Continuous SpO₂.

Maternal Instructions

• Press the handset at the first subjective sign or in anticipation of labour contraction.
• It will take 20 seconds for the remifentanil to reach the brain and 1 minute to reach its peak effect.

Post Delivery

Please record: Method of delivery: NVD / instrumental / LSCS Time of delivery: ........ : ........

Points of safety:

• Always use a dedicated cannula
• Always flush the cannula after the PCA is removed with 5 ml saline
• Do not give any other drugs via the PCA cannula
• Only the patient is to use the PCA button. The PCA button is not to be pressed by staff or relatives
• If SpO₂ remains < 90% despite oxygen therapy, contact the duty anaesthetist immediately and remove the handset from the patient so that they cannot continue with therapy.
GUIDANCE FOR MIDWIVES

MONITORING

- Record observations on ‘Observation Chart for use with PCA pumps’
- All observations should be measured and recorded every 30 minutes.

- **Continuous** SpO2 monitoring
- Respiratory rate and sedation score
- BP monitoring
- Pain score
- Sedation score
- IV site integrity
- Continuous foetal heart rate monitored with CTG
- Number of Tries/Good Tries
- Volume remaining in syringe

**Indications for contacting the anaesthetist (bleep 1032)**

- SpO2 < 90% despite oxygen via nasal specs.
- Sedation score > 2 Moderate (frequently drowsy).
- Respiratory rate < 10 breaths per minute.
- PCA pump troubleshooting.
- Any other concerns.

**EMERGENCY MANAGEMENT**

**Inadequate Analgesia**

- Ensure IV site is intact and there is no pump malfunction
- Re-educate mother as to appropriate timing of PCA bolus
- Seek advice from the obstetric anaesthetist

**Respiratory Depression**

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**Emergency Management of Respiratory Depression**

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<td>Awaken patient if possible</td>
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**Respiratory arrest**

- Stop PCA pump
- Administer basic life support
- Call crash team on 2222

**Sedation**

Increasing sedation score is an important precursor to more serious side effects such as respiratory depression.

**Emergency Management of Over-Sedation**

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## Appendix 4

Maternity Services Guideline and policies group checklist

Guideline name: Obstetric Remifentanil PCA

Date: 01/08/11

<table>
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| Guideline development/review approved by Guidelines and Policies Group | √ |   |
| Guideline submitted as per agreed deadline | √ |   |
| Guideline submitted using agreed template | Being re typed |   |
| Guideline contains agreed headings | Being re typed |   |
| Sub-headings in Arial point 12, UPPERCASE and Bold | Being re typed |   |
| All headings are point numbered | √ |   |
| Pages are numbered | √ |   |
| References included and appropriate | √ |   |
| Minimum CNST Criterion included (as applicable) | N/A |   |
| If yes – guideline checked against criterion |   |   |
| All appendix attached (as applicable) | √ but not referred to in main body or text |   |
| All appendix referred to in guideline (as applicable) | √ but not referred to in main body or text |   |
| Patient Information attached (as applicable) | Yes |   |

**Comments:**

To be re-typed in approved format

| Guideline approved to go to Risk Management: | √ |   |
| Guideline not approved, to be presented at the next meeting: |   |   |
### Dissemination and Implementation Process

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<tr>
<td>Put on the HUB as PDF</td>
<td>√ 9/8/11</td>
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<tr>
<td>Put PDF copy in folder on the W Drive for staff access</td>
<td>√ 12/8/11</td>
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<tr>
<td>Update guideline database</td>
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<tr>
<td>Email to all staff, include instruction</td>
<td>√ 12/8/11</td>
</tr>
<tr>
<td>Put into CHATTE</td>
<td>Sept 2011</td>
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<tr>
<td>Put on Clinical Governance notice boards</td>
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**New practice/Changes to practice required**

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On completion this proforma is attached to the appropriate guideline

April 2011