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Remifentanil Patient Controlled Analgesia (PCA) in Labour Guideline

Summary statement: How does the document support patient care?	A Remifentanil PCA will provide a safe, effective alternative analgesic option for those labouring women/people in whom epidural analgesia is contraindicated or has failed.
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For use by:	Anaesthetists, Midwifery staff and Clinical Nurse Specialist In-patient Pain Service
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Remifentanil Patient Controlled Analgesia (PCA) in Labour Guideline

1.0 Aim

To provide guidance for Obstetric, Anaesthetic, Midwifery and clinical nurse specialist In-patient Pain Service (CNS IPS) staff to enable the safe delivery of remifentanil patient controlled analgesia (PCA) analgesia for women/people in labour who are unable to have an epidural.

A remifentanil PCA has become an increasingly popular alternative to other opioids such as diamorphine in patients who do not want or cannot have an epidural. One of the known side effects of remifentanil is respiratory depression in the mother and at higher doses (40mcg) can cause respiratory depression in 1 in 10 women/people. There are no known case reports of respiratory depression in babies born to mothers using remifentanil PCAs.

The main change in this guideline is to increase the safety features of remifentanil PCAs by the following:

1. Bolus dose reduced to 20mcg initially then increased to 40mcg as necessary.
2. PCA button handset to be removed and retained by midwife if at any point the midwife needs to leave the room. This ensures 1:1 midwifery care.
3. Lockout period remains at 3 minutes (increased from 2 minutes).
4. Give supplemental oxygen if SaO_2 < 94% (increased from 92%).
5. PCA should be stopped 5-10 minutes before cord clamping.
6. Paediatric doctor is not required to attend the delivery (mirrors other Trust's guidelines).

2.0 Scope

- Anaesthetists
- Obstetricians
- Midwives
- CNS IPS working within the maternity service.

3.0 Responsibilities

3.1 Anaesthetists, midwives, obstetricians and CNS IPS:

- To access, read, understand and follow this guidance.
- To use their professional judgement in application of this guideline.

3.2 Management:

- To ensure the guideline is reviewed as required in line with Trust and National recommendations.
- To ensure the guideline is accessible to all relevant staff.

4.0 Introduction

The guidance is designed to provide an analgesia alternative for labour in women/people who cannot have an epidural or choose not to have an epidural. **It is not designed to replace epidural analgesia for labour.** A remifentanil PCA will provide a safe, effective alternative analgesic option for pregnant women/people in whom epidural analgesia is contraindicated or has failed.

Remifentanil is an ultra-short acting opioid analgesic drug with a half-life of 2 to 4 minutes. It acts within 2 minutes and is rapidly metabolised in the mother and fetus by tissue and red blood cell esterases. It does not accumulate in the mother or fetus so regardless of the length of time the drug has been used the drug will wear off in about 3 minutes.

PCA remifentanil has been shown to be superior to either intramuscular (IM) or intravenous (IV) pethidine for labour analgesia. In obstetric units where PCA remifentanil is used routinely, the conversion rate to epidurals is about 9% which indicates that in some cases analgesia is inadequate. Epidurals remain the gold standard for labour analgesia.

Remifentanil PCA reduces, but does not abolish, labour pain and women/people should be made aware of this. **Remifentanil can be used in conjunction with Entonox** but it may increase sedation so only offer Entonox once established on the remifentanil PCA.

Neonatal complications have not been reported although published work has not included preterm neonates. **Remifentanil should not be used at a gestation less than 36 weeks** unless agreed by a consultant anaesthetist and obstetrician or the fetus is non-viable.

5.0 Side effects

- Maternal sedation (25%)
- Reduced respiratory rate (25%)
- Apnoea (very rare and responds to tactile or verbal stimulation)[14]
- Itching (2%)
- Nausea and vomiting (15%)
- Dizziness
- Reduced fetal heart rate variability on the CTG

6.0 Indications

- Where epidural analgesia is contraindicated e.g. clotting abnormalities, spinal surgery, spinal cord problems, local/generalised sepsis, patient refusal. The patient will usually have been seen in the anaesthetic antenatal clinic and there will be an anaesthetic plan in their handheld notes or a letter on Medway or Evolve.
- At maternal request if midwifery staffing levels allow.

7.0 Contra-Indications (Absolute & Relative (R))

- Inadequate midwifery staffing to provide 1:1 care.
- Known allergy to opioid drugs.
- **Recent opioids within 4 hours** e.g. IM Morphine or if anaesthetist considers the patient to be too drowsy.
- Must not run concurrently with an epidural.
- Baseline SaO_2 < 95% on room air or concurrent respiratory and / or cardiac disease.
- Fetal compromise e.g. PET - discuss with Obstetric and Neonatal teams (R).
- Gestation less than 36 weeks unless agreed by a consultant anaesthetist and obstetrician or the fetus is non-viable (R).

8.0 Absolute requirements before considering

- The patient should be issued with and have read the remifentanil PCA patient information leaflet and give verbal consent.
- **A midwife to be continuously in the room to provide one to one care**. This means that the midwife should not leave the room unless relieved by another midwife even in cases of IUD.
- Dedicated IV cannula for PCA use only.
- The on-call anaesthetist and Labour Ward co-ordinator must be informed and agree.
- Oxygen saturation (SaO_2) monitoring must be established before the woman/person starts using the PCA and must be monitored continuously while the remifentanil PCA is being used and for 15 minutes after discontinuation of the PCA.
- Anaesthetist must be present on labour ward for the first 15 minutes of use.
- A remifentanil PCA observation chart must be completed while the PCA is in progress.
- **Naloxone 400 microgram** (mcg) (opioid antagonist) should be prescribed on the drug chart and readily available in the room for administration to the woman/person.

9.0 Reasons to discuss with Consultant Anaesthetist

- For an increase in the bolus dose above 40 mcg.
- **If the patient is on drugs which might slow the heart rate down e.g. beta-blockers or calcium channel blockers.**
- Maternal cardiac and respiratory disorders.
- Morbid obesity.

10.0 Complications

Complication	Incidence
Desaturation < 90%	Common
Decreased respiratory rate	
Drowsiness	
Poor CTG	Variable

11.0 Monitoring and other requirement

- Continuous SaO_2 monitoring.
- Oxygen must be available and administered by nasal cannula or facemask at 2-4 L/min if SaO_2 is less than 94%. If SaO_2 is still below 92% despite oxygen administration call the anaesthetist.
- Continuous CTG monitoring.
- Sedation score and respiratory rate every 5 minutes for 30 minutes after initiation, then every 30 minutes thereafter.
- Measure the pulse every 30min.
- NIBP every 60mins **(Do not place NIBP cuff on same arm as the cannula).**
- Omeperazole 20mg (PO) administered 12 hourly and cyclizine 50mg (IM/IV) should be prescribed and administered 8 hourly.
- Patients should not eat whilst using the PCA but may have sips of water.
- Monitoring should continue for at least 15 minutes after the remifentanil PCA has stopped.
- **If the midwife needs to leave the room the PCA handset should be taken with them as a safety precaution.**

12.0 Set up

- PCA pump and drug should be mixed, prepared and connected up by the anaesthetist and the mixing checked with the labour ward midwife or ODP.
- Separate, dedicated intravenous cannula ideally at forearm (won't be occluded by patient movement). PCA line connected directly to IV cannula.

- Dilution method:

  Make up a solution of **50mcg/mL of remifentanil** in 0.9% sodium chloride
  Using 100mL: **5mg Remifentanil in 100mL 0.9% sodium chloride**

PCA set up:

- **PCA dose 20mcg** (= 0.4mL) delivered stat
- **3 minute lockout**
- No loading dose
- No background infusion
- Maximum 800mcg/hour
- Note this is a low dose PCA set up and a standard PCA set up is 30-40mcg with a 3 minute lockout. The Anaesthetist can change the patient to this dose once established on 20mcg dose if required.

13.0 Points of safety

- **Anaesthetist must be present on labour ward for the initial bolus and first 15 minutes of remifentanil PCA use.**
- Always use a dedicated cannula.
- Always flush the cannula after the PCA is removed (10 mL sodium chloride).
- Do not give any other drugs via the PCA cannula.
- Only the patient is to use the PCA button. It is **NOT** to be pressed by **midwifery staff**, or the **patient's relatives.**
- **The PCA button should be removed and taken with the midwife if she needs to leave the room.**
- Can be used in conjunction with Entonox.
- The PCA can be used during delivery and for the repair of tears and episiotomies.
- **Naloxone should be readily available in the room and prescribed on the drug chart** as 100 microgram every 2-3 min.

14.0 Trouble Shooting

14.1 Analgesia not effective

Educate the woman/person to co-ordinate the bolus dose with the contraction. Entonox may be necessary.

14.2 Maternal desaturation

- Give oxygen supplementation (2-4 L/min via nasal prongs).
- If respiratory depression is more profound, i.e. SaO_2 is less than 92% despite supplemental oxygen, the PCA handset should be temporarily removed from the patient, encourage them to take deep breaths and call the anaesthetist to reduce the PCA dose.
- The bolus dose should be reduced by 10mcg and the patient observed with further reductions in the bolus dose if respiratory depression persists.
- Naloxone should be available and used in cases of severe respiratory depression.

14.3 Sedation

Excessive sedation is rare. If it occurs reduce the bolus dose or stop the PCA.

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14.4 Nausea & Vomiting

Prescribe cyclizine 50mg IM/IV tds and consider Ondansetron 4mg IM/IV tds.

14.5 Pruritus

This is usually worst in the first two hours. Prescribe Chlorpheniramine 4mg PO/ 10mg IM or IV. If severe reduce the bolus dose of remifentanil or stop the PCA.

15.0 How to explain the PCA to the woman/person

- It might help to say that it is a fast acting strong pain relieving drug delivered into the vein every time they press the PCA button and it wears off in between contractions.
- It is not licensed for this use but is widely used in many hospitals around the world including the UK.
- Timing of pressing the button is important and should be done before the contraction starts or as soon as it's anticipated.
- Inform the woman/person of the side-effects including drowsiness, itching, nausea, dizziness and transient lower oxygen saturations requiring supplemental oxygen.

References

Blair JM, Dobson GT, Hill DA, McCracken GR, Fee JPH. Patient controlled analgesia for labour: a comparison of remifentanil with pethidine. Anaesthesia 2005; 60: 22-27

Evron S, Glezerman M, Sadan O, Boaz M, Ezri T. Remifentanil: A novel systemic analgesic for labour pain. Anaesthesia and Analgesia 2005; 100: 233-238

Marwah R, Hassan S, Carvalho JC,et al. Remifentanil versus fentanyl for intravenous patient-controlled labour analgesia: an observational study. Can J Anaesth. 2012 Mar; 59(3):246-54

Marr R, Hyams J, Bythell V. Cardiac arrest in an obstetric patient using remifentanil patient-controlled analgesia. Anaesthesia 2013 Mar;68(3):283-7

Melber A, Jelting Y ,Huber B et al Remifentanil patient-controlled analgesia in labour: six-year audit of outcome data of the RemiPCA SAFE Network (2010–2015). IJOA 2019; 39:12-21.

Morley-Forster P.K. and Weberpals J. Neonatal effects of patient-controlled analgesia using fentanyl in labor. International Journal of Obstetric Anesthesia, Volume 7, Issue 2, April 1998, Pages 103-107

Muchatuta NA, Kinsella SM. Remifentanil for Labour Analgesia: time to draw breath. Anaesthesia 2013, 68, 227-235.

Murray H, Hodgkinson A, Hughes D. Remifentanil patient-controlled intravenous analgesia during labour: a retrospective observational study of 10 years' experience. IJOA 2019; 39:29-34.

Schnabel A, Hahn N, Broscheit J et al. Remifentanil for labour analgesia: a meta-analysis of randomised controlled trials. Eur J Anaesthesiol. 2012 Apr;29(4):177-85

Tveit TO, Halvorsen A, Seiler S et al Efficacy and side effects of intravenous remifentanil patient-controlled analgesia used in a stepwise approach for labour: an observational study. IJOA 2013 Jan; 22(1):19-25.

Volikas I, Male D. A comparison of pethidine and remifentanil patient-controlled analgesia in labour. International Journal of Obstetric Anesthesia, 1998; 10: 86-90

Volmanen P., Akural E., Raudaskoski T., Alahuhta S. Remifentanil in Obstetric Analgesia: A Dose-Finding Study. Anaesthesia and Analgesia 2002; 94(4): 913-917

Volmanen P, Akural E, Raudaskoski T, Ohtonen P, Alahuhta S. Comparison of remifentanil and nitrous oxide in labour analgesia. Acta Anaesthesiologica Scandinavica. 2005; 49(4): 453-458

Van de Velde M. Carvelho B. Remifentanil for labor analgesia: an evidence-based narrative review. IJOA 2016; 25: 66-74.

Melber AA. Et al Remifentanil patient-controlled analgesia in labour: six-year audit of outcome data of the RemiPCA SAFE Network (2010–2015) IJOA 2019; 39: 12-21.

Murray P, Hughes D. Remifentanil patient-controlled intravenous analgesia during labour: a retrospective observational study of 10 years' experience. IJOA 2019; 39: 29-34.

Appendix 1: PCA - Information sheet for pregnant women/people

What is a remifentanil PCA?
Remifentanil is a very short-acting pain relieving drug rather like pethidine and diamorphine. Its pain relieving effect comes on very rapidly, and also wears off very quickly afterwards. A small measured dose of the remifentanil will be administered by a drip into a vein in your arm at your request, by pushing a button on an electronic pump.

Who can use remifentanil?
A woman/person in labour who is unable to have an epidural for medical reasons, or if insertion of an epidural is not technically possible. However, we would advise anyone with an allergy to morphine, pethidine or other related drugs not to use remifentanil. It can't be used if you have had opiate pain relieving drugs within the last 4 hours.

How is it given?
To use remifentanil you will need to have a cannula ('drip') placed in a vein, usually on the back of your hand or arm. The drip is connected to an electronic pump, which delivers a small measured dose of the drug once you press the hand-held button. The pain relieving effect is usually felt in 40 to 60 seconds, and wears off again within a few minutes. You are in control and you get the drug when you need it and not in between contractions. There is a safety feature built into the pump so that you can only get a safe amount of the drug, however some people can be sensitive to its effects so monitoring your respiratory rate and oxygen levels is important. You can use the pump at any time, right up to your delivery if you wish, and the effects will still wear off very quickly when you stop using the PCA after your baby has been born.

Are there any unwanted effects of remifentanil?
Nausea and vomiting, itching and dizziness may occur. Some women/people can get sleepy between contractions and not breathe as often, as tends to also happen with other similar drugs, such as pethidine and diamorphine. However, even if you are drowsy, this will wear off very quickly after you stop using the pain relief. As part of our routine observations your midwife will measure your oxygen levels continuously using a sensor (like a peg) on your finger, as well as your level of pain relief and drowsiness at regular intervals. If your oxygen levels are lower than normal you will be required to have some extra oxygen usually through a small tube into your nose, otherwise all observations and treatments are the same as for any other woman on the labour ward.
Remifentanil has been shown to be safe for babies, with similar short term side effects occurring with pethidine or diamorphine.

Are there any risks with remifentanil?
Recent studies have **not** shown cases of respiratory arrest (i.e. mother/person stopped breathing) but were it to happen it should respond quickly to immediate treatment. It is more common that your oxygen levels can fall without supplementary oxygen (1 to 2 in 10 cases). For this reason we ensure that you have a midwife with you at all times, monitor your oxygen levels with a probe on your finger and give you extra oxygen should you require it.

When can I ask for remifentanil?
You can request remifentanil at any time in labour but it may not be available if the labour ward is very busy. Your midwife will contact the duty anaesthetist to organise the setting up of the pump. This may take a little while, but you will be able to use it immediately, once you are given the button to push.

Appendix 2: Remifentanil PCA Prescription & Observation Chart

Please complete or Affix Patient Label Unit No: …… NHS No: …….. Surname …….. Forenames ……..	**Ward/Dept: MATERNITY** **Remifentanil PCA Prescription & Observation Chart**

Staff Details	Solution	PCA Setting
Anaesthetist:		**Drug:** Remifentanil 50 microgram/mL
Date:		**PCA Dose:** 20 micrograms (initial)
Bleep: SRH 008 WH 002	**100ml Solution**	**Lockout:** 3 Minutes
Midwife:	5mg Remifentanil in 100mL 0.9% Sodium Chloride	**Max:** 800 micrograms/hour

Observation Scores

Sedation Scores (A) Alert (V) Verbal - Respond when spoken to (P) Pain - Respond to painful stimuli (U) Unresponsive	**Pain Score** (0) No Pain (1) Mild Pain (2) Moderate Pain (3) Severe Pain (4) Excruciating Pain

Management of Side Effects

ANY OF THESE OBSERVATIONS TRIGGER THE ACTION PLAN:	ACTION PLAN
• Respiratory rate < 8 • SaO_2 below 94% despite oxygen • Sedation score < V (not responding to verbal command	1. STOP PCA PUMP 2. Give or increase Oxygen 3. Bleep Anaesthetist URGENTLY 4. Give Naloxone 100 microgram every 2-3 minutes

Absolute Requirements

- The patient should have read the Remifentanil PCA patient information leaflet & given verbal consent.
- **A midwife must at all times be in the room and provide one to one care.**
- In the exceptional case of a midwife needing to leave the room, the handset button of the PCA should be taken with the midwife so no drug can be administered without supervision.
- The Anaesthetist and Labour Ward Co-ordinator on call must be informed and agree.
- The Anaesthetist must be present on Labour Ward for the first 15 mins of use.
- Naloxone must be written on the drug chart and available in the room for administration to the mother. (**Naloxone:** 400 microgram Naloxone add 3mL water for injection = 100mcg/mL).

Remifentanil PCA Observation Chart

Call Anaesthetist if:

- Respiratory rate < 8
- SaO_2 below 94% despite oxygen
- Sedation score < V (not responding to verbal command)

Measure SpO2 continuously & ALL other observations every 30 minutes.
(Measure every 5 minutes for the first 30 minutes or if any concerns.)

Date:

Time 24 hours	SaO_2 **%**	**Sedation score**	**Resp. rate**	**O2** A) Nasal Cannula L/min B) Mask %	**Pain score**	**Pulse**	**BP**	**Volume Delivered** mL	**Initials**

Continue observations for 15 minutes after the PCA has been stopped.

Sedation Score

(A) Alert
(V) Verbal - respond when spoken to
(P) Pain - respond to painful stimuli
(U) Unresponsive

Pain Score

No pain	(0)
Mild pain	(1)
Moderate pain	(2)
Severe pain	(3)
Excruciating pain	(4)