Children's Hospital

Guideline for the Care of Children and Young People (under 18yrs) Requiring Morphine, Fentanyl and Ketamine & morphine Patient Controlled Analgesia (PCA), Nurse Controlled Analgesia (NCA) & Continuous Morphine Infusion.

Staff relevant to:	Health Professionals who care for children & young people with Morphine, Fentanyl and Ketamine & morphine Patient Controlled Analgesia, Nurse Controlled Analgesia & Continuous Morphine Infusion.
Team approval date:	April 2022
Version:	V 4
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Written by:	Zoe Syrett
Trust Ref:	C246/2016

1. Introduction and Who Guideline applies to

To provide Health Professionals guidance in the safe and effective care and management of a child or young person receiving morphine, fentanyl and ketamine & morphine Patient Controlled Analgesia (PCA), Nurse Controlled Analgesia (NCA) and Continuous Morphine Infusion

For COMPLEX ONCOLOGY AND COMPLEX PAIN CHILDREN aged under 18 years please refer to: Morphine - Fentanyl PCA and NCA and Continuous Ketamine and Clonidine Infusion UHL Childrens Hospital Guideline UHL C7/2022

Contents

Related documents:

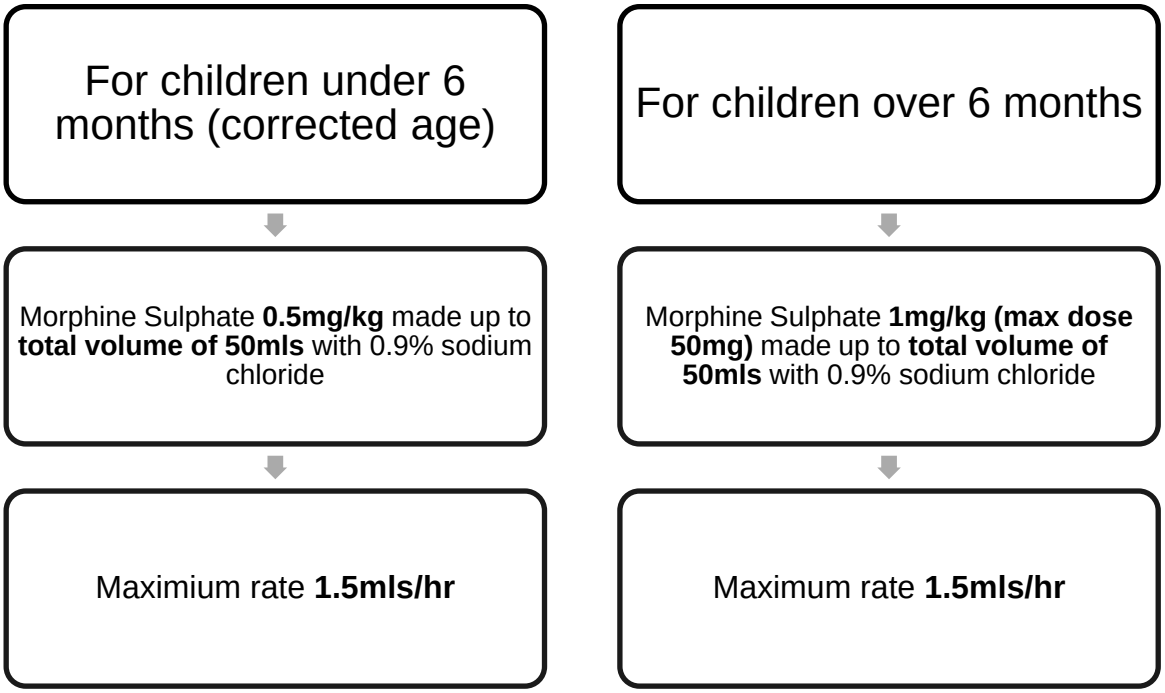
- Consent to Examination or Treatment UHL Policy A16/2002
- IV (Intravenous Therapy) UHL Policy B25/2010
- Vascular Access UHL Policy B13/2010
- Controlled Drugs UHL Policy B16/2009
- Aseptic Non Touch Technique UHL Guideline B20/2013

2. Resources/Procedure

2. Resources/Procedure	
No.	**Action**
a)	Identify the suitability of the child for the use of PCA ensuring that: • The child or young person has appropriate mental capacity to be able to understand PCA • Physically able to push the button on the pump handset • Understands the relationship between pressing the PCA button and receiving the analgesia
b)	You must ensure that the parent/carers and child are given a full explanation of what PCA/NCA/morphine infusion is, answer any questions and ensure that an information leaflet on PCA/NCA/morphine infusion is available and given to the parent/carers and young person at the time of consent of treatment
c)	You must ensure that the prescription adheres to the Leicestershire Medicines Code prescribing standards and is prescribed using the appropriate pre-printed sticker: • White for continuous morphine infusion • Pink for morphine PCA • White & pink stripes for morphine NCA • Grey for fentanyl PCA • White & grey stripes for fentanyl NCA • Purple for Morphine & Ketamine PCA • Purple and white stripes for Morphine & Ketamine NCA
d)	You must ensure that additional analgesia is prescribed **regularly; but no other opiates (except in exceptional circumstances under direction from the pain team) Caution must be used for NSAIDS in oncology and nephrology patients**
e)	You must reassure the child and parent/carer that if they are not happy using the PCA device at any time it can be discontinued and alternative analgesia will be used
f)	You must explain that **only** the child should press the PCA device For NCA nursing/medical staff to administer bolus via button – **A sleeping or sedated child should NEVER be given a bolus of IV opioid**
g)	You must contact the Paediatric Pharmacist before administering any other drug via the same cannula as the PCA/NCA/morphine infusion to ensure safe compatibility

2.1 SET UP PROTOCOL MORPHINE INFUSION:

Refer to CH IV monograph for morphine on Medusa



- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion.
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.2 SET UP PROTOCOL MORPHINE PCA:

Refer to CH IV monograph for Morphine on Medusa

Morphine Sulphate **1mg/kg (max dose 50mg)** made up to **total volume of 50mls** with 0.9% sodium chloride

Bolus dose is **1ml**

The minimum lockout time (the time between available doses of morphine) is **5 minutes** unless the initiating doctor decides a longer period is preferable

If a continuous background infusion is required it should be at 0.2ml/hr (4 mcg/kg/hr), **this dose should not be exceeded**

- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.3 SET UP PROTOCOL MORPHINE NCA:

Refer to CH IV Monograph for Morphine on Medusa

For children under 6 months (corrected age)	For children over 6 months
Morphine Sulphate **0.5mg/kg** made up to a **total volume of 50mls** with 0.9% sodium chloride	Morphine Sulphate **1mg/kg (max dose 50mg)** made up to a **total volume of 50mls** with 0.9% sodium chloride
Bolus dose is **1ml**	Bolus dose is **1ml**
No background infusion	Background infusion rate **0-0.2mls/hr**
Lockout 20 minutes	Lockout 20 minutes

- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.4 SET UP PROTOCOL FENTANYL PCA:

Refer to CH IV Monograph for Fentanyl on Medusa

Fentanyl **25mcgs/kg (max dose 1mg**) made up to **total volume of 50mls** with 0.9% sodium chloride

Bolus dose is **1ml**

The minimum lock out time (the time between available doses of Fentanyl) is **5 minutes** unless the initiating doctor decides a longer period is preferable

If a continuous background infusion is required: 0.5-1ml/hr **(max 1ml/hr this dose should not be exceeded)**

- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.5 SET UP PROTOCOL FENTANYL NCA > 1 YEAR:

Refer to CH IV Monograph for Fentanyl on Medusa

Fentanyl **25mcgs/kg (max dose 1mg)** made up to **total volume of 50mls** with 0.9% sodium chloride

Bolus dose is **1ml**

The minimum lockout time (the time between available doses of Fentanyl) is **20 minutes** unless the initiating doctor decides a longer period is preferable

If a continuous background infusion is required: 0.5-1ml/hr **(max 1ml/hr this dose should not be exceeded)**

- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.6 SET UP PROTOCOL KETAMINE & MORPHINE PCA:
Refer to CH IV Monograph for ketamine & morphine on Medusa

Ketamine Hydrochloride **1mg/kg (max dose 50mg)** +
morphine sulphate **1mg/kg (max dose 50mg)**
made up to a **total volume of 50mls** with 0.9% normal saline

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Bolus dose is **1ml**

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The minimum lockout time (the time between available doses) is **5 minutes** unless the initiating doctor decides a longer period is preferable

↓

If a continuous background infusion is required it should be at 0.2ml/hr, **this dose should not be exceeded**

- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.7 SET UP PROTOCOL KETAMINE & MORPHINE NCA:

Refer to CH IV Monograph for ketamine & morphine on Medusa

For children under 6 months (corrected age)	For children over 6 months
Ketamine hydrocholride **0.5mg/kg** + Morphine Sulphate **0.5mg/kg** made up to **total volume 50mls** with 0.9% sodium chloride	Ketamine hydrochloride **1mg/kg (max dose 50mg)** + Morphine Sulphate **1mg/kg (max dose 50mg)** made up to **total volume of 50mls** with 0.9% sodium chloride
Bolus dose is **1ml**	Bolus dose is **1ml**
Background infusion rate **0.2mls/hr**	Background infusion rate **0.2mls/hr**
Lockout 20 minutes	Lockout 20 minutes

- The syringe must be changed every 24hrs as per UHL Intravenous Medication Policy and ANTT Guideline with **two** registered nurses, one of whom must be IV assessed, must check and set up the new infusion
- Ensure Naloxone prescribed at 10 micrograms per KG* (initial dose) for partial reversal, and repeat after 1 minute if required, to cumulative total dose not greater than 2mg, irrespective of body weight. If inadequate effect or complete reversal required, use 100 micrograms per KG dose instead, repeated as necessary, to cumulative total dose not greater than 2mg.
- N.B Naloxone has a short acting life, close observation is essential as further doses may be required.

2.8 Monitoring and observing a child or young person with a PCA/NCA and morphine infusion:

- Explain to the parent/carers and child what observations are necessary and why
- Wherever possible care for the child close to the nurses' station

2.8.1 **Observations**

- **Hourly** for the first 4 hours and then 2 hourly if stable – **over 6 months and morphine only** *(Under 6 months, fentanyl and morphine & Ketamine mix must continue observations **hourly** for the duration)*
    - Pulse rate
    - Respirations
    - Oxygen saturations
    - Pain score
    - Emesis score
    - Sedation score
    - Pruritus check
    - Boluses attempted
    - Boluses delivered
- Continuous oxygen saturation monitoring for the **duration of the infusion and for 2 hrs post infusion**

  N.B. Continuous oxygen saturation monitoring should be used for children and young people within the oncology department undergoing regular PCA/NCA and continuous morphine infusions unless it is clinically judged that the child/young person is NOT opiate naïve and therefore not at risk of respiratory depression.

2.8.2 NCA- monitor the effectiveness of an NCA bolus by checking the child's pain score 5-10 mins after administration. **A sleeping or sedated child should NEVER be given a bolus of opioid**

2.9 Actions to be taken in cases of emergencies, inadequate pain relief and side effects

Action to be taken if any of the following occur and medical assistance requested immediately:

2.9.1 Reduced oxygen saturations and/or respiratory rate/effort

- Respiratory depression
    - STOP PCA/NCA infusion
    - Administer oxygen if needed to maintain saturations
    - Monitor the child closely until saturation and/or respiratory rate return to normal
    - Consider whether naloxone is required
    - Inform pain team/anaesthetist

- Respiratory arrest
    - Call for help/2222
    - STOP PCA/NCA
    - Commence basic life support
    - Administer oxygen using bag and mask
    - Administer naloxone
    - Monitor continuously
- Fall in oxygen levels **without** signs of respiratory depression
    - Administer oxygen to correct saturation
    - Assess the child for possible causes including severe pain which may cause diaphragmatic splinting, wheezing or evidence of respiratory problems or difficulties

i. Increased/unresolved pain

- Assess the child for causes of pain
    - Is the pump being used correctly?
    - Is the correct protocol in use?
    - Are there large numbers of demand many of which are unsuccessful?
    - Has the child's condition changed?
    - Has supplementary analgesia been given?
    - Is the opiate having the expected effect?

ii. Sedation

- A patient with an opiate infusion in running should respond readily to voice or gentle stimulation if asleep. If a child is unresponsive or requires extensive stimulation the they are over sedated
    - Suspend PCA/NCA
    - Monitor airway patency and respiratory rate and effort
    - Administer oxygen if needed to maintain oxygen saturation
    - Monitor child closely until sedation level returns to normal
    - If sedation level deepens and their respiratory rate continues to fall consider the administration of naloxone
    - Notify pain team/anaesthetists

iii. Nausea and/or vomiting

- May be due to general anaesthetic in first 12 hours post-operatively, opioid related or both
    - Administer anti-emetic

iv. Pruritis

- Related to opioids
    - Administer chlorphenamine 6 hourly as required via IV route
    - Contact the pain team if this problem persists despite treatment

v. Constipation

- Can occur in children of all ages particularly if the child's history identifies they have a tendency to be constipated
    - Encourage fluids/high fibre diet whenever possible
    - Walking, if this is possible for the patient, can also help
    - Movicol/Laxido should be prescribed as per BNFC

vi. Hallucinations

- For ketamine and morphine PCA/NCA
    - Suspend PCA/NCA and consider reducing bolus time or increasing lockout time. Consider changing to fentanyl PCA/NCA.

2.10. Assessment

- Allow the child to assess their own pain using the pain tool identified during the admission process. Use the FLACC/FACES scale for babies and non-verbal/younger children
- Assess sedation level using the Children's Hospital Sedation Scale (AVPU) - if P or U **STOP** infusion and seek medical advice.
- Assess emesis level using the Childrens Hospital Nausea and Vomiting Scale

2.11. Discontinuing the PCA/NCA/morphine infusion:

- Ensure regular analgesia has been administered
- Record and sign the amount of controlled drug to be disposed of on the front sheet with **two** Registered nurses checking the amount
- Dispose of the controlled drugs in appropriate facility
- Continue observations 2hrly for 4 hours after discontinuing infusion.

Continue observations and pain scores at least 4 hourly to ensure regular analgesia is adequate

**The Childrens & theatres Q&S group have authorised the dose in this guideline which differ from those in the current BNFC*

3. Education and Training

All nursing staff caring for and setting up morphine PCA/NCA and morphine infusion must be IV competent and have attended and signed off competent for the PCA/Morphine Infusion section of the Paediatric Pain Management Study Day. This will ensure that staff:

- Can give an explanation to the child and family on PCA/NCA and morphine infusion to achieve maximum benefit from its effects
- Can programme the pump
- Can check, programme and change the pump if the child's condition changes
- Able to troubleshoot the pump
- Able to troubleshoot any problems or complications associated with the PCA/NCA and morphine infusion
- Have an understanding of the side effects of morphine and are able to deal with complications effectively
- Have an understanding of which drugs can be given alongside PCA/NCA and morphine infusion

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
100% of prescriptions are prescribed on the appropriate pre-printed stickers	Prescription charts monitored on pain round	Zoe Syrett	Pain nurse to liaise with relevant clinical area management if issues arise with prescribing	Datix

5. Supporting References

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- Consent to Examination or Treatment UHL Policy A16/2002
- IV (Intravenous Therapy) UHL Policy B25/2010
- Vascular Access UHL Policy B13/2010
- Controlled Drugs UHL Policy B16/2009
- Aseptic Non Touch Technique UHL Guideline B20/2013

6. Key Words

Intravenous, Children, PCA/NCA, Morphine infusion, ketamine, fentanyl

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The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

Contact and review details	
Guideline Lead (Name and Title) Zoe Syrett – Nurse Specialist	**Executive Lead** Chief Nurse
Details of Changes made during review: April 2022 Added the use of Fentanyl, Ketamine & Morphine mix Added different monitoring guidance dependent on age of child <6 months and specific to drug administered. Added guidance on actions in cases of emergencies, inadequate pain relief and side effects. Added reference to related documents, specifically which guidance to follow when treating oncology and/or complex pain management children	