IAEM Clinical Guideline

Intranasal Fentanyl Guidance for Paediatric Patients

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DISCLAIMER

IAEM recognises that patients, their situations, Emergency Departments and staff all vary. These guidelines cannot cover all clinical scenarios. The ultimate responsibility for the interpretation and application of these guidelines, the use of current information and a patient's overall care and wellbeing resides with the treating clinician.

Revision History

Date	Version	Section	Summary of Changes	Author
June 2024	V1.0	All	Final version	JM/EF-L/ RL/KL/CS

CONTENTS

GLOSSARY OF TERMS

CSF	Cerebrospinal Fluid
ED	Emergency Department
IM	Intramuscular
IN	Intranasal
IV	Intravenous
MAD	Mucosal Atomiser Device
mcg	Microgram
URTI	Upper Respiratory Tract Infection

Intranasal Fentanyl Guidance for Paediatric Patients

INTRODUCTION

Children frequently attend the Emergency Department (ED) with acute pain that requires rapid treatment as a result of an illness or injury. Pain relief should be provided quickly to treat pain effectively, and reduce stress caused to the child. Oligoanalgesia, and failure to reassess pain score have been repeatedly demonstrated in the management of acute pain in the paediatric population in EDs in national and international audits.[1,2] Paediatric Emergency Research in the UK and Ireland (PERUKI) identified pain practice as a priority research domain[3], yet childhood pain management remains suboptimal with pain assessment documented in under 60% of children with minor injuries, and re-assessment of pain in just 11%.[1]

The intranasal (IN) route has been shown to be a non-invasive and effective method of drug administration to rapidly treat pain in children.[4] IN medications can be drawn up in a syringe and administered immediately using the MAD® (Mucosal Atomiser Device) into one or two nostrils. IN administration of highly lipophilic drugs, such as fentanyl, has a rapid onset with direct entry into the cerebrospinal fluid (CSF) and brain. This avoids hepatic first-pass metabolism, making it an effective analgesic option for the treatment of children with acute moderate to severe pain, with its mode of administration causing minimal distress.[4]

PARAMETERS

Target audience	Healthcare professionals working in the ED with paediatric patients <16 years-old.
Patient population	Paediatric patients, aged 1-16 years-old, presenting with moderate to severe pain without any contraindications to the delivery of IN fentanyl (as outlined below).
Exclusion criteria	The following patient populations are not addressed in this guideline: • Patients ages <1 year-old or >16 years-old • Pregnant patients
Contraindications	The following are a list of contraindications for the administration of IN fentanyl: • Decreased level of consciousness • Head injury with suspected facial fractures or base of skull fracture • Allergy to fentanyl • Epistaxis • Children under 1 year of age
Relative contraindications	Precautions should be taken if the patient has blocked nose or upper respiratory tract infection (URTI) as there may be unreliable drug delivery. Any such patient should have their nasal cavity cleaned with saline drops or gently suctioned prior to administration.

AIMS

The aim of this guideline is to provide prescribers with guidance on the safe administration of IN fentanyl in the paediatric population.

FENTANYL PHARMACOKINETICS

IN fentanyl is a well-tolerated, safe, and effective method of pain management, with a bioavailability of 71–89%.[5,6] Therapeutic drug levels are reached within 2 minutes[7], with a time to maximum arterial concentration of 7 minutes and a plasma half-life of 60 minutes.[7] A single dose provides analgesia lasting 120–200 minutes[8], with minor adverse effects limited to mild mucosal irritation.[9]

IN fentanyl provides effective analgesia without the need for intravenous (IV) access or iatrogenic pain from intramuscular (IM) injections. This makes it particularly useful for patients with minor injuries who do not require IV access for resuscitation. The use of IN fentanyl significantly reduces the time from patient arrival to initial analgesia compared with IV morphine.[10] IN fentanyl is as effective as orally administered paracetamol and hydrocodone[11], is as effective as IN ketamine and IM morphine with a lower rate of adverse events and discomfort[12], and improves the time to opioid administration.[13-15]

A fentanyl concentration of 50 mcg/mL is commonly available and used in EDs.

EPIDEMIOLOGY

Acute pain is one of the most common presenting symptoms in children attending hospital in the emergency setting, and its optimal management continues to challenge practitioners.

Difficulty and time delays related to establishing vascular access, and fear of opiate administration to small children are recognised as reasons for oligoanalgesia.[4] This guideline addresses the administration of IN fentanyl for paediatric patients aged 1 year to 16 years old.

INDICATIONS

IN fentanyl is ideal for rapidly treating pain in numerous circumstances, including but not limited to:

- Burns and wound management.
- Long bone fractures and other trauma.
- Severe abdominal pain.

COMPLICATIONS

The IN route has been proven to be a safe and rapid method of drug administration, with only minor side effects such as transient nasal itching, nasal burning, and cough. IN-administered fentanyl is shown to be effective and well tolerated, with no serious adverse events in the referenced literature.[16] There are known risks of respiratory depression associated with the broader use of opiates in the paediatric population, however the use of intranasal fentanyl at 1.5 mcg/kg has been shown to have minimal complications.[16]

EQUIPMENT

The equipment necessary for the delivery of IN fentanyl includes:

- 1ml Luer Lock syringe
- Filter needle to draw up medication
- Mucosal atomiser device (MAD®)
- 1.5 mcg/kg dose of fentanyl (50 mcg/ml solution)

Figure 1: From bottom to top: 1 ml Leur Lock syringe, filter needle for drawing up medication, mucosal atomiser device, fentanyl (50 mcg/ml concentration).
Image courtesy of CUH Children's ED.

MONITORING

No monitoring is required during administration. Record oxygen saturations, respiratory rate and heart rate following administration at intervals as detailed below.

PROCEDURE FOR THE ADMINISTRATION OF INTRANASAL MEDICATION

Explain the intended procedure to patient/parents. Provide patient/parent information leaflet.

1. Wash hands and put on disposable gloves.
2. Follow An Bord Altranais guideline for the safe administration of medication: **right drug, right route, right patient, right time, right dose** (NMBI Guidance for Registered Nurses and Midwives on Medication Administration (2020; https://www.nmbi.ie/NMBI/media/NMBI/NMBI-Medication-Administration-2020.pdf?ext=.pdf)
3. Draw up the medication as prescribed, and attach the syringe to the atomiser device. When drawing up the dose, draw an additional amount of **0.1ml for dead space**.
4. Attach the atomiser tip via the Leur Lock mechanism. It will twist into place (Figure 2).

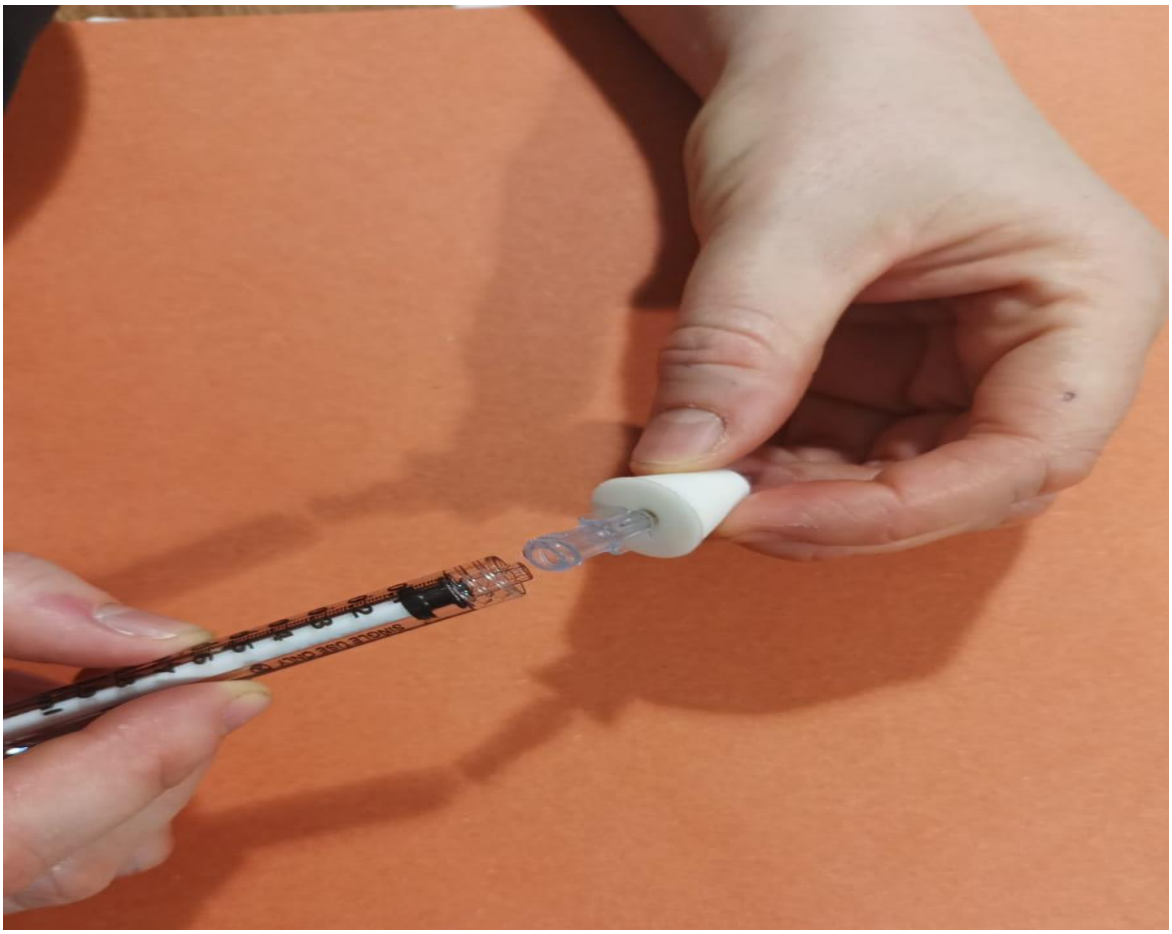

Figure 2: How to attach atomiser tip to the syringe.
Image courtesy of CUH Children's ED.

5. Check the patient's nostril for blood or mucus discharge. Clean or suction the nasal passage prior to delivery of medication if congested. The patients should be reclining at a 45-degree angle (Figure 3). The presence of blood/mucus will limit absorption.[17]

Figure 3: Administration of IN fentanyl to patient at 45-degree angle

6. Using your free hand to hold the crown of the patient's head stable, place the tip of the atomiser against the nostril snugly and aim for the centre of the nasal cavity.
7. For dosages of 1 ml or more, the volume should be halved in each nostril. This ensures maximum absorption by doubling the available mucosal surface for medication absorption and increasing rate and amount absorbed.
8. Briskly compress syringe plunger and spray contents quickly into the nostril. The medication will expel like a mist in one rapid dose. Hold atomiser for 5-10 seconds after administration.
9. Document all care given, evaluate the effectiveness of the fentanyl delivery and record any adverse reactions.
10. Record vital signs 5 minutes after administration of opiate medication delivery

- Heart rate
- Respiratory rate (risk of respiratory depression)
- Oxygen saturation

11. Record pain score 5 minutes after administration
12. If required, a repeat dose may be given after 10 minutes
13. After the last dose has been given, a further set of observations at **10 minutes** should be completed, followed by every **30 minutes** for one hour.

NOTE: If the child becomes sedated or demonstrates abnormal vital signs, the treating doctor should be informed, and observations continued every 5 minutes until return to baseline. When at baseline, repeat the vital signs every 30 minutes for 1 hour.

Table 1: Dosing table of Fentanyl

Weight (kgs)	Dosage (1.5mcg/kg)	Volume(ml) (excluding 0.1ml for dead space)
10	15	0.3
11	15	0.3
12	20	0.4
13	20	0.4
14	20	0.4
15	24	0.5
16	24	0.5
17	24	0.5
18-24	30	0.6
25-29	40	0.8
30-34	45	0.9
35-39	55	1.1
40-44	60	1.2
45-49	70	1.4
50-54	75	1.5
55-59	85	1.7
60-64	90	1.8
65-69	100	2

COMPANION DOCUMENTS

- **Patient information leaflet**

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