GUIDELINE ON THE DELIVERY OF INTRANASAL MEDICATION USING MAD (MUCOSAL ATOMISER DEVICE)	
Version Number	*V2*
Date of Issue	*October 2016*
Reference Number	*DIMMMAD-08-2016-AMcDGOC-V2*
Review Interval	*3 yearly*
Approved By *Name: Fionnuala O'Neill* *Title: Nurse Practice Coordinator*	*Signature:* *Date: August 2016* 
Authorised By *Name: Rachel Kenna* *Title: Director of Nursing*	*Signature:* *Date: August 2016* 
Author/s	*Name: Amanda McDonnell* *Title: Clinical Nurse Manager II, Emergency Department* *Name: Gill O'Callaghan* *Title: Clinical Nurse Specialist, Pain Management*
Location of Copies	*On Hospital Intranet and locally in department*

Document Review History		
Review Date	***Reviewed By***	***Signature***
2019		

Document Change History	
Change to Document	***Reason for Change***

CONTENTS

1.0 Introduction

The Intranasal route of medication administration is a recognised to be a useful and reliable form of drug delivery comparable to oral and parenteral routes. This anatomical, physiological and histological characteristics of the nasal cavity, provides potential for rapid systemic drug absorption and quick onset of action. In addition, intranasal absorption avoids gastrointestinal and hepatic presystemic metabolism, enhancing drug bioavailability when compared to that obtained after gastrointestinal absorption. (Leonard et al, 2007).

Atomized Intranasal administration is achieved by using a product known as a Mucosal Atomiser Device (MAD) Wolfe Tory Medical, Inc, Salt Lake City, Utah. This latex free device attaches directly to a leur-lock syringe and atomizes medication to a particle size of 30 to 100units.

The Intranasal route can also be used when a patient is unable to take oral medication due to nausea and/or vomiting (Boland 2007). The exact dose can be given and is absorbed by the highly vascular mucous membranes of the nose to the central nervous system. The onset of action is considerably faster that the oral route as it does not require gastrointestinal absorption.

Using the MAD in administering medication reduces the need for obtaining intravenous access which can often be painful and upsetting for the child along with the additional risk of needle stick injury (Shepherd 2007). Delivery of Intranasal medication is also relatively painless, inexpensive, and easy to deliver with a minimum of training (Wolfe 2010).

2.0 Definition of Guidelines

Intranasal route: the administration of drugs through the nasal passage via an atomiser device.

Indications

There are several theoretical and practical advantages of using the intranasal route. It is much more accepted by patients as it is less invasive than I.V cannulation or the PR route.

- Oral or IV route unavailable
- For rapid control of breakthrough pain and anxiety in palliative care
- For rapid control of pain in the Emergency department e.g. sickle cell crisis, painful procedures, POP application
- Management of procedural pain and sedation e.g. Burns and wound dressing changes
- Fractures and other trauma cases
- Management of opiate overdose (naloxone)
- Control of seizures (Midazolam)
- Administer Adrenaline

Relative Contradictions

- Age < 2 years as limited data available in this age group. Intranasal route using MAD has been used in neonate sin the palliative care setting, by removing the cone at the end of the device.
- Head, Chest or Abdominal trauma
- Hypovolaemia (Shepherd 2007)
- Allergies to medication

Precautions

- Condition or injury requiring immediate IV access
- URTI as there may be unreliable drug delivery. (May cause unreliable delivery of drug) If the child has a blocked nose or URTI the nasal cavity should be suctioned prior to administration of intranasal drugs.
- Prior dosing with opioid may produce drug accumulation
- Co-administration of sedatives and co-morbid conditions may require modified dosing

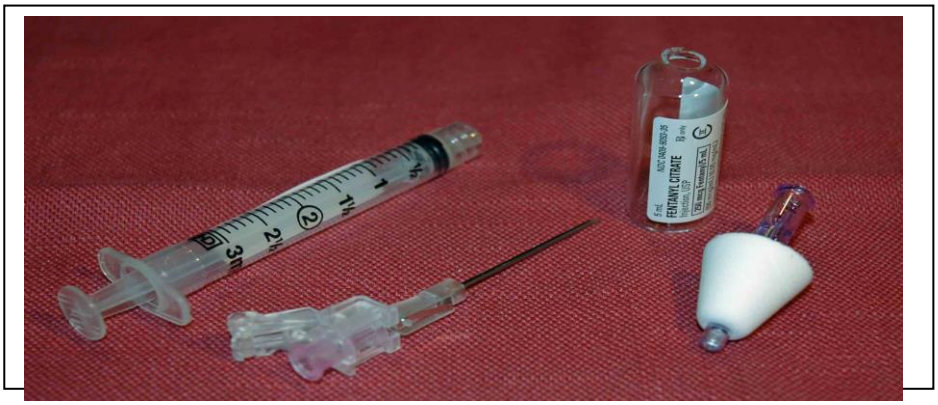
Possible adverse effects

Adverse effects of nasal medications are infrequent. The most common adverse effect noted is nasal burning and irritation and bitter taste after administration of midazolam. Although this discomfort is transient, parents and children should be forewarned of this adverse effect before drug delivery.

Uncommon: nausea, vomiting, sedation (prophylactic antiemetic use is not required)

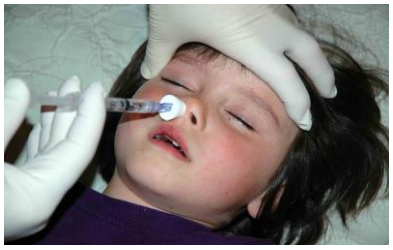
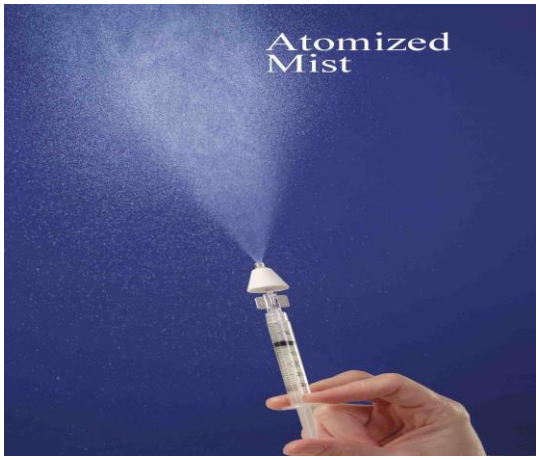
3.0 Guidelines for Equipment (fig.1)

- 1ml or 2ml syringe
- Filter needle to draw up medication
- Mucosal atomiser device (MAD) single patient use
- Medication



4.0 Procedure for Administration of Intranasal Medication

Procedure for Administration of Intranasal Medication	
ACTION	**RATIONALE & REFERENCE**
Explain to patient/parents what you are going to do. All medications must be prescribed and administered as per hospital guidelines. Follow the An Bord Altranais guideline for the safe administration of medication, right drug, right route, right time, right dose, and right patient. Review child's baseline vital signs before drug administration and if necessary carry out a baseline set of observations	This ensures cooperation and you can check parents and child's level of understanding (Hockenberry 2008). To ensure safe administration of medications (OLCHC 2006, An Bord Altranais 2007)
Draw up the medication as prescribed by the Doctor and attach the syringe to the atomiser device. Draw up dose plus additional amount **0.1ml** for dead space.	To account for estimated dead space in the device. (MAD, Accessed June 2012)
Decontaminate hands and put on disposable gloves	To reduce transfer of micro-organisms (OLCHC 2005).
Attach the atomiser tip via the Luer lock mechanism, it should twist into place. See Fig 2.  Fig 2.	This allows the syringe to be kept horizontal (Shepherd 2007).

Check the patient's nostrils for blood or mucous discharge. Suction the nasal passage prior to delivery of medication if necessary. The patient should be reclining at a 45 degrees angle. See Fig 3.  Fig 3.	Presence of blood/mucous will limit medication absorption (Wolfe 2010).
Using your free hand to hold the crown of the patients head stable, place the tip of the atomiser against the nostril snugly against the nostril aiming slightly up and outward (towards the top of the ear). For dosages of 1 ml or more the volume should be halved in each nostril. More than one ml per nostril per dose should likely be split and delivered over several cycles separated by 10-15 minutes. Briskly compress syringe plunger and spray contents quickly into the nostril - medication will expel like a mist in one rapid dose. Hold atomiser for 5-10 seconds after administration. Encourage the child to sniff as the medication is administered. Monitor the child closely following administration for signs of adverse symptoms If necessary use continuous pulse oximetry , HR monitoring and monitor level of sedation If overly sedated (level 3 or above) or abnormal vital signs, inform treating doctor and continue observations and sedation scores until return to baseline. Document all care given; and evaluate the effectiveness of the drug delivery and record any adverse reactions.	To ensure maximum absorption and double the available mucosal surface area for medication absorption and increase rate and amount absorbed (Borland 2007). Low volume of nasal cavity restricts amount of drug formulation administered to about 100-150ul. (Pires 2009) The absorptive surface is doubled if half the dose is put up each nostril.  To facilitate communication, to provide evidence of delivery of quality care, and to ensure evaluation of this care to ensure safe practice and maintain accountability (An Bord Altranais 2007).

5.0 References

An Bord Altranais (2007) Recording Clinical practice. An Bord Altranais: Dublin

Borland M, Jacobs I, King B, O'Brien D (2007) A randomized controlled trial comparing intranasal fentanyl to intravenous morphine for managing acute pain in children in the emergency department. *Ann Emerg Med* 2007;**49** (3):335-40.

Chiaretti A, Barone G, Rigante D et al (2011) Intranasal lidocaine and midazolam for procedural sedation in children *Arch Dis Child* **96**(2):160-163

Hockenberry, M.J. and Wilson, D (eds) (2008) Wong's Essentials of Pediatric Nursing, 8th Edition. Mosby, St Louis.

Labat E, Goldman M, Barr J, Bistrister T, Berkovitch M. (2000) Comparison of intranasal midazolam with intravenous diazepam for treating febrile seizures in children: a prospective randomized study. *BMJ* **321** (7253):83-86

Mudd S. (2011) intranasal fentanyl for pain management in children: a systematic review of the literature. *Journal of Pediatric Health Care* **5**:316-22.

Pires A, Fortuna A, Alves G and Falcão A. (2009) Intranasal drug delivery: How, Why and What for? *Journal of Pharmacy and Pharmaceutical Sciences* **12**(3):288-311

Rey E, Delaunay L, Pons G et al (1991) Pharmacokinetics of Midazolam in children: comparative study of intranasal and intravenous administration. *European Journal Clinical Pharmacology*.**41** (4):355-357

Shepherd, M. (2007) Intranasal Fentanyl. Starship Children's Health.

Wolfe, R. (2010) intranasal medication Delivery for Children: a Brief review and Update. *Pediatrics*. (10) 2010-0616.

Younge PA, Nicol MF, Kendall JM, Harrington AP. (1999) A prospective randomized pilot comparison of intranasal fentanyl and intramuscular morphine for analgesia in children presenting to the emergency department with clinical fractures. *Emergency Medicine* 1999;**11**(2):90-94.

Saunders M, Adelgais K, Nelson D. (2010) Use of intranasal fentanyl for the relief of pediatric orthopedic trauma pain. *Acad Emergency Med*.; **17**(11):1155–1161.

MAD Nasal Mucosal Atomizer Device. Wolfe Tory Medical, Inc. web site http://www.wolfetory.com/MAD/MADNasal.aspx

Warrington SE, Kuhn RJ (2011) Use of Intranasal Medications in Pediatric Patients. *Orthopedics; 34*(**6**):456-459.

Wermeling DP, Record KA, Archer SM, Rudy AC. (2009) A pharmacokinetic and pharmacodynamics study, in healthy volunteers, of a rapidly absorbed intranasal midazolam formulation. *Epilepsy Review*, **83**(2-3):124-132

6.0 Appendix: Dosing Guideline for intranasal fentanyl

Table 1. Fentanyl (50mcg/ml) Intranasal Dose of for Weight guide

Weight (Kg)	Dosage (1.5mcg/kg)	Volume (ml) + 0.1ml for dead space	Final volume
10	15 mcg	0.3 ml	*0.4ml*
12	18 mcg	0.35 ml	*0.45ml*
14	20 mcg	0.4 ml	*0.5ml*
16	24 mcg	0.5 ml	*0.6ml*
18	27 mcg	0.55 ml	*0.65ml*
20-24	30mcg	0.6 ml	*0.7ml*
25-29	37.5 mcg	0.75 ml	*0.85ml*
30-34	45 mcg	0.9 ml	*1ml***
35-39	52.5 mcg	1.05 ml	*1.15ml*
40-44	60 mcg	1.2 ml	*1.3ml*
45-49	67.5 mcg	1.35 ml	*1.45*
50-54	75 mcg	1.5 ml	*1.6ml*
55-59	82.5 mcg	1.65 ml	*1.75ml*
60-64	90 mcg	1.8 ml	*1.9ml*
65-69	97.5 mcg	1.95 ml	*2.05ml*

Note * Do NOT draw up 1ml extra for second dose when re-using the delivery device (MAD)

- A second dose may be administered 10 minutes after the first to provide adequate analgesia - **0.75 - 1.5mcg/kg**
- After 2nd dose, if further analgesia is required, review and consider alternative or additional analgesia

**Doses of 1ml (50 micrograms) or more should be divided between nares (The volume to be infused limits the use of intranasal fentanyl using MAD device to children under 70k

@2016 OLCHC