

Midazolam for seizures: **Buccal** administration

Rationale

Buccal Midazolam is a convenient and efficient method used to treat prolonged seizures and status epilepticus in children. It can be used in hospital by trained staff, by paramedics, and carers in the home. Buccal Midazolam is absorbed directly into the blood stream through the lining of the cheek. Swallowing Midazolam is not recommended as it is not absorbed as well through the stomach.

Introduction

Midazolam is a benzodiazepine with anti-seizure properties. Like other benzodiazepines, the properties of midazolam mean that it crosses mucosal surfaces at a fixed and rapid rate and is therefore effective.

Where to get it from?

Plastic ampoules of midazolam can be obtained on a private prescription from community pharmacies, but it is not available on PBS. It is recommended that carers source the plastic ampoules from their community pharmacy. These ampoules may need to be ordered in from the company Pfizer Australia. Ampoules need to be protected from light and discarded eight months after opening the foil pack. In the warmer months when transporting Midazolam ampoules, please keep them in a cool insulated pack to ensure they are kept at a temperature less than 25 degrees.

As part of the provision of education to families in the use of midazolam, parents are advised to undertake accredited basic life support training, such as that provided by St Johns Ambulance and The Red Cross and Royal Life Saving.

Approved situations

It is recommended that buccal midazolam be used in the emergency management of prolonged seizures where venous access cannot be obtained.

Situations where the use of **buccal** midazolam is appropriate or acceptable

- Treatment of patients for seizures in the ED when an IV route has not been established.
- Treatment of seizures by parents and carers.

Carers must be given written and diagrammatic instructions (e.g. Epilepsy Association leaflet) and be shown how to administer the medication before they have been discharged or when they attend clinic.

Dose:

Up to 0.3 mg/kg per dose via the buccal route, maximum single dose 10mg.

Your doctor will have instructed you the correct dose you need to give and whether a second dose is appropriate.

How to administer buccal midazolam

Always keep the snap lock container with the midazolam and syringes etc. in an accessible place, but out of reach of children!

- Position the patient on their side in the recovery position and prevent injury by moving things away from the child.
- Time the seizure.
- With the IV formulations (5mg/1ml) withdraw the dose that has been prescribed for your child from the plastic ampoule. Your child's doctor or Epilepsy nurse should have shown you how much to draw up into the syringe.
- Open the child's lips and slowly squeeze the solution into the buccal cavity (into the inside of the lower cheek, closest to the ground) between the gum and cheek until the amount is delivered. Gently rub the exterior of the cheek to *massage* it into the mucosa.

After giving the midazolam:

- Keep the patient in the recovery position and stay with them!
- Watch the child's breathing and seizure activity while keeping them on their side.
- Once the seal is broken on the Midazolam ampoule it must be safely discarded.
- Write down when and how much midazolam was given.

Call an ambulance:

- If you are in any doubt about what to do.
- If the patient suffers a serious injury while having the seizure.
- Or if your doctor has given you instructions to do so.
- **Not all children will need an ambulance.**

Side effects of midazolam:

- Midazolam has a sedative effect and your child may be sleepy for some time afterwards. Headache, nausea, vomiting, coughing, and hiccups may occur after giving the Midazolam.
- Your child may have shallow or slow breathing (respiratory depression) after midazolam. If this occurs call an ambulance and if needed give mouth to mouth resuscitation if your child stops breathing. Basic Life support courses are listed on the PENNSW site under the safety heading. It is advisable that families with children know first aid and how to give rescue breaths in an emergency.

Points to remember:

- **Use the plastic ampoules containing 5 mg midazolam in 1 ml NOT glass ampoules or plastic ampoules of other sizes or strengths. The plastic ampoules are produced by Pzifer Australia and can be ordered by your local pharmacy.**
- **Midazolam needs to travel where your child goes in case of a seizure when away from home. However it must be given by a trained person in the prescribed manner. Never expect someone who has not been trained to administer it.**
- **It is important to follow your doctor's advice on: when and how to give midazolam, when to call an ambulance, and when to take your child to hospital.**
- **Midazolam must be stored at normal room temperature (below 25 degrees Celsius)**
- **Midazolam should be protected from light (wrapped in foil). Note the date that the midazolam is taken out of the prescribing box and wrapped in foil, as it needs to be discarded 8 months after exposure to light.**
- **ALWAYS keep Midazolam locked away and out of the reach of children and keep in a "snap lock" type container.**
- **This is a guide only. Your Epilepsy First Aid Management Plan has been written by your doctor and / or Epilepsy nurse and should be followed.**

Midazolam for seizures: Intra-nasal administration

Rationale

- **Intra-nasal** Midazolam is a convenient and efficient method used to treat prolonged seizures and status Epilepticus in children. It can be used in hospital by trained staff, paramedics and carers in the home.
- Intra-nasal Midazolam is absorbed directly into the blood stream through the lining of the nasal passage.
- Swallowing Midazolam is not recommended as it is not absorbed as well through the stomach.

Introduction

Midazolam is a benzodiazepine with anti-seizure properties. Like other benzodiazepines, the properties of midazolam mean that it crosses mucosal surfaces at a fixed and rapid rate and is therefore effective.

Where to get it from?

Plastic ampoules of midazolam can be obtained on a private prescription from community pharmacies, but it is not available on PBS. It is recommended that carers source the plastic ampoules from their community pharmacy. These ampoules may need to be ordered in from the company Pfizer Australia. Ampoules need to be protected from light and discarded eight months after opening the foil pack. In the warmer months when transporting Midazolam ampoules, please keep them in a cool insulated pack to ensure they are kept at a temperature less than 25 degrees.

As part of the provision of education to families in the use of midazolam, parents are advised to undertake accredited basic life support training, such as that provided by St Johns Ambulance and The Red Cross.

Approved situations

It is recommended that intra-nasal midazolam be used in the emergency management of prolonged seizures where venous access cannot be obtained and there are too many secretions to use buccal midazolam.

Situations where the use of **intra-nasal** midazolam is appropriate or acceptable:

- Treatment of patients for seizures in the ED when an IV route has not been established.
- Treatment of seizures by parents and carers.
- Where, for some reason the family have been instructed to use Intra-nasal instead of Buccal Midazolam.

Carers must be given written and diagrammatic instructions (e.g. Epilepsy Association leaflet) and be shown how to administer the medication before they have been discharged or when they attend clinic.

Dose:

Up to 0.3 mg/kg per dose via the intra-nasal route, maximum single dose 10mg.

Your doctor will have instructed you the correct dose you need to give and whether a second dose is appropriate.

How to administer intra-nasal midazolam

Always keep the snap lock container with the midazolam and syringes etc. in an accessible place **but out of reach of children!**

- Position the patient on their side in the recovery position and prevent injury by moving things away from the child.
- Time the seizure.
- With the IV formulations (5mg/1ml) withdraw the dose that has been prescribed for your child from the plastic ampoule. Your child's doctor or Epilepsy nurse should have shown you how much to draw up into the syringe.
- Slightly tilt the patients head. This may require a pillow under the shoulders. To administer, hold the ampoule or syringe over the nostril and gently squeeze and drip Midazolam, 2 to 3 drops at a time, into one nostril and then the other. Once done, ensure your child is safe and if necessary place on their side to facilitate breathing.

After giving the midazolam:

- Keep the patient in the recovery position and stay with them!
- Watch the child's breathing and seizure activity while keeping them on their side.
- Once the seal is broken on the Midazolam ampoule it must be safely discarded.
- Write down when and how much midazolam was given.

Call an ambulance:

- If you are in any doubt of what to do.
- If a serious injury has occurred to the patient while they had the seizure.
- Or if your doctor has given you instructions to do so.
- **Not all children will need an ambulance.**

Side effects of midazolam:

- Midazolam has a sedative effect and your child may be sleepy for some time afterwards. Headache, nausea, vomiting, coughing, and hiccups may occur after giving the Midazolam.
- Your child may have shallow or slow breathing (respiratory depression) after midazolam. If this occurs call an ambulance and if needed give mouth to mouth resuscitation if your child stops breathing. Basic Life support courses are recommended on the PENNSW site under the safety heading. It is advisable that families with children know first aid and how to give rescue breaths in an emergency.

Points to remember:

- **Use the plastic ampoules containing 5 mg midazolam in 1 ml NOT glass ampoules or plastic ampoules of other sizes or strengths. The plastic ampoules are produced by Pfizer Australia and can be ordered by your local pharmacy.**
- **Midazolam needs to travel where your child goes in case of a seizure when away from home. However it must be given by a trained person in the prescribed manner. Never expect someone who has not been trained to administer it.**
- **It is important to follow your doctor's advice on: when and how to give midazolam, when to call an ambulance, and when to take your child to hospital.**
- **Midazolam must be stored at normal room temperature (below 25 degrees Celsius).**
- **Midazolam should be protected from light (wrapped in foil). Note the date that the midazolam is taken out of the prescribing box and wrapped in foil, as it needs to be discarded 8 months after exposure to light.**
- **ALWAYS keep Midazolam locked away and out of the reach of children and keep in a "snap lock" type container.**
- **This is a guide only. Your Epilepsy First Aid Management Plan has been written by your doctor and / or Epilepsy nurse and should be followed.**

References

1. Mims Online [Internet]. St Leonards, NSW: UBM Medica; 2013. Midazolam [Last updated 21/03/2012 ; Accessed 04/06/2013]; Available from: https://www.mimsonline.com.au.acs.hcn.com.au/Search/FullPI.aspx?ModuleName=ProductInfo&searchKeyword=midazolam&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=61040001_
2. Therapeutic Guidelines: Neurology Version 4: 2011
3. NSW Ministry of Health Policy Directive 2009_065 . Children and Infants with Seizures - Acute Management Clinical [internet] [April 2009; Accessed May 2013] Available from: http://www0.health.nsw.gov.au/policies/pd/2009/PD2009_065.html
4. Body R , Ijaz M. Best Evidence Topic Report. Buccal midazolam as an alternative to rectal midazolam for prolonged seizures in childhood and adolescence. *Emerg Med J* 2005;22:364-5
5. Baysun S, Aydin OF et al. A comparison of buccal midazolam and rectal diazepam for acute treatment of seizures. *Clinical Pediatrics* 2005;44 (9):771-6.
6. Lahat E, Goldman M, Barr J, et al: Comparison of intranasal midazolam with intravenous diazepam for treating febrile seizures in children: prospective randomised study. *Br Med J* 2000a; 321:83-86
7. Scott SC et al Buccal midazolam should be preferred to nasal midazolam [letter] *BMJ* 2001;322:107.
8. Wilson MT et al. Nasal/buccal midazolam use in the community. *Arch Dis Child* 2004;89(1):50-1.
9. Wiznitzer M Buccal midazolam for seizures *Lancet* 2005;366:182-3
10. Scott RC et al Buccal administration of midazolam: pharmacokinetics and EEG pharmacodynamics. *Epilepsia* 1998;39:290-4.
11. McIntyre J et al Safety and efficacy of buccal midazolam versus rectal diazepam for emergency treatment of seizures in children: a randomised controlled trial. *Lancet* 2005;366:205-10.
12. Epilepsy Action Australia Patient information Fact Sheet: "Seizure Smart Midazolam – Plastic Ampoules [internet] [Updated Jan 2011; Accessed May 2013] Available from: [http://www.epilepsy.org.au/sites/default/files/Seizure Smart-Midazolam Plastic Ampoules.pdf](http://www.epilepsy.org.au/sites/default/files/Seizure%20Smart-Midazolam%20Plastic%20Ampoules.pdf)
13. Royal Children's Hospital, Melbourne Fact Sheet "Buccal midazolam" [internet] Royal Children's Hospital, Melbourne [Updated September 2012; Accessed May 2013] Available from: http://www.rch.org.au/kidsinfo/factsheets.cfm?doc_id=9300
14. Shinnar S, Berg AT, Moshe SL, et al. "How long do new onset seizures in children last?" *ANN Neurology* 2001 49:659-664.
15. Sydney Children's Hospital Guideline Drug Protocol No: 1/C/13:7024-01:00 Drug Protocol: Midazolam for Seizures: Buccal Administration - SCH
16. St Johns Ambulance Course phone **1300 360 455**
17. Red Cross Organisation Australia **1300 367 428**