SUPPORTING GUIDANCE FOR ADMINISTRATION OF LEVETIRACETAM VIA CONTINUOUS SUBCUTANEOUS INFUSION IN THE COMMUNITY SETTING

Links To:

Devon Formulary Guidance, chapter 16 (Palliative Care)

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Scope

- Devon-wide Community based nursing teams including Non-Medical Prescribers
- Devon-wide Specialist Palliative Care teams
- Devon-wide General Practitioners & OOH providers

This guidance supports the use of subcutaneous levetiracetam in palliative care patients who require treatment for seizure control but are unable to continue taking levetiracetam orally, when IV access is not an appropriate intervention and/or when use of a benzodiazepine such as midazolam is inappropriate, for example if sedation is undesirable.

Background

Levetiracetam is a commonly used first-line drug for the management of seizures in palliative care, with favourable efficacy and tolerability compared to other anti-epileptic drugs. It is also used in the acute care setting to treat status epilepticus refractory to benzodiazepines, usually given as a single IV bolus dose.

The management of seizures in patients approaching the end of their lives, when they are no longer able to manage their oral anticonvulsants, has previously relied upon the use of benzodiazepines such as midazolam (and very occasionally, phenobarbitone) administered via a continuous subcutaneous infusion.

There is increasing evidence for the use of levetiracetam, administered via a syringe pump, as an alternative anticonvulsant choice for use in end-of-life care. It has few drug interactions and may be less sedating than midazolam. The dose of levetiracetam needs adjusting in renal impairment.

The use of levetiracetam administered via a subcutaneous route is “off licence”. This should therefore be discussed with the patient (or if they lack capacity, with those close to them) as with any other “off licence” medication.

INDICATION FOR USE	For patients with an ongoing seizure risk who were receiving oral levetiracetam and for whom oral administration is no longer possible 1. On the recommendation of a palliative care specialist **and** 2. when midazolam is inappropriate or not desired due to sedative effects
PRESCRIBING, PREPARATIONS and SUPPLY	Levetiracetam concentrate for IV infusion is amber in the Devon Formulary for administration as a continuous subcutaneous infusion in palliative care in patients who are unable to continue receiving oral levetiracetam. Levetiracetam concentrate for IV infusion, for administration as a continuous subcutaneous infusion may be prescribed on the advice of a palliative care specialist. **Desitrend®** concentrate for IV infusion 100mg/ml 5ml **ampoule** **Keppra®** concentrate for IV infusion 100mg/ml 5ml **vial** **Prescribe by brand** to aid identification when different preparations are available. Availability from community pharmacies: **1. Planning is vital to ensure a timely and continuous supply** 2. Levetiracetam concentrated solution for IV infusion is: a. **not** routinely held in stock by community pharmacies b. **not** included on the Specialist Medicines List and therefore is **not** routinely stocked by specialist pharmacies 3. An **early discussion with the community pharmacy** is important to determine whether the pharmacy is able / willing to order levetiracetam concentrate solution for IV infusion and to identify which formulation will be most readily available to prescribe (**Desitrend®** ampoules or **Keppra®** vials). 4. Community pharmacies have different cut-off times for ordering medicines and different delivery times: a. Always inform the pharmacist of a prescription for levetiracetam for infusion to ensure it is included on the daily order for the wholesaler b. Ask the pharmacist if same day or next day supply is possible c. **Do not assume levetiracetam for infusion will be available the same day**. d. Consideration must also be given to **weekend / bank holiday** pharmacy opening hours and wholesaler delivery schedules, these may vary between pharmacies – confirm timescales with the individual pharmacy 5. Each levetiracetam ampoule or vial contains 500mg levetiracetam (supplied in packs of 10). Order two packs for the first prescription if total daily oral dose is at the higher end of the dose range 6. As with all palliative care medicines administered by syringe pump, responsibility for identifying when further supplies of medicines are needed lies with the community nursing teams administering the medicines.

<table>
<tr><td>DOSING</td><td>Starting dose and changes in dose to be decided by the palliative care specialist

A typical starting dose for focal seizures is 500mg to 1 gram/24hours.
If necessary, increase the dose by an increment of 500mg-1gram every 2 weeks.
The maximum recommended dose is 3 grams/24hours.

The conversion rate from total oral levetiracetam dose/24hours to total subcutaneous dose/24hours = 1:1.
i.e. a dose of 500mg bd PO = 1 gram via subcutaneous infusion/24hrs.

The dose needs adjusting in renal impairment (see below) because levetiracetam is largely excreted unchanged by the kidneys. However, there is no need to routinely re-check renal function when changing from oral to subcutaneous levetiracetam in a dying patient.

<table><tr><th>Creatinine clearance (ml/min/1.73m^2)</th><th>Total daily dose/24 hours</th></tr><tr><td>>80</td><td>1.0 gram to 3.0 grams</td></tr><tr><td>50-80</td><td>1.0 gram to 2.0 grams</td></tr><tr><td>30-49</td><td>500mg to 1.5 grams</td></tr><tr><td><30</td><td>500mg to 1.0 gram</td></tr></table>
Levetiracetam is not metabolised by the liver and is not protein-bound. There is therefore no need to reduce the dose in hepatic impairment unless there is associated renal impairment.</td></tr>
<tr><td>VOLUMES AND DILUENT</td><td>The osmolarity of levetiracetam has been reported as high and this may add to the risk of inflammatory site reactions. Maximal dilution is therefore recommended to reduce this risk.

Levetiracetam can be diluted with sodium chloride 0.9% or water for injection (WFI) in a 30mls syringe and infused over 24 hours, but sodium chloride tends to be the preferred option.

Two syringe pumps may be required for doses above 2.0 grams/24hours</td></tr>
<tr><td>PRESCRIBING CONSIDERATIONS</td><td>Reduce dose in renal impairment (see above)</td></tr>
<tr><td>COMPATABILITY</td><td>Data on compatibility with other drugs is limited. Clinical experience suggests that levetiracetam is compatible with:
Diamorphine
Haloperidol
Hyoscine butylbromide (Buscopan)
Levomepromazine
Metoclopramide
Methadone
Midazolam
Morphine sulfate
Oxycodone</td></tr>
</table>

	Administering the levetiracetam in a second, separate syringe pump from any other medications is a recommended approach if there is concern about incompatibility or problems with site reactions. It also reduces drug wastage (of levetiracetam) when other medication doses for symptom control may require daily adjustment. The use of two separate syringe pumps may be a preferred approach in the community setting.
SIDE EFFECTS	**Very common** (>10%): fatigue, drowsiness, headache **Common** (<10%, >1%): ataxia, hyperkinesis, tremor, dizziness, diplopia, blurred vision, amnesia, abnormal thinking, attention disturbance, behavioural disturbances, depression, insomnia, anorexia, abdominal pain, diarrhoea, dyspepsia, nausea, vomiting, myalgia, rash, pruritus, thrombocytopenia **Uncommon** (<1%, >0.1%): suicidal ideation **Rare** (<0.1%): psychosis, pancreatitis, hepatic failure, acute kidney injury, bone marrow suppression, hyponatraemia, extra-pyramidal symptoms, rhabdomyolysis, severe skin reactions. Refer to full Summaries of Product Characteristics (SPCs) for complete tabulated list of adverse effects
IN THE EVENT OF LEVETIRACETAM NOT BEING AVAILABLE	Benzodiazepines would be the drug of choice should levetiracetam not be available e.g., midazolam. Consult with Specialist Palliative Care doctor/CNS to discuss appropriate treatment options. The patient's GP should be included in these discussions.
IN THE EVENT OF SEIZURES	Benzodiazepines remain the first line treatment for a prolonged seizure or status epilepticus Ensure as required subcutaneous and/or buccal benzodiazepine is prescribed and available in the event of a seizure. Consult with Specialist Palliative Care doctor/CNS to discuss ongoing pharmacological management of seizures. The patient's GP should be included in these discussions.
SPECIALIST PALLIATIVE CARE CONTACT DETAILS - SOUTHERN	**SOUTHERN LOCALITY (covering Torbay and South Devon)** **Rowcroft Hospice** ▪ 01803 210800 - 24 hour advice line. Ask for the senior nurse or doctor on-call **Torbay Hospital** ▪ 01803 655056 - Monday to Friday, 9am-5pm ▪ 01803 210800 - Out-of-hours, including weekends and bank holidays, 24 hour advice line **Rowcroft Community Specialist Palliative Care Team (covering Torbay and South Devon)** ▪ 01803 210811 - Monday to Friday, 9am-5pm ▪ 01803 210812 - Out-of-hours, including weekends and bank holidays, 9am-1pm ▪ 01803 210800 - Out-of-hours, including weekends and bank holidays, 24 hour advice line

	Hospice at Home team Service available for patients with prognosis of less than 2 weeks who wish to die at home ▪ 01803 217620 - available 24/7
SPECIALIST PALLIATIVE CARE CONTACT DETAILS - WESTERN	**WESTERN LOCALITY (covering Plymouth, South Hams and West Devon)** **St Luke's Hospice** ▪ 01752 401172 - 24 hours advice line. Ask for senior nurse or doctor on-call **Derriford Hospital St Luke's Specialist Palliative Care Team** ▪ 01752 436744 **St Luke's Community Specialist Palliative Care Team** ▪ 01752 964200 Available 9am-5pm, 7 days per week
SPECIALIST PALLIATIVE CARE CONTACT DETAILS - EASTERN	**EASTERN LOCALITY (covering Exeter, East and Mid Devon)** **For Palliative Care advice from a Hospiscare doctor:** Advice available 24 hours a day: ▪ Phone 01392 688044 and ask to speak to the Consultant clinical lead or the doctor covering the ward ▪ From an internal Royal Devon & Exeter Hospital phone use extension 2586 **Hospiscare Community Clinical Nurse Specialists** 8.00am-6.00pm, 7 days per week including weekends and bank holidays: ▪ 01392 688040 or 01392 688041 **Out of hours advice line for patients, relatives and professionals:** After 6.00pm and before 8.00am, 7 days per week: ▪ 01392 688044 If hospice ward staff cannot immediately resolve your query, then you will be contacted by an experienced Palliative Care Community CNS or Doctor on call. **Royal Devon and Exeter Hospital based Specialist Palliative Care nurses:** 8.00am-6.00pm, Monday to Friday and 10.00am-3.00pm at weekends and bank holidays ▪ 01392 403750 or via RD&E switchboard 01392 411611 and ask for bleep 606
SPECIALIST PALLIATIVE CARE CONTACT DETAILS - NORTHERN	**NORTHERN LOCALITY** **North Devon District Hospital Specialist Palliative and End of Life Care Team** ▪ 01271 311 642 (Internal ext. 3642) – Monday to Friday, 8.30am–5pm **North Devon Hospice** **Community Specialist Palliative Care Team or Bedded Unit** ▪ 01271 344 248 - Monday to Friday, 9 am-5pm **Out-of-hours Specialist Palliative Care advice for professionals** ▪ North Devon Hospice Advice Line on **01271 347 214** or **01271 344 248** (Select Option 1)

This supporting guidance has been developed by Dr Sarah Human, Dr Jenny Hayes, Dr Doug Hooper and Dr Hasib Choudhury, Consultants in Palliative Medicine working across Devon, with support from the Devon Joint Formulary team.

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Version 2

References

Health Improvement Scotland and NHS Scotland. Scottish Palliative Care Guidelines. Levetiracetam (subcutaneous infusion)
Levetiracetam (subcutaneous infusion) | Right Decisions

Juba K, Weiland D. Seizure management in a complex hospice patient. *Journal of Pain and Palliative Care Pharmacotherapy* 2010;**24**(1);27-32

Levetiracetam Monographs. Summary of Product Characteristics (SPC)
http://www.medicines.org.uk/emc/

Lopez-Saca JM, Vaquero J, Larumbe A, Urdirox J, Centeno C. Repeated use of subcutaneous levetiracetam in a palliative care patient. *Journal of Pain and Symptom Management*. 2013;**45**(5):e7-8

Remi C, Lorenzi S, Vyhnalek B et al. Continuous Subcutaneous Use of Levetiracetam: A Retrospective Review of Tolerability and Clinical Effects. *Journal of Pain and Palliative Care Pharmacotherapy* 2014;**28**:371-377

Wilcock A, Howard P. Therapeutic Reviews. Levetiracetam. *Journal of Pain and Symptom Management* 2018;**56**:645-649

Wilcock A, Howard P, Stark Toller C, Droney J and Charlesworth S. *Palliative Care Formulary*. 9th edition. Pharmaceutical Press. August 2025.