Subcutaneous Levetiracetam for Adults in Palliative Care
Information for staff

Indications in palliative care

For licensed indications see BNF/SPC

Subcutaneous Levetiracetam is indicated where:

- Seizure control can be maintained with Levetiracetam, but oral or intravenous administration is not possible or desired;

Subcutaneous use of Levetiracetam is off-licence, although there is evidence for its safe use by this route.[3,4]

Dosing and administration

Dose

Levetiracetam is administered as continuous subcutaneous infusion (CSCI) using a syringe pump (syringe driver).
Convert from the patient's current oral or intravenous dose (see Dose conversion below).
The maximum licensed dose of levetiracetam is 3g in 24 hours. Higher doses have occasionally been used following advice from neurology.
For patients not already using levetiracetam, start at 1g CSCI over 24 hours. Increase as necessary over two to four days[3]. Contact Palliative Care Team for advice.

Dose conversion from PO or IV to CSCI

The conversion ratio used is **1:1** between all routes of administration for levetiracetam. For example, a patient on 500mg twice daily orally should receive 1g over 24 hours via CSCI. **Ideally, start the pump at least 4 hours before the next oral or IV dose would have been due**.

Syringe Pump volume

The maximum volume to be administered via a syringe pump, including diluent, is:

- 22mL for a 30mL syringe
- 34mL for a 50ml syringe.

Levetiracetam comes in 500mg/5mL vials. The maximum levetiracetam dose in a **30mL** syringe is **2g** over 24 hours, therefore it may be necessary to split higher doses between two syringe pumps, or use a 50mL syringe. As levetiracetam should be well diluted, using at least a 30mL syringe is recommended.

Renal Impairment*

Doses must be adjusted for renal impairment. See SPC or BNF for further information.

Creatinine Clearance (ml/min/1.73m^2)	Maximum Total daily dose / 24 hours
>80	1g to 3g
50-80	1g to 2g
30-49	500mg to 1.5g
<30	500mg to 1g

Hepatic Impairment**

In severe hepatic impairment halve the dose if the creatinine clearance < 60mL/min, as creatinine production will be reduced and the creatinine clearance may underestimate renal impairment[2,3]

Compatibility

There is emerging evidence for compatibilities with levetiracetam. It is compatible with oxycodone, morphine sulfate, midazolam, levomepromazine and hyoscine butylbromide (Buscopan®).

For specific combinations, check Medicines Complete Drug Compatibility Checker (account required), The Syringe Driver book[5], or contact pharmacy for advice.

Diluent
Sodium chloride 0.9% is the preferred choice of diluent. Water for injection can also be used. To avoid injection site reactions dilute the syringe to maximum possible volume (see section Syringe Pump Volume above). Site reactions are rare when levetiracetam is well diluted.

Ordering and Strength

Preparation	Pack size
Levetiracetam 500mg/5ml	10 vials

Use generic name levetiracetam for all prescriptions.

These vials can be obtained by community pharmacies to allow administration in the community. Discuss with GP practice prior to discharge.

Caution
For full list see BNF/SPC

Renal impairment: Dose adjustment is required. See dosing and administration box*.

Hepatic impairment. Dose adjustment may be required. See dosing and administration box**.

Adverse effects [1-3]
For full list see BNF/SPC

- Behavioural disturbances**
- Skin reactions
- Fatigue
- Drowsiness
- Ataxia
- Nasopharyngitis
- Hyperkinesis
- Dizziness
- Diplopia, blurred vision
- GI side effects

**Alteration to mood, irritability, aggressiveness and increased risk of suicidal thoughts and behaviour have been reported with Levetiracetam. Patients should be monitored for signs of altered mood attributable to Levetiracetam.

Interactions[1-3] *For full list see BNF/SPC*

Not significantly metabolised in the human body. However caution advised when administered with carbamazepine, methotrexate or phenytoin due to isolated reports of toxicity.
May increase methotrexate levels (monitor).

References
1. BNF available at: https://bnf.nice.org.uk/ [last accessed 17-Dec-2021]
2. Levetiracetam 100mg/ml infusion SPC Levetiracetam 100 mg/ml concentrate for solution for infusion - Summary of Product Characteristics (SmPC) - (emc) (medicines.org.uk) [last accessed 17-Dec-2021]
3. Scottish Palliative Care Guidelines, Levetiracetam monograph Scottish Palliative Care Guidelines - Levetiracetam (Subcutaneous Infusion) [accessed 30-Jan-2023]
4. Palliative Care Formulary Online [accessed 14/01/22 via medicines complete]
5. The Syringe Driver 4th Edition 2017 by Andrew Dickman and Jennifer Schneider.

Hospital Supportive and Specialist Palliative Care Team (HSSPCT). Contact us at the numbers below (choose option 2).				
Belfast City Hospital and NI Cancer Centre 028 9615 7755	Mater Hospital 028 9615 7744	Royal Hospitals 028 9615 7733	Musgrave Park Hospital 028 9615 7733	Out of hours: specialist palliative medicine 24/7 advice **(GPs and Hospital doctors only)** 028 9615 1900

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