

INTRAVENOUS LEVETIRACETAM SUPPLETION DURING HAEMODIALYSIS PRESERVED STABLE THERAPEUTIC SERUM CONCENTRATIONS: A CASE REPORT

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Background and Importance

- Levetiracetam is a widely used antiepileptic drug.
- Due to its pharmacokinetic properties, see table 1, it is highly dialyzed during haemodialysis (HD).
- Therefore, it is difficult to preserve stable plasma levels during dialysis and patients starting with HD are often switched to other antiepileptic drugs.
- Information about levetiracetam concentrations in this group of patients are rarely described and show conflicting data.

Aim and Objectives

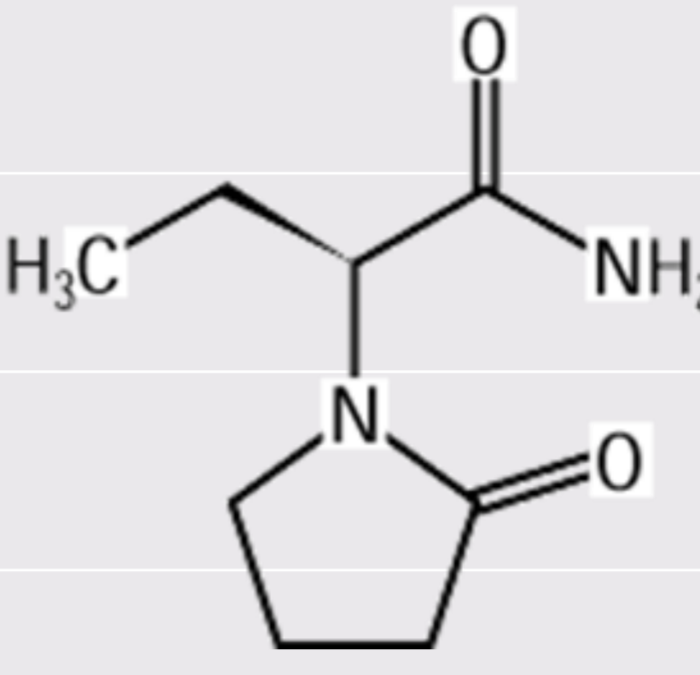
- We report a case of a 63-year-old woman who started intermittent HD because of renal failure due to diabetic nephropathy.
- She was treated with levetiracetam 250 mg b.i.d. for therapy-resistant focal epilepsy.
- Levels <10 mg/L resulted in frequent seizures, therefore the target values in this patient were set at 10-25 mg/L.

Dialysis settings

- HD sessions lasted 4 hours, trice weekly.
- Fresenius 5008 (Fx CorDiax 1000) HD machine was used.

Table 1: Pharmacokinetic properties of levetiracetam.

Levetiracetam	
Volume of distribution (Vd)	0.5–0.7 L/kg
Protein binding	< 10%
Molecular weight (g/mol)	170.2
Clearance	~100% renal 0.3% via feces



Materials and Methods

- Additional intravenous doses of levetiracetam were administered during bypass pre-HD, after 2 hours HD and post-HD (see Table 2).
- Levetiracetam concentrations were measured 30 minutes after levetiracetam supplementation.
- Pre-HD samples were measured before the first supplementation dose was given.

Results

Table 2. Levetiracetam supplement and serum concentrations before, during and after haemodialysis sessions.

HD session	1	2	3	4	5	6	7
Supplemental intravenous dose (mg) of levetiracetam							
Pre-HD				250	250	250	500
After 2 hours HD	250	250	250	250	250	250	250
Post-HD	250	250	250	250	250	250	250
Levetiracetam plasma concentrations (mg/L)							
Pre-HD	18	20	19	18	20	10	19
After 2,5 hours HD	8	10	10	13	12	17	15
Post-HD	8	8	17	11	10	9	13

- Plasma concentrations remained most stable with suppletion doses of 500-250-250mg.
- No seizures or absences have occurred during dialysis and also not on non-dialysis days since the doses were set at 500-250-250mg.

Conclusion and Relevance

- HD showed to eliminate levetiracetam significantly.
- In this case, intravenous levetiracetam suppletion during HD safely preserved stable levetiracetam plasma concentrations preventing seizures.
- Close monitoring of plasma concentrations is recommended to determine the appropriate supplemental dose to maintain therapeutic levels.
- Treatment with anticonvulsant drugs that are not highly eliminated by HD are preferred, e.g. valproate.

Suggestions

- Continuous levetiracetam supplementation during HD could be of further interest.

References

- RenalDrugDatabase, Levetiracetam, accessed 21-06-2023, via: <https://renaldrugdatabase.com/monographs/levetiracetam>

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