Indian Journal of Trauma and Emergency Pediatrics
Volume 12 Number 2 / April – June 2020
DOI: http://dx.doi.org/10.21088/ijtep.2348.9987.12220.1

Intravenous Levetiracetam as the First Line Antiepileptic Drug in Status Epilepticus

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How to cite this article:

Ananda Kesavan TM, Arya R Nair. Intravenous Levetiracetam as the First Line Antiepileptic Drug in Status Epilepticus. Indian J Trauma Emerg Pediatr. 2020;12(2):9–11.

Abstract

Seizures are common in children. With the advent of newer antiepileptics efficacy as well as safety profile has increased. Although we are using conventional antiepileptics to abort an acute episode of seizure more studies have to be conducted for assessing the safety and efficacy of newer drugs as first line antiepileptic drugs. Here we conducted a study to assess levetiracetam as first line antiepileptic.

Keywords: Levetiracetam; Statusepilepticus; First line; Efficacy.

Introduction

Status Epilepticus (SE) is the commonest pediatric neurological emergency situation visited in casualty. The morbidity and mortality is high, if proper treatment is not given in time. Intravenous (IV) Phenobarbitone, Phenytoin and Benzodiazepine (Pheno/DPH/BDZ) are 'traditionally' used antiepileptic drugs (AEDs).[1] But many cases of SE are poorly controlled with the conventional drugs. Also all the conventional drugs got major side effects. So later uncontrolled SE are put on newer drugs like Levetiracetam, Sodium Valproate, etc. This study was conducted to assess safety and efficacy of intravenous Levetiracetam (LEV) as the first line antiepileptic drug in SE in children.

Materials and Methods

The study was conducted in the Dept of Pediatrics, Govt Medical College, Thrissur. It is a Prospective case series study conducted between August 2017 to July 2018. All children between 1 year to 12 yrs, admitted with SE included in the study. Cases of cerebral palsy on multiple AEDs and with history of SE after 2 (BDZ, Pheno/DPH) drugs failed also included in the study. Permission from Institutional Ethical Committee was obtained before starting the study.

Exclusion Criteria: Children with Secondary seizures like hypoglycemia, hypocalcemia, children with severe cardio respiratory compromise and children treated with other drugs for SE before hospital admission are excluded from the study.

Methodology

LEV was administered as first-line treatment in 6 children with SE, after ruling out metabolic disturbances. Initial intravenous dose of 20 mg/kg Levetiracetam was gradually increased up to a maximum of 30 mg/kg until seizure control was achieved (in 100ml NS/15mts).[2,3]

First 3 cases were known cases of cerebral palsy on multiple AEDs and with history of SE in the

past. In the past also they were put on IV LEV after 2 (BDZ,Pheno/DPH) drugs failed.

Other 6 cases also, on multiple AEDs and with breakthrough seizures, but not treated with inj. LEV for SE in the past.

EEG, Imaging studies (whenever necessary), monitoring of biochemical parameters and vitals were done.

Clinical Profile of 9 children are given below:

Sl. No.	Age and Diagnosis	AED
1	8yr, M, CP	On 3 AEDs (on LEV). Stopped drugs for 5 days. SE previously treated with Inj LEV.
2	7yr, F CP	2 AEDs, treated previously with Inj LEV
3	6yr, M, refractory SE, CP	On 3 AEDs (on LEV) plus pyridoxine, Low dose oral LEV; treated with Inj LEV
4	2.5yr , F, NMD	2 drugs , (Not on LEV), SE treated with IV LEV
5	3.5yr, F, CP	On 2 drugs, (Not on LEV), treated with IV LEV
6	6yr, MR with Seizure	On 2 AEDs, (Not on LEV), treated with IV LEV
7	2yr, M, Post HIE CP	On 3 AEDs, 9 not on LEV), treated with LEV
8	3yr, M, LGS	On 3 AEDs, now treated with LEV
9	7yr, F, CP	On 2 AEDs, treated with LEV

Results

Seizures were controlled in all 9 children with LEV as first line drug. No significant adverse effects were observed and the mean time taken to control seizure was 8 mts (6–12 mts), while that in first 3 cases were 60 mts (50–75 mts), when treated earlier with LEV. Later they were discharged with their regular AED with addition of LEV.

Discussion

SE is usually managed with traditional drugs like Pheno/DPH or BDZ. If seizure is not controlled, will go for newer drugs like Sodium valproate or LEV, but at the cost of significant delay in controlling seizure (8 vs 60 mts). The first 3 children are already on LEV, that is why delay in treatment with LEV.

LEV-a safe drug in children and has a unique pharmacologic profile.It is not metabolized by the liver.[2] No serious drug-drug interactions.It has low protein binding (<10%) and excreted mainly through kidneys. Absorption LEV is not affected by food and has a half life of 6–8 hrs which makes the dosing schedule for a school children more convenient.[5,6] No cardiac/respiratory complications orskin rash reported with LEV.

The other main advantages of LVT are:

1. No significant side effects, safe in children
2. After controlling with IV preparation, can continue same drugs with oral preparation and
3. Can continue for long term(unlike Pheno/DPH) and good compliance
4. LEV fits for all fits.

While LEV is approved as an adjuvant agent for the management of status, data on its use as a first-line therapy is quite limited.[7] Review of available literature reveals a very few reports of LEV used as a first-line agent in status (only a single randomized pilot study and a limited number of case and retrospective reports).

Limitations of the study are Small number of participants of the study, patients are not uniform (regarding diagnosis, oral AEDs, etc and Cost of therapy (not available freely in Govt institutions) is more when compare to other AEDs.[8]

To Conclude;

- LVT is effective in controlling SE with good safety profile
- Warrants further RCTs.
- Both acute seizures and status epilepticus controlled
- Effective and well tolerated orally for long term use.

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