

# Recurrent seizures in hospitalized patients with status epilepticus: risk factors and role for outcome

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## Introduction

- Status epilepticus (SE) is a life-threatening condition of ongoing or repetitive seizures which carries high mortality and severe disability.
- Despite the great number of studies, that have focused attention on various aspects of SE, there are still gaps and contradictions in the current knowledge about SE outcome predictors.
- The rate of seizure recurrence is an important aspect of short-term outcome in patients with status epilepticus, which has received scarce attention by few studies.

**Purpose:** To identify the risk factors for recurrent seizures during hospitalization of patients with SE and the role of seizure recurrence for functional outcome.

## Methods:

- The study included 95 consecutive patients aged 18 years and above, diagnosed with SE, and treated in the neuro-intensive care unit at the University Hospital in Plovdiv, Bulgaria over a period of 3 years.
- Demographics and clinical data concerning established epilepsy, mental retardation, existing neurological abnormalities, and SE were collected by a trained health professional by means of a purposeful interview of a reliable patient's relative or attendant and review of patients' medical records.
- During hospitalization patients were monitored by a neurologist who is a specialist in epilepsy.
- SE functional outcome assessment was based on the results from the Glasgow Outcome Scale.
- The relationship of the abovementioned characteristics to seizure recurrence was analyzed by means of  $\chi^2$ -tests and F-tests. The predictive role of the significant demographics and clinical findings for seizure recurrence was determined by multivariate regression analysis. The level of significance was set at  $P < 0.05$ . All data were processed using SPSS 14.0.

## Results

- Fifty-one (53.68%) of participants in our study were men; the remaining 44 participants (46.32%) were women.
- Their mean age was  $50.32 \pm 1.72$  years. Most patients (53.68%) were above 50 years of age.

Table 1. Clinical findings concerning established epilepsy of the study participants

Clinical findings concerning established epilepsy	N	P (%)	SE
<b>Epilepsy duration</b>			
- epilepsy start	22	23.16	4.35
- = 10 years	37	38.95	5.03
- > 10 years	36	37.89	5.00
<b>Etiology of epilepsy</b>			
- idiopathic	9	9.47	3.02
- symptomatic	56	58.95	5.07
- cryptogenic	30	31.58	4.79
<b>Epilepsy type</b>			
- partial	42	44.21	5.12
- generalized	53	55.79	5.12
<b>Seizure type</b>			
- partial	11	11.58	3.30
- generalized	51	53.68	5.14
- polymorphic	33	34.74	4.91
<b>AEDs for epilepsy treatment</b>			
- monotherapy	32	33.69	4.88
- a combination of 2 AEDs	13	13.68	3.54
- = 3 AEDs	11	11.58	3.30
- untreated	17	17.89	3.95
- Not applicable (epilepsy start)	22	23.16	4.35
<b>AEDs' serum levels</b>			
- in therapeutic range	23	24.21	4.42
- in subtherapeutic range	17	17.89	3.95
- unknown	15	15.79	3.76
- Not applicable (epilepsy start or AEDs cannot be routinely investigated)	40	42.11	5.09

- There was a history of learning disability or other type of retardation in 13 (13.68%) patients.
- Preexisting neurological abnormalities had been described in 42 (44.21%) of study participants.

Table 2. Clinical findings concerning SE of the study participants

<b>SE type</b>			
- non-convulsive	21	22.11	4.28
- convulsive	74	77.89	4.28
<b>SE etiology</b>			
- idiopathic	34	35.79	4.94
- remote symptomatic	45	47.37	5.15
- acute symptomatic	8	8.42	8.20
- progressive encephalopathy	8	8.42	8.20
<b>SE trigger factor</b>			
- poor compliance	28	29.48	4.70
- metabolic/electrolyte disorder	9	9.47	3.02
- ischemia	3	3.16	-
- alcohol	11	11.58	3.30
- inadequate treatment	7	7.37	2.69
- insomnia	1	1.05	-
- unknown	36	37.89	5.00
<b>AEDs for SE treatment</b>			
- Diazepam i.v.	52	54.74	5.13
- Phenobarbital i.m.	4	4.21	-
- a combination of AEDs	39	41.05	5.12
<b>SE duration</b>			
- < 60 min.	70	73.69	4.54
- 60 min. – 24 hours	20	21.05	4.20
- > 24 hours	5	5.26	2.30
<b>Recurrent SE</b>			
- yes	9	9.47	3.02
- no	64	67.37	4.84
- epilepsy start	22	23.16	4.35
<b>EEG after SE management</b>			
- normal	48	50.53	5.16
- non-specific findings	24	25.26	4.48
- specific findings	23	24.21	4.42
<b>GOS</b>			
- dead	5	5.26	2.30
- persistent vegetative state	-	-	-
- severe disability	9	9.47	3.02
- moderate disability	24	25.26	4.48
- good recovery and resumption of normal activities	57	60.00	5.05
<b>Recurrent seizures</b>			
- no	54	56.84	5.11
- single seizures	26	27.37	4.60
- clusters/SE	15	15.79	3.76

- The rate of seizure recurrence was significantly higher in participants with:
  - longer duration of prior epilepsy ( $\chi^2 = 9.62, P < 0.05$ ) and SE ( $\chi^2 = 15.33, P < 0.001$ )
  - SE polytherapy ( $\chi^2 = 10.77, P < 0.05$ )
  - recurrent SE episodes ( $\chi^2 = 15.58, P < 0.01$ )
  - established epilepsy with polymorphic seizures ( $\chi^2 = 9.54, P < 0.05$ )
  - poor compliance and inadequate antiepileptic treatment ( $\chi^2 = 9.85, P < 0.05$ ).
- On multivariate regression analysis the predictive role of prior epilepsy duration and SE duration for seizure recurrence was confirmed ( $F = 14.52, P < 0.001$ ) – Table 3. The predictive value of this model was 24%.
- No correlation was found between the rate of seizure recurrence and functional outcome  $P > 0.05$ .

Table 3. Results from multivariate regression analysis of recurrent seizures' predictors

Factor	B-coefficients	P	95% CI
SE duration	0.318	0.001	0.220 ÷ 0.860
Prior epilepsy duration	0.255	0.009	0.065 ÷ -0.432
Constant	0.163	0.208	-0.092 ÷ 0.417

## Discussion

- The rate of seizure recurrence is a rarely discussed aspect of SE outcome.
- The reported recurrence rate in children treated in the intensive care unit was 21% [1], which was much lower compared to our study (43.6%).
- Our results verified the predictive role of prior epilepsy duration and SE duration for seizure recurrence.

## Conclusions

- The study confirms the role of some clinical factors for the rate of seizure recurrence in hospitalized patients with SE and denies the direct association of seizure recurrence with functional outcome.
- Our results may be useful for finding more successful management strategies of the post-SE period.

## References

- [1]. Kravljanc R, Jovic N, Djuric N, Jankovic B, Pekmezovic T. Outcome of status epilepticus in children treated in the intensive care unit: a study of 302 cases. *Epilepsia*. 2011; 52(2): 358-63.