

Outcome of Status Epilepticus in Srinagarind Hospital

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Status epilepticus (SE) is one of the common neurological emergencies in adults and for which morbidity and mortality are high and associated with either inappropriate management or underlying diseases. Forty SE patients were included (23 men; 17 women) between 18 and 86 years of age. Generalized convulsive status epilepticus (GCSE) was most common (34 events, 85%) vs. non-convulsive status epilepticus (NCSE) (6 events, 15%). Nineteen patients (47.5%) had previously diagnosed neurological disorders. Antiepileptic drug withdrawal, encephalitis and alcohol-related illness were the common causes of SE. Thirteen patients (32.5%) developed refractory status epilepticus. Improper management was found in 23 events (57.5%). Outcomes of SE included death (14, 35%), complete recovery (14, 35%) and partial recovery (12, 30%). Of the patients who experienced improper management 43.5% died over against the 23.5% who died despite proper management. To improve the outcome of SE, a public information campaign on the management of SE is needed.

Keywords: Status epilepticus, Outcome, Proper management

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Status epilepticus (SE) is defined as recurrent epileptic seizures without complete recovery between seizure(s), or continuous clinical and/or electrical seizure activity that lasts 30 minutes or longer, whether or not consciousness is impaired⁽¹⁾. SE is one of the most common neurological emergencies in adults^(2,3).

SE can be classified by type of onset (*i.e.*, partial or generalized), or clinical characteristic (overt, subtle or electrical)⁽⁴⁾. The most common and life-threatening form of SE is generalized convulsive SE (GCSE)⁽¹⁾.

There are many acute illnesses and conditions that might be the direct cause or precipitator of SE, such as central nervous system (CNS) infection, cerebrovascular accidents (CVA), metabolic derangement, anti-epileptic drugs (AEDs) withdrawal and post-hypoxic encephalopathy^(5,6).

The morbidity and mortality are high and associated with either inappropriate management or underlying diseases⁽²⁾. There are many reports from Western and developed countries, and only two reports

regarding SE in Thai children and adults^(7,8). Tiamkao S et al reported that high mortality was associated with improper management. Since 1995, Srinagarind Hospital has used clinical practice guideline (CPG) for all SE patients. The authors expected that SE patients were treated with appropriate management and good outcomes. Herein the authors report on SE at Srinagarind Hospital. The underlying etiologies, clinical course, types of AEDs used, and the outcomes are compared to those published in a previous study⁽⁸⁾. In addition, the authors compared outcomes between patients treated with appropriate vs. inappropriate management.

Material and Method

A retrospective study was conducted between January 1, 1995 and December 31, 2005 at the Department of Medicine, Srinagarind (university and referral) Hospital, Faculty of Medicine, Khon Kaen University, Thailand. The authors reviewed the medical records of SE patients over 14 years of age. GCSE is characterized by paroxysmal or continuous tonic and/or clonic motor activity associated with marked impairment of consciousness⁽¹⁾. Refractory status epilepticus (RSE) defined as continued seizures after three antiepileptic drugs had failed.

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Subtle GCSE is characterized by continuous rhythmic subtle motor phenomena (facial twitching, nystagmoid eye jerks, or subtle focal twitches of the trunk or extremities⁽¹⁾). Nonconvulsive status epilepticus (NCSE) comprises a group of status seizure types that include: 1) complex partial SE (which can be further subdivided, based on whether it occurs in patients with epilepsy, illness or coma), 2) typical absence and 3) status occurring in comatose patients⁽⁹⁾.

The presented data include demographics, types of SE, duration of seizures, underlying neurological disorders, cause of SE, laboratory results, treatment, clinical course and outcomes. Management of SE in Srinagarind Hospital was classified as proper and improper management: proper management defined as management which followed with CPG and improper management defined as management which did not follow CPG. Statistical analyses of the descriptive study included frequency and percentage. The association between outcome and treatment was also analyzed.

Results

Forty SE patients were included (23 men; 17 women) between 18 and 86 years of age (mean, 45). The types of SE include: 1) GCSE without partial onset (22 events, 55%), 2) GCSE with partial onset (12 events, 30%) and 3) nonconvulsive status epilepticus (NCSE) (6 events, 15%).

Nineteen patients (47.5%) had previously diagnosed neurological disorders including, epilepsy (11), head injury status post-craniotomy (4), cerebral infarction (3) and post-encephalitis (1). Seventeen patients had underlying diseases (each of whom had more than one underlying disease), cardiovascular disease (9), gastrointestinal disorder (8), diabetes (7), renal disease (5), hyperlipidemia (3), systemic lupus erythematosus (3), chronic obstructive pulmonary disease (2), and protein S deficiency (1).

Table 1 shows the causes and/or precipitating factors of SE including, AEDs withdrawal, encephalitis and alcohol-related. All of the SE patients in the present study were referred to the authors by community hospitals in Khon Kaen province. The mean duration of onset until referral to Srinagarind Hospital was 4.5 days. When patients arrived at ER, they were treated within an average 22.6 minutes, such that only 3 patients experienced delayed diagnosis.

Table 2 shows the type of AEDs which physicians used to control seizures and phenytoin

Table 1. Causes and/or precipitating causes of SE

Causes/Precipitating causes	Number (%)
Acute symptomatic	21 (52.5)
Encephalitis	6 (15)
Cerebral infarction	3 (7.5)
Meningitis	3 (7.5)
Hypertensive encephalopathy	2 (5)
Head injury	1 (2.5)
Craniotomy	1 (2.5)
Post-cardiac arrest	1 (2.5)
Intracerebral hemorrhage	1 (2.5)
Cerebral venous sinus thrombosis	1 (2.5)
Septic encephalopathy	1 (2.5)
Remote symptomatic	3 (7.5)
Post-cerebral infarction	1 (2.5)
Post-head injury	1 (2.5)
Post-intracerebral hemorrhage	1 (2.5)
AEDs withdrawal	10 (25)
Alcohol related	6 (15)

Table 2. AEDs used in SE

AEDs	Number (%)
First line drugs	
Diazepam i.v.	30 (75)
Phenytoin i.v.	7 (17.5)
Phenobarbital i.v.	7 (7.5)
Second line drugs	
Phenytoin i.v.	33 (82.5)
Phenobarbital i.v.	4 (10)
Third line drugs	
Phenytoin i.v.	20 (50)
Phenobarbital i.v.	12 (30)
Fourth line drugs	
Phenobarbital i.v.	10 (25)
Valproic acid i.v.	2 (5)
Thiopental i.v.	1 (2.5)
Fifth line drugs	
Phenobarbital i.v.	1 (2.5)

was the most common prescribed. Thirteen patients (32.5%) developed refractory status epilepticus (RSE), while a respective 11 and 2 patients were controlled by high-dose phenobarbital and valproic acid given intravenously (i.v.).

Improper management occurred in a total of 23 cases (57.5%): 1) inappropriate dosages of AEDs (14/23 or 60.87%), 2) delayed treatment (5/23 or 21.74%) and delayed diagnosis (3/23 or 13.04%) and improper

route of AEDs (1/23 or 4.35%). The outcomes in the presented SE patients were: death (14/40, 35%), complete recovery (14/40, 35%), total dependency (6/40, 15%), and partial dependency (6/40, 15%). Ten of the patients (10/23, 43.5%) who received improper management resulted in death, whereas death occurred in 4 of 17 (23.53%) patients receiving proper management. The causes of death were sepsis (7/40, 17.5%), severe hyperkalemia (3/40, 7.5%) and going against medical advice (4/40, 10%).

Discussion

The annual incidence of SE ranges from 10 to 41 per 100,000 persons^(10,11), and it is estimated that worldwide there are 3 million cases annually⁽⁹⁾. In developing countries, hospital-based studies indicate there are various clinical courses and outcomes^(7,8).

Nearly half of the patients (47.5%) the authors studied had previously diagnosed neurological disorders and 11 had an established diagnosis of epilepsy and SE, of whom 10 (90%) abruptly withdrew from their prescribed AED regime. Hence, the common causes in the present study were either CNS infection (22.5%) or AED withdrawal (25%), in line with previous reports in Thai adults⁽⁸⁾.

The outcomes in the present study are unsatisfactory despite our hospital's being a referral center. About one-third of the patients experienced complete recovery, while 14 died and 12 suffered a neurological deficit. The duration of SE continues to have a direct effect on outcomes^(2,12,13). The present study indicates that the duration of onset to referral was 4.5 days, and 13 patients (32.5%) developed RSE. Thus, prompt, appropriate and effective medical therapies to stop convulsions and supportive treatments to stabilize the function of other systems are needed for sufferers of SE⁽¹⁴⁾. Diazepam, phenytoin and phenobarbital are the three main AEDs used and the effectiveness of which in the present study was ~67.5%, similar to a previous study⁽¹²⁾.

The rate of improper management in the present study was 57.5%, which represents an improvement (albeit inadequate) over the authors' previous study (72%) in the same setting⁽⁸⁾. Similarly, the mortality rate improved from 56%⁽⁸⁾ to 35% in the current study. The improved outcomes in the present study are likely the result of good intensive care, implementation of national guidelines for the treatment SE and a campaign at Srinagarind Hospital to improve proper treatment of SE.

Conclusion

Improper management of SE at Srinagarind Hospital was 57.5%, mortality was 35%. Improved management of SE is needed.

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ผลการรักษาภาวะชักต่อเนื่องในโรงพยาบาลศรีนครินทร์

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ภาวะชักต่อเนื่องเป็นภาวะฉุกเฉินทางระบบประสาทที่พบบ่อยในผู้ป่วยผู้ใหญ่ และมีอัตราการเจ็บป่วย และเสียชีวิตสูง ซึ่งสัมพันธ์กับการรักษาที่ไม่เหมาะสม และโรคที่เป็นสาเหตุ ผู้ป่วยภาวะชักต่อเนื่อง 40 ราย ชาย 23 คน หญิง 17 คน อายุระหว่าง 18-86 ปี การชักต่อเนื่องชนิดเกร็งกระตุกทั้งตัวพบบ่อยที่สุด 34 ครั้ง (ร้อยละ 85) และชนิดไม่เกร็งกระตุก 6 ครั้ง (ร้อยละ 15) ผู้ป่วย 19 ราย (ร้อยละ 47.5) เคยได้รับการวินิจฉัยโรคทางระบบประสาท การหยุดยากันชัก สมอองอีกเสบ และการเจ็บป่วยที่เกี่ยวข้องกับสุราเป็นสาเหตุที่พบบ่อยของภาวะชักต่อเนื่อง ผู้ป่วย 13 ราย (ร้อยละ 32.5) เป็นภาวะชักต่อเนื่องชนิดที่ต้องต่อการรักษา การรักษาที่ไม่เหมาะสมพบ 23 ครั้ง (ร้อยละ 57.5) ผลการรักษาเสียชีวิต 14 ราย (ร้อยละ 35) หายดีเป็นปกติ 14 ราย (ร้อยละ 35) และหายบางส่วน 12 ราย (ร้อยละ 30) ผู้ป่วยที่ได้รับการรักษาไม่เหมาะสมร้อยละ 48 เสียชีวิต ขณะที่ยังร้อยละ 23.5 ของกลุ่มที่ได้รับการรักษาเหมาะสม เสียชีวิต เพื่อให้ผลการรักษาผู้ป่วยภาวะชักต่อเนื่องได้ผลดี ควรรณรงค์วิธีการรักษาให้เป็นที่ทราบโดยทั่วกัน