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Case Report

Seizure after Subdural Hematoma Treated with Combination Western-Korean Medicine



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ABSTRACT

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Combined Western-Korean medicine treatments were given to a 67-year-old woman with late onset seizures who underwent surgical drainage of a subdural hematoma. Clonazepam and herbal medicine was prescribed. Acupuncture, moxibustion, cupping, chuna, and physical therapy were also performed. The frequency and intensity of seizures was assessed using the Chalfont Seizure Severity Scale. The seizure index score improved from 25 at admission to 0 at discharge. Pain in the right upper extremity reduced from 10 to 0 on the visual analogue scale and muscle strength increased from Grade 3 to 5 in Medical Research Council Scale for the Manual Muscle Test. At the time of hospitalization, the manual muscle strength tests for the affected shoulder, elbow, wrist, and grip strength were 30%, 60%, 10%, 5%, respectively, which improved almost 100% by discharge. Further studies using combined Western-Korean medicine for seizures after strokes are necessary to determine the most effective treatment.

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Introduction

Seizures are a major complication that can occur after a stroke, and seizures are also the most common symptom of adult epilepsy. In general, the incidence of seizures increases significantly when a hemorrhagic infarction occurs, when the lesion is located in the cerebral cortex, or when the lesion is large and severe. Seizures caused by stroke sequelae are called post-stroke seizures or post-stroke epilepsy [1,2].

Post-stroke seizures are defined as single or multiple convulsive episodes after a stroke which are associated with brain damage due to the stroke, regardless of the time of onset after the stroke. Post-stroke epilepsy refers to a seizure after a stroke and a diagnosis of epilepsy has been confirmed [3]. Post-stroke seizures include early seizures and late seizures, depending on when they first occur. Early seizures occur within a week after the stroke, and late seizures occur 2 weeks or more after the stroke [1,2].

Post-stroke seizures are more common in patients with a

cerebral hemorrhage compared with an ischemic stroke and they typically occur within 48 hours of the onset of stroke symptoms. Seizures after a brain hemorrhage are accompanied by worsening clinical symptoms, deviation of the body midline, and a reduced recovery from the brain hemorrhage, but the exact cause-effect relationship is still unclear [2].

There are many studies on post-stroke epilepsy in Korea, but only 1 study in 2006 [4] which mentioned Korean medical intervention. In this study combined Western-Korean medicine treatment was given to a post-stroke patient after surgical subdural hematoma drainage.

Case Report

Patient

○○○ (Female/67 years)

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Chief complaints

1. Seizure

The patient had no symptoms of convulsions from the time of the occurrence of the subdural hematoma until after its drainage on the 25th March, 2019 at a local university hospital. However, on June 26th, 2019, she was readmitted to the same local university hospital because there were a sudden series of muscle contractions and stiffness occurred in her right upper extremity (U/E), and these cramps occurred intermittently several times thereafter. Once the convulsions began, the right arm joint involuntarily extended to the maximum, and the right elbow flexed to the maximum. During the seizure, a stinging, intense pain occurred in the right U/E which was scored by the patient as a visual analog scale (VAS) 10. At the same time, the patient's neck involuntarily rotated to the left, and she experienced difficulty speaking. The convulsions occurred once every 15 to 30 minutes, and the symptoms persisted for about 2 to 3 minutes. The pain continued throughout the day, even after the spasm in the right arm ended. There were no changes in mental status during the convulsions, but she suffered from pain, fatigue, and depression due to the frequent cramps. The patient was prescribed an anticonvulsant.

2. Right U/E pain and weakness

Following subdural hematoma drainage on the 25th March, 2019, the patient was discharged from hospital with right hemiplegia and her manual muscle test (MMT) grade was 4. However, when the convulsions occurred, the pain and weakness of the right U/E worsened. The MMT grade decreased to 3.

At the time of admission to the Korean medicine hospital on July 11th, 2019, the flexion power of the right shoulder joint compared with the left was 30%, the elbow was 60%, and the wrist joint was 10%. The grip strength on the right was 5% compared with the left. This strength test was performed manually every day by a single Korean medicine doctor. The test evaluated the affected side as a percentage compared with the healthy side.

Onset

2019-06-26

Medical history

1. She underwent a hysterectomy due to endometrial cancer Stage 1 in 1985.
2. She was diagnosed with diabetes mellitus in 1989 and started on medication.
3. Hyperlipidemia was diagnosed in 1994 and she was started on medication.
4. A cervical herniated intervertebral disc was diagnosed in 2010.
5. Bilateral cataracts were diagnosed in 2016 and she started on medication.

Presenting illness

She suffered from a sudden headache, right hemiplegia, and changes in mental status on March 24th, 2019. She was diagnosed with an acute non-traumatic left subdural hematoma on the brain. Computed tomography (CT) and magnetic resonance imaging (MRI) at a local university hospital was performed on March 25th (Figs. 1 and 2). She had burr-hole trephination and closed-system drainage surgery on March 27th, 2019 (Fig. 3), and remained in hospital until April 13th, 2019. After the surgery, her headaches and cognitive decline recovered, but the right U/E remained at muscle manual testing Grade 4. After discharge, a convulsive seizure occurred in the right U/E on June 26th, 2019. She underwent

another brain CT and was prescribed an anticonvulsant at the hospital where she was originally hospitalized (Fig. 4). However, the seizures were not relieved by the medication prescribed.

The patient was admitted to the Semyung University Korean Medicine Hospital on July 11th, 2019, for the purpose of treating the seizures.

Duration of Korean medicine treatment

2019-07-11 to 2019-08-03 (24 days of hospitalization)

Patient protection policy for use of patient information

This study is a retrospective chart review and was exempted from deliberation by The Institutional Review Board of Semyung Korean Medicine Hospital (IRB no.: SMJOH-EX-2020-06).

Materials and Methods

Treatment

1. Acupuncture

Acupuncture treatment was performed to relieve the right U/E pain caused by spasms. The patient received acupuncture treatment in the supine position by a Korean medicine doctor with 1 to 3 years of clinical experience.

The patient was treated with acupuncture on the Suori (LI13), Gokji (LI11), Susamni (LI10), Cheoktaek (LU5), Gongchoe (LU6), Goktaek (PC3), Naegwan (PC6), Oegwan (TE5) and ashi points. These points were selected by referring to the trigger point of the fascia and a Korean acupuncture medicine textbook [5].

This treatment was performed twice a day (once a day on weekends) for 15 minutes using 0.20 × 0.30 mm and 0.25 × 40 mm stainless needles (Dongbang Acupuncture, Korea). The depth of the needle varied depending on the location of the acupuncture point and the depth of the muscle, but typically it was between 3-7 mm. Since the strong stimulation of the trigger point can be stressful to the patient, the stimulation was set to the extent that the patient felt a light acupuncture sensation. Infrared irradiation therapy and precipitator stimulation was performed using 3 Hz during the acupuncture treatment.

2. Moxibustion

During the hospitalization period, except on Sundays, indirect moxibustion treatment was performed every morning on the Gwanwon (CV4) acupoint for 15 minutes. This treatment was performed to help the blood and qi circulation. In addition, indirect electric moxibustion treatment was performed daily on the right U/E for 2 minutes. The moxibustion points were the same as the acupuncture points to give additional mild stimulation to the same area after the acupuncture treatment.

3. Cupping therapy

Wet cupping was performed on both sides of the Gansu (BL18), Bisu (BL20) and Jangmun (LR13) points, 5 days a week (not on weekends) for 5 minutes. These points were the places where tenderness was observed during palpation [6]. In Korean medicine, these points are also where the functions of the liver and spleen are revealed. The liver controls the tendons and the spleen controls the muscles and the extremities of the limbs [7]. Therefore, it was judged to be the matching meridian points in the treatment of arm convulsions and pain.

4. Chuna therapy

During the hospital stay, cervical fascial relaxation therapy was performed every Monday and Thursday for 10 minutes. Since the

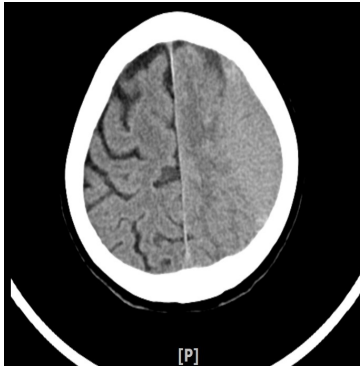


Fig. 1. Patient's Brain CT. There is a moderate amount of acute subdural hematoma in the left cerebral convexity (2020-03-25). CT, computed tomography.



Fig. 3. Brain CT after surgical drainage (2020-03-27). This CT was taken after surgery for burr-hole trephination and closed-system drainage surgery. CT, computed tomography.

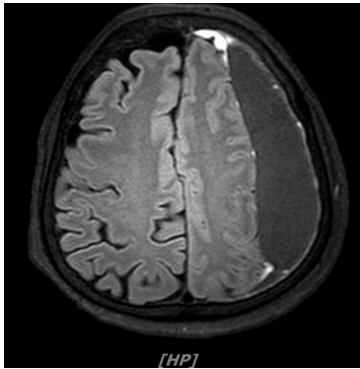


Fig. 2. Patient's Brain MRI (Axial FLAIR) (2020-03-25). MRI, magnetic resonance imaging.

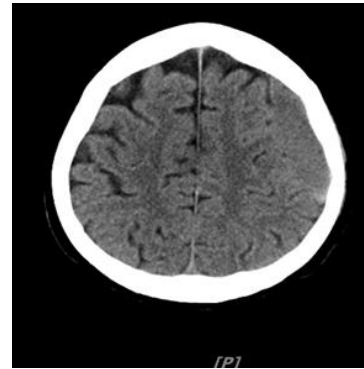


Fig. 4. Brain CT taken on the day of the seizure. There were no new signs of brain damage (2020-06-26). CT, computed tomography.

neck also rotated to the left during the seizure, to relieve tension in the neck Chuna therapy was performed.

5. Physiotherapy

Hot pack treatment was applied daily (except for weekends) to the same points as the acupuncture treatment points.

6. Herbal medicine

Dokwaljihwangtang was administered from July 11th, 2019, to July 28th, 2019, and Sipjeondaebotang was administered from then on, until discharge. The medications were administered 3 times a day, after meals (Tables 1 and 2).

7. Western medicine treatment

The patient continued to take medications related to her past medical history and prescriptions from the local hospital that diagnosed, and drained the subdural hematoma. After the seizure symptoms disappeared, antiemetic and anticonvulsant drugs were withheld sequentially. The symptoms of convulsive seizure did not recur.

The following prescriptions were the drugs the patient was taking before the onset of SDH:

- (1) Metformin 500 mg Tablet bid ac.
- (2) Tenepliptin 10 mg Tablet 2T#2 bid ac.

(3) Glimpiride 4 mg Tablet. 2T#2 bid pc.

(4) Omega-3-Acid Ethyl Esters90 1,000 mg Capsule 2C#2 bid pc.

(5) Bilberry fruit dried ext. 3% 170 mg Capsule 2C#2 bid pc.

The discharge medications prescribed from the local university hospital, after the epidural hematoma surgery were:

(1) Atorvastatin 10 mg Tablet 1T qd pc.

(2) Choline alfoscerate 400 mg Capsule 1C qd pc.

(3) Citicoline 500 mg Tablet 1T qd pc.

(4) Teprenone 50 mg Capsule 1C qd pc.

(5) Clonazepam 0.5 mg Tablet 1T qd pc. After the convulsive symptoms disappeared, the amount was reduced from 1 to 0.5 tablets from July 16th, and the symptoms did not. On July 18th, this medication was completely discontinued.

(6) Vitamin B and C complex Tablet. 1T qd pc (ascorbic acid 50 mg, cyanocobalamin 1 µg, pyridoxine hydrochloride 1 mg, thiamine HCl 6 mg, calcium pantothenate 5 mg, nicotinamide 25 mg, riboflavin 6 mg).

(7) dimenhydrinate 50 mg Tab. 1T qd pc. This medication was completely discontinued on July 16th.

Evaluation

There were 4 evaluation methods used to identify changes in patient symptoms during her stay at the Korean medicine hospital. The number and pattern of seizures the patient experienced each

day and the severity of seizures at admission and at discharge from the Korean medicine hospital were compared using the Chalfont seizure severity scale [8]. The VAS score was used to evaluate pain due to stiffness in the right U/E. In addition, the muscle strength of the right U/E was assessed by a single Korean medicine doctor during the MMT.

Results

Changes in symptoms presenting with the seizure (during hospitalization)

During the hospitalization period in the Korean medicine hospital, the number and pattern of convulsions were recorded by the Korean medicine doctor. The recording of seizures (11th July to

July 15th) occurred from 6 pm to noon the next day.

The patient said that seizures had previously occurred once every 15 to 30 minutes before admission to the Korean medicine hospital and they manifested only in slight shaking of the right arm when walking. On July 11th, the hospitalization day, the frequency of convulsions decreased from once every 1 hour to every 1.5 hours. On July 12th, the cramps occurred every 1 to 2 hours, and on July 13th, the cramps occurred every 1 to 3 hours. On July 14th, seizures were not triggered by light movement of the right arm. Seizures only occurred when she used her right forearm intentionally, such as when brushing her teeth or carrying things. On July 15th, the seizures occurred only once a day. No additional convulsions occurred from July 16th during hospitalization, or after discharge.

In addition to patient interviews, the Chalfont Seizure Severity Scale was used to compare the severity of seizures before and after treatment. At the time of admission to the Korean medicine hospital, the patient’s seizure index was 25. The score improved to 0 at discharge.

Table 1. The Prescription of Dokwhaljiwhangtang.

Botanical name	Dosage (g)
Rehmanniae Radix Preparata	16
Corni Fructus	8
Poria Sclerotium	6
Alismatis Rhizoma	6
Moutan Radicis Cortex	4
Saposhnikoviae Radix	4
Araliae Continentalis Radix	4
Total amount	48

Table 2. The Prescription of Sipjeondaebotang.

Botanical name	Dosage (g)
Glycyrrhizae Radix et Rhizoma	5
Angelicae Gigantis Radix	5
Zizyphi Fructus	4
Poria Sclerotium	5
Paeoniae Radix	5
Atractylodis Rhizoma Alba	5
Zingiberis Rhizoma Recens	4
Rehmanniae Radix Preparata	5
Cinnamomi Cortex	4
Cnidii Rhizoma	5
Astragali Radix	4
Total amount	51

Changes in the level of pain in the right U/E

The pain in the right U/E was a VAS score 10 on the day before hospitalization (July 10th). It is an estimate that the patient was asked on the admission day (July 11th). On July 13th, the level of pain was measured as a VAS score of 8. When the convulsions occurred, pain followed as the muscles of the right U/E were tense and stiff, but from July 15th, seizures rarely occurred, and the pain decreased. The pain in the right U/E was resolved from July 16th (Fig. 5).

The MMT for the right U/E

The strength of the right U/E was evaluated daily. The right U/E muscle strength on the hospitalization day (July 11th) was a MMT Grade 3. It changed to Grade 4+ as the seizures disappeared on July 16th. It had improved to a MMT Grade 5 by August 3rd, the discharge date.

The muscle strength was measured by classifying each joint. The patient was evaluated for bending the joints of the right U/

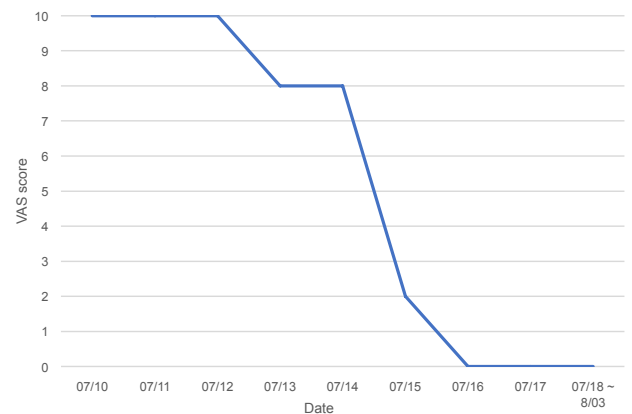


Fig. 5. VAS score. This graph is the VAS score change in the level of right upper extremity pain. The VAS on July 10th (the day before hospitalization) is an estimate that the patient was asked on July 11th. VAS, visual analog scale.

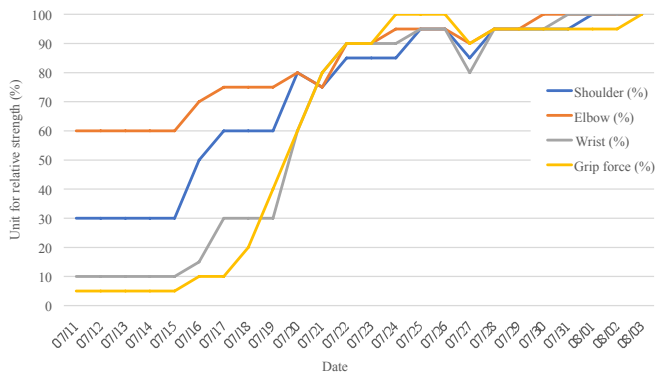


Fig. 6. Unit for relative strength. Daily change of the strength of the right upper extremity relative to the left side.

E (shoulder, elbow, wrist) in the neutral position under resistance whilst sitting. The grip strength was assessed by holding the examiner's hand and comparing the left and right sides. Daily right muscle strength relative to the left-hand side was measured and recorded as a percentage (Fig. 6).

Discussion

The patient in this case report is a slender woman who had a pale complexion, stiff back and knees, and often felt fatigued, and urinated frequently due to diabetes. Based on these symptoms, the Korean medical diagnosis was Bishineumheo (lack of yin in the spleen and kidneys). The patient said that she had been performing rehabilitation exercise as recommended following hemiplegia surgery, but suddenly the seizures started. So, she had to stop her rehabilitation exercises. It was assumed that she may not recover due to lack of energy because she was in a Bisineumheo state. Dokhwajihwangtang is a drug derived from Yukmijihwangtang and is used for various symptoms caused by a prolonged Bisineumheo state. In Korean medicine, Saposhnikoviae Radix and Araliae Continentalis Radix relieve the symptoms of a stroke, and the pain and cramps in the musculoskeletal system, so these drugs were prescribed to the patient [8]. On July 16th, when the convulsive symptoms had disappeared, the patient slowly began her rehabilitation exercises. This patient would need more physical strength to exercise so Sipjeondaebotang was prescribed to the patient from July 29th. Sipjeondaebotang has the effect of filling all the qi, blood, yin and yang in the whole body. It is also used for people who have lost stamina after surgery or due to a long illness [9]. In fact, Dokhwajihwangtang is a medicine that corresponds to Soyangin in Sasang Constitutional Medicine, and Sipjeondaebotang is not a medicine for Soyangin because it contains ginseng and other warm herbs [10,11]. However, this patient needed energy for her rehabilitation exercises and she was in a state of weakness after her illness. Therefore, Sipjeondaebotang was prescribed for a short period of time, and the patient's condition was carefully checked during the treatment period. There were no side effects after taking Sipjeondaebotang.

As described above, herbal medicine was prescribed according to the traditional Korean medical diagnosis system, and acupuncture treatment was basically performed for the purpose of relieving muscle tension in the areas of pain and promoting blood-

qi circulation.

Chuna treatment promotes blood circulation, relieves muscle spasms, removes adhered muscles, and enhances metabolism. This patient's neck turned to the left during seizures. The patient did not complain of neck pain, but the patient's scalene muscle, sternocleidomastoid muscle, and trapezius muscle caused pain when they were palpated. Fascia relaxation therapy was performed focusing on these muscles, and the patient felt more comfortable after the chuna treatment [12].

Remote wet cupping treatment was added to areas in the trunk where non-physiological blood stagnation and gas were suspected, such as Gansu (BL18), Bisu (BL20) and Jangmun (LR13).

The main treatments for seizure were herbal medicine, but there is no evidence of cause and effect. Further studies are needed to observe the effects of stroke and stroke in patients with convulsions after a stroke and brain surgery.

After surgical drainage of acute non-traumatic subdural hematoma on March 27th, the patient had symptoms of hemiplegia and a MMT Grade 4 on the right side. On June 26th, a simple partial seizure occurred, mainly causing symptoms of the right U/E. She had a brain CT after the seizure, but no additional lesions were observed. She was prescribed an anticonvulsant drug at the university hospital where the surgery was performed, but her symptoms remained the same. The daily dose of Clonazepam was increased from 0.5mg to 1mg but there was no improvement in symptoms. However, the frequency and severity of the seizures continued. The patient was admitted to the Korean medicine hospital on July 11th and received combined Korean medicine treatment.

After hospitalization, the frequency and intensity of convulsions gradually decreased, and as of July 15th, convulsions no longer occurred. From July 16th, the daily dose of Clonazepam was reduced from 0.5mg to 0.25mg. The patient was in a good condition, so on July 18th, the anticonvulsant medication was completely stopped. Bonaring A was also stopped on July 16th. Even after discontinuing these medications, the seizures did not recur, and the pain and weakness steadily improved until discharge.

Epilepsy after a stroke and brain surgery is well known. The diagnosis of epilepsy requires not only clinical symptoms, but also an magnetic resonance imaging and electroencephalogram of the brain [3]. The patient in this case did not bring her electroencephalogram findings from the previous hospital and was taking only prescribed anticonvulsant and antiemetic drugs. The pattern of seizures corresponded to simple partial seizures.

Appropriate anticonvulsant medications are recommended for seizures after a cerebral hemorrhage or brain surgery. However, in the case of recurrent seizures or delayed seizures following intraparenchymal bleeding, a long-term medication plan is considered [13].

Clonazepam is effective for up to 6 to 12 hours in adults [14]. Therefore, it means that only Korean medicine was applied in the treatment of seizures from several days after stopping clonazepam. Even after stopping the anticonvulsant drug, all symptoms improved. However, it was not clear whether the herbal medicine played a role in the treatment of seizures, because this patient did not receive just herbal medicine from the beginning of the treatment at the Korean medicine hospital.

Anticonvulsants usually require long-term use and if symptoms improve, they are tapered over several weeks [15,16]. These drugs have various side effects. There is a 10-15% chance of serious side effects when using common anticonvulsants such as valproic acid or phenytoin. Therefore, anticonvulsant drugs are justified when the risk of seizures is at least 10%. A single seizure can be dangerous to the patient, or if the seizure causes serious disturbance to daily life,

the use of anticonvulsant drugs is justified [15]. Further studies are needed to determine whether anticonvulsant medications can be used in combination with Korean medicine treatments in patients with seizures after cerebral hemorrhage.

The limitations of this study are firstly, the patient’s electroencephalogram could not be confirmed after the convulsions had disappeared. Secondly, it’s not clear which treatment contributed to the cessation of the seizures because combined Korean medicine treatment was received. Thirdly, the patient’s post-discharge condition was not followed. In epilepsy, the probability of recurrence varies from 12% to 67% when the drug is stopped, and seizures occur frequently within the first year after stopping medication. Therefore, it is desirable that the patient’s condition be followed long-term after discharge [17]. Fourthly, this study is limited by the patient number included in this case report.

This study is the first case report where Korean medicine has been used to treatment and manage seizures after a cerebral hemorrhage and brain surgery. However, further study of combined Western-Korean medicine treatment for seizures after a stroke or surgical brain surgery is necessary.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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Appendix A. Medical Research Council Scale for the Manual Muscle Test.

Grade	Explanation
5	Holds test position against maximal resistance.
4+	Holds test position against moderate to strong pressure.
4	Holds test position against moderate resistance.
4-	Holds test position against slight to moderate pressure.
3+	Holds test position against slight resistance.
3	Holds test position against gravity.
3-	Gradual release from test position.
2+	Moves through partial ROM against gravity OR Moves through complete ROM gravity eliminated and holds against pressure.
2	Able to move through full ROM gravity eliminated.
2-	Moves through partial ROM gravity eliminated.
1	No visible movement; palpable or observable tendon prominence/ flicker contraction.
0	No palpable or observable muscle contraction.

Appendix B. Chalfont Seizure Severity Scale.

Classification of type of seizure	Type 1	Type 2	Type 3
Loss of awareness no = 0, yes = 1			
Warning (if loss of awareness) no = 1, yes = 0			
Drop/spill a held object no = 0, yes = 4			
Fall to ground no = 0, yes = 4			
Injury no = 0, yes = 20			
Incontinent no = 0, yes = 8			
Automatism no = 0 mild (chew, swallow, fiddle) = 4 severe (shout, undress, run, hit) = 12			
Convulsion no = 0, yes = 12			
Duration of seizure < 10 sec = 0 10 sec-1 min = 1 1-10 min = 4 > 10 min = 16			
Time to return to normal from onset. < 1 min = 0 1-10 min = 5 10-30 min = 20 30-60 min = 30 1-3 h = 50 > 3 h = 100			
If an epileptic event (e.g., Brief aura) with total score = 0, then add 1.			
If seizure only in sleep, score divided by 2			
TOTAL			