Multiple Subpial Transection: Report of A Case

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Multiple subpial transection (MST) is a surgical technique designed for use in patients whose epileptic foci are located in high functional cortical areas such as the primary sensorimotor cortex and the language cortex. Theoretically, MST disrupts horizontal neuronal interconnections that are essential to the spreading of seizure, while preserving the intrinsic columnar organization of the brain. MST thus interrupts the synchronization of epileptic neurons while sparing input, output and vascular supply. This report describes the case of a 23-year-old woman with seizure disorder that lasted for 17 years. The epileptic foci located in the motor cortex were noted following chronic subdural plate electrocorticographic (ECoG) recording. MST was performed and the patient exhibited a Class II surgical outcome. This new surgical technique for treating medical intractable epilepsy will be discussed.

Key words: epilepsy surgery, cortical resection, cortical stimulation, multiple subpial transection

In recent years, surgical resection of the epileptogenic region has been considered to be an important procedure for treating medically intractable seizures. When functional areas such as the motor cortex, the sensory cortex, Broca's area, Wernicke's area, the angular gyrus, and the visual cortex, are involved, resection results in unacceptable neurological deficits. Multiple subpial transection (MST) proposed by Morrel et al in 1969 provides an effective and safe method for treating such patients[1,2,3]. This technique has never been employed in Taiwan. A case with intractable seizure treated with MST is presented here. At the same time, we use a sub-dural plate implantation for one-week seizure spike recording and cortical function mapping.

Case Report

A 23-year-old female patient began to suffer from seizure disorder when she was six years old. The seizure first numbed the left face, and then the left hand, the left side of the trunk, and the left leg. Then, secondary general tonic-clonic epilepsy occurred. The frequency of the seizures was four to five times per day. The patient took anti-epileptic medications including carbamazepine, gabapentin and clonazepam administered by our hospital. The control of the seizures remained poor.

Seizure studies were performed at the outpatient clinic. Scalp EEG revealed epileptic activities with foci at the right side of the brain. Brain MRI demonstrated questionable right mesial temporal sclerosis. Single photon emission computed tomography (SPECT) showed a cerebral hypoperfusion picture in the right parietal and upper temporal cortex. MR spectroscopy revealed a reduced N-acetyl aspartate (NAA) to creatine ratio in the right frontal lobe around the motor and sensory cortex.

The patient was admitted to our ward in March 2001. Craniotomy, with 64-lead subdural grid implantation in the right fronto-temporo-parietal area for mapping cortical function and recording seizure spikes, was performed. Epileptic discharges from the motor and sensory cortex were noted during the recording (Fig 1).

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