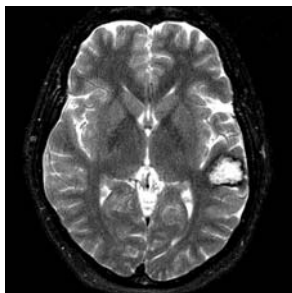
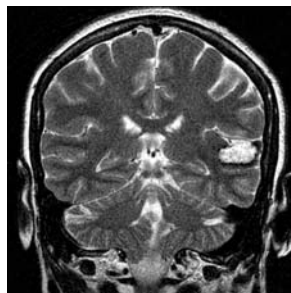


Case Study:

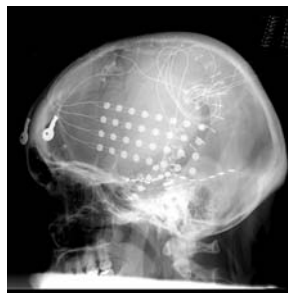
Awake Craniotomy for resection of cavernous angioma.



▲ Pre-operative
Axial MRI of Brain



▲ Pre-operative
Coronal MRI of Brain



▲ Cortical Grid
Placement



▲ Cortical Grid
Placement

PATIENT HISTORY:

The patient is a 32-year-old woman with history of seizures since the age of 15. During a typical event she would demonstrate behavior arrest, blank stares and automatisms in both hands. Each would last 30 - 90 seconds followed by post-ictal confusion. She had several seizures throughout the course of a day. She has tried multiple anti-epileptic medications, even in multiple combinations, but without any reduction in seizure frequency and duration. Due to the epilepsy, she could not work, drive or be at home alone and she had a very difficult time taking care of her two infants.

A recent MRI scan of the brain demonstrated a cavernous angioma involving the posterior part of her left temporal lobe. Neuropsychological testing showed that her IQ was 90. She was admitted to the Brackenridge Epilepsy Monitoring Unit where she underwent video EEG monitoring. Two episodes were captured; both of these subtly suggested that the seizure activity originated in the left temporal lobe and then spread to the remainder of the left and right hemispheres.

DISCUSSION:

Her case was then presented at the monthly epilepsy conference, attended by physicians from neurosurgery, neurology, neuroradiology and neuropsychology services. An Intra-carotid

Sodium Amytal (WADA) test was then performed in order to determine language and memory dominance in either the left or the right hemisphere. With the left the internal carotid artery (ICA) injection, she demonstrated clear impairment with language function. With the right ICA injection, the patient had mild dysarthria but the language function was grossly intact. The memory function was localized more to the right hemisphere.

The next step was a craniotomy for implantation of grids and strips on the right and left cortical surfaces and implantation of depth electrodes into the medial left temporal lobe. This was done to better localize the origin of the epileptiform discharges and to rule out the amygdala and hippocampus as possible sites of origin of the seizure activity.

TREATMENT:

Following this procedure, the patient was admitted to the ICU and was closely monitored with continuous video and EEG recordings. The cavernous angioma and surrounding tissue were identified as zones of epileptogenicity. Her language area was in close proximity to the cavernous angioma. The goal of any neurosurgical procedure is to restore or improve functionality, whether it is movement, speech, vision, etc. In her case, such an important function as speech should not be sacrificed or

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injured in an attempt to cure her of her seizure disorder.

The vast majority of neurosurgical procedures are performed with the patient under general anesthesia. This is done to keep the patient still, to control brain edema and blood pressure and to avoid interference with any delicate surgical procedures. Given her set of circumstances and the close proximity of the speech area to the epileptogenic zones, the decision was made to perform an awake craniotomy. The patient was awake throughout the entire procedure and underwent intra-operative stimulation of the left temporal lobe to maximize resection of the epileptogenic regions and to prevent any injury to her speech function. The cavernous malformation was resected in its entirety, along with all epileptogenic tissue adjacent to it. The procedure progressed carefully and methodically as her speech area was identified and any planned area of resection was carefully tested to rule out any possibility that it could have an eloquent function. She was asked to count numbers, recognize objects and speak throughout the resection. This was the first case of an awake craniotomy for brain mapping in the central Texas region.

The patient tolerated the procedure very well and was discharged home three days later. She did not have any speech dysfunction at the time of discharge. The patient remained seizure free since the operation in August, 2006 until October, 2006 when the patient decided to taper down her anti-epileptics. It was following this independent dosage change that the patient experienced a recurrence of seizures. However, the seizures have been much less frequent as compared to the past. Currently, she is being maximized on anti-epileptics with the hope that her seizures may be fully controlled. However, if her seizures become refractory to combination anti-epileptics

in the future, she may be candidate for surgery again to remove the mesial temporal seizure focus.

OUTCOME AND FOLLOW UP:

In the majority of patients with epilepsy, seizures can be well controlled with appropriate medication. However, current estimates indicate that 20 to 30 percent of patients with epilepsy are refractory to all forms of medical therapy. Although epilepsy surgery involves small risks, these risks do not equal the risks of uncontrolled seizures. The morbidity and mortality of seizures include: accidents (fractures, burns, lacerations and head injuries), cognitive decline and sudden death. Psychological, social and vocational impairments are also concerns. Sudden unexplained death in epilepsy can reach a rate of one death per 500 patients per year. Depression and anxiety are very common among patients with medically refractory epilepsy. These patients are also frequently unable to be employed.

Continued medical therapy following failure to control seizures with aggressive trials of anti-epileptic drugs (AEDs) is suboptimal treatment. In several retrospective trials and one prospective, randomized, controlled trial for mesial temporal lobe epilepsy (a well-defined syndrome with a known favorable surgical outcome), the morbidity and mortality associated with surgery has been demonstrated to be less than that associated with the disorder (Wiebe, 2001; Spencer, 2003; Engel, 2003). In addition, surgery yields a better quality of life when compared with continued medical therapy. Surgery also reduces depression and anxiety in as little as three months following temporal lobectomy (Spencer, 2003).

