

Case Report

“Seizure-alert dogs”: Observations from an inpatient video/EEG unit

Rafael Ortiz *, Joyce Liporace

Jefferson Hospital for Neuroscience, Philadelphia, PA, USA

Received 5 February 2005; revised 5 February 2005; accepted 24 February 2005

Available online 5 April 2005

Abstract

Studies have demonstrated that “seizure-alert dog” owners with epilepsy exhibit improvement in seizure rates. One of the most difficult aspects for patients with epilepsy is the unpredictability of seizures. We evaluated the detection abilities of seizure-alert dogs in an inpatient epilepsy care unit where patients were undergoing continuous computer-assisted EEG. Between March and May of 2004 we monitored two patients who owned “seizure dogs” in the Epilepsy Care Unit at Thomas Jefferson University Hospital in Philadelphia. Both patients were accompanied by their “seizure dogs” during their admission, as the patients felt more secure with the dogs. The dogs’ performance in alerting before a seizure was poor for patient 1 and misleading for patient 2. In our limited but objective experience, the “seizure dogs” were not as effective as previously thought in predicting the seizure activity. At the same time we must be fair and recognize the limitations that the environment of the Epilepsy Care Unit places not only on patients but also on seizure-alert dogs. Similar studies (in epilepsy monitoring units) of larger samples of patients are needed to determine if these trained dogs are responsible for clinical improvement in epilepsy patients.

© 2005 Elsevier Inc. All rights reserved.

Keywords: Seizure dog; Seizure-alert dog; Seizure-assist dog; Epilepsy monitoring unit

1. Introduction

Interest in “seizure-alert dogs” arose in the 1980s when a woman with epilepsy said that her dog could predict her seizures. Since then, the public has been interested in learning about seizure-alert dogs, but their reliability remains unknown. Seizure-alert dog owners with epilepsy have reported improvements in seizure rates that they attributed to their dogs [1,2].

If seizure dogs were able to predict seizures, they would be of extreme benefit to epilepsy patients. One of the most difficult aspects of epilepsy is the unpredictability of seizures. Many patients with epilepsy limit their exposure to the outside world by staying at home. This social isolation contributes to depression and low self-esteem. If people with epilepsy could be warned be-

fore their seizures, they would be less likely to suffer physical injuries or psychosocial consequences.

Canine centers have been spending thousands of dollars (\$10,000 to \$25,000) to train seizure-alert dogs for epilepsy patients. We had the opportunity to observe the behavior of seizure-alert dogs in the hospital while their owners were undergoing continuous computer-assisted electroencephalography (EEG) recording in the Epilepsy Care Unit (ECU). We sought to evaluate the reliability of seizure detection in these animals.

2. Methods

This study was a retrospective chart and video/EEG review. Between March and May of 2004, two patients with seizure-alert dogs were admitted to the ECU of Thomas Jefferson University Hospital in Philadelphia. Both patients were accompanied by their seizure-alert dogs during their admission as the patients felt more

* Corresponding author.

E-mail address: rafael.ortiz@mail.tju.edu (R. Ortiz).

secure with the dogs. The dogs' behavior before a seizure was correlated with the video/EEG records.

3. Cases

Patient 1, a 17-year-old man, had a 5-year history of intractable epilepsy. He did not have any epilepsy risk factors. He had 5 to 14 atonic, generalized tonic-clonic, and complex partial seizures daily. His seizures had not responded to three antiepileptic drugs (AEDs) and the vagal nerve stimulator. He was admitted to the video/EEG unit for consideration of epilepsy surgery. Patient 1 had owned his seizure-alert dog for approximately a year. He and his parents reported to his physician that they felt the dog detected the majority of his seizures. The alerting mechanism of the dog involved sitting up and barking.

Patient 2, a 20-year-old woman, had a 4-year history of seizures. Her seizures started after she fell off a horse and was kicked in the head by the horse. She denied loss of consciousness at the time of the accident. Since that time she had had seizures beginning with an aura described as a "copper penny taste," followed by a change in awareness and generalized shaking lasting approximately 2 minutes. She had been treated unsuccessfully with eight AEDs. Patient 2 was admitted to the ECU for classification.

Patient 1 had eight complex partial seizures during his 4-day stay in the hospital. Four seizures occurred while awake and four seizures during sleep. The EEG revealed a left frontal lobe seizure onset. The seizure-alert dog alerted the patient prior to one of the seizures by quickly standing up from a sitting position and staring at the patient for 2 seconds prior to the seizure. For seven of the eight seizures, the dog was sleeping and did not alert the patient. The dog did wake up a few seconds after the patient's seizure began and alerted family members by barking and/or by constantly walking around the bed. There were no false detections by the dog.

Patient 2 had five of her typical seizures during her stay in the ECU. Her seizure-alert dog was present during only one of her seizures. The dog alerted her, and 7 minutes later, the patient had her seizure. There was no EEG change with the seizure and the patient was diagnosed with nonepileptic seizures.

4. Discussion

In this study of two patients with seizure-alert dogs, one seizure dog did alert in advance of one of eight seizures. Overall, the dogs' performance in alerting before a seizure was poor for patient 1 and misleading for patient 2. However, for patient 1, the seizure-alert dog was helpful to the family because the dog alerted the family members to the seizure while it was occurring. We believe that the seizure-alert dog of patient 2 contributed

to her nonepileptic seizures by alerting and increasing the frequency of her events.

"Seizure dogs" have been divided into seizure-alert dogs, which alert their human companions before a seizure occurs, and seizure-assist dogs, which respond after a seizure. It is well documented that a seizure-assist dog is trained to assist the human companion, but may or may not alert.

In the first stage of dog training, the dog and trainer live with a foster owner for 3 to 6 months. During this time the trainer teaches obedience training and social skills. In the second stage, which lasts 170 hours, the dog learns obedience skills in a variety of settings outside the home. In the third stage, the dog and new owner are trained together to teach the dog to assist and support the owner's specific disability. By this time, the dog should be able to recognize some psychological and behavioral changes prior to a seizure that are not recognized by others around him or her. At the final stage, the training continues at home where a final assessment is the final test.

Multiple hospitals in large academic centers have performed surveys to study the different aspects of "seizure dogs." One study concluded that dogs have an innate ability to alert and/or respond to seizures [3]. They added that the success of these dogs depends largely on the handler's awareness and response to the alerting behavior. Another study surveyed families of epileptic children and determined that quality of life was higher in families with a dog that responded to seizures [4]. From their sample, 40% of families owned a dog, about 40% of these had seizure-specific behavior, and about 40% of these showed anticipatory ability.

Strong and Brown reported their experience with 36 pet dogs that had not been trained as seizure dogs and suffered significant adverse health effects as a result of spontaneously reacting to or anticipating epileptic seizures in their owners [5]. These included three cases in which the dog died and one case in which the dog exhibited aggressive behavior toward humans. They say that these adverse effects have not been seen in trained "seizure dogs."

In our limited but objective experience, "seizure dogs" were not as effective as previously thought in predicting seizure activity. In the patient with frontal lobe epilepsy, the dog exhibited abnormal behavior, predicting a seizure before the only spell during which the dog was awake. In the patient with nonepileptic seizures, the dog's behavior was reinforcing the patient's psychogenic events.

We must be fair and recognize the limitations that the environment in the ECU places not only on the patient, but also on the seizure-alert dog. It is possible that the dogs were distracted by other people having seizures in nearby rooms.

On the basis of previously cited studies, "seizure dogs" do have a positive effect, at least subjectively, on epilepsy patients and their families. Similar studies

(ECUs) of samples of patients are needed to determine if these trained dogs are responsible for clinical improvement in epilepsy patients.

References

- [1] Brown SW, Strong V. The use of seizure-alert dogs. *Seizure* 2001;10:39–41.
- [2] Strong V, Brown S, Huyton M, Coyle H. Effect of trained seizure alert dogs on frequency of tonic-clonic seizures. *Seizure* 2002;11:402–5.
- [3] Dalziel DJ, Uthman BM, Mcgorray SP, Reep RL. Seizure-alert dogs: a review and preliminary study. *Seizure* 2003;12:115–20.
- [4] Kirton A, Wirrell E, Zhang J, Hamiwka L. Seizure-alerting and -response behavior in dogs living with epileptic children. *Neurology* 2004;62:2303–5.
- [5] Strong V, Brown SW. Should people with epilepsy have untrained dogs as pets? *Seizure* 2000;9:427–30.