



## The difficult patient with unexplained intermittent symptoms (of any type)

24-hour Ambulatory Video-EEG Recording (AEEG)

By: Ali Elahi, M.D.

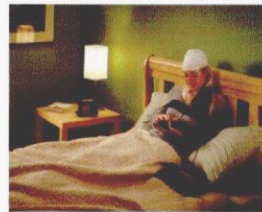
I am sure you have heard of long term heart monitors such as Holter or the implantable loop monitors. These types of ambulatory monitors are invaluable in detecting occult heart arrhythmias and for the work-up of patients with unexplained paroxysmal spells of TIA, stroke (e.g. 'cryptogenic stroke'), syncope, or non-specific 'dizziness'. What about patients who present with *unexplained paroxysmal spells of dizziness, change in mental status, sudden paresthesias, sudden alterations in consciousness* and who have already undergone heart monitors, MRI scans, EKG's and plethora of work-up, all of which is normal? In most, if not all medical specialties, there is the patient(s) with 'unexplained spells'. In such cases, 24-hour ambulatory video-EEG (AEEG) can be very helpful.

### What is AEEG and how is it different than routine EEG?

A routine electroencephalogram (EEG) is a common test done to record the electrical activity of the brain for 20 minutes and extended EEGs record up to 40 minutes or 1-2 hours usually. Most modern EEG's also have at least one electrode for cardiac monitoring. Similar to an EKG for heart arrhythmias, routine and even extended EEG's can miss abnormal cerebral or heart activity due to the short period of recording time.

AEEG's are composed of EEG electrodes that are safely attached to patient's scalp and secured to avoid detachment and discomfort for up to 3 days (72 hours). The electrodes are connected to a small

amplifier encased in a small container that is attached to patient's hip. AEEG's were initially developed in the early 1970's using cassette recording and limited channels. Modern AEEG's can provide superior quality of amplification, add video-capture of patient's behavior, and can be analyzed with sensitive electronic digital review software for efficient review.



Components of an ambulatory EEG system fitted to the patient for day or night.

### What do the studies show?

AEEG's have been proven in numerous trials to increase diagnostic yield of seizures two to three-fold in comparison to routine EEG's. In addition, AEEGs have shown to be far more sensitive to detection of abnormal cerebral activity even when patients are not experiencing the spell (e.g. seizure) than routine EEGs.

### What are the indications for AEEG?

- » Confirmation of suspected epilepsy (seizure disorder)
- » Documentation of seizures in unaware patients
- » Distinguishing seizures from syncope
- » Evaluate presence or absence of pseudoseizures (e.g. emotional and psychiatric condition versus epileptic or cardiac spells)
- » Evaluate response to treatment
- » Evaluating nocturnal or sleep-related spells when patient refuses, cannot tolerate, or has already undergone in-house or home sleep study.

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- » Evaluation of seizure-precipitating factors (i.e. triggers)

### What are the risks and benefits?

#### Advantages

- » Patients are not required to stay in the EEG lab or medical center
- » Capturing occult events and data that are not possible with routine studies
- » Non-invasive
- » Includes Video-capture of behavior
- » Far less costly than in-patient monitoring

#### Disadvantages

- » Some scalp discomfort
- » Can have a lot of artifact (chewing, motor movements, talking, etc.)
- » May not capture infrequent spells (e.g. spells that are not occurring on daily or near-daily basis)

### Conclusion

Intermittent spells of any kind that remain undiagnosed leads to significant patient and physician frustration. AEEG is another diagnostic tool for evaluation of such spells and often leads to correct diagnosis, proper management strategies (e.g. removal of unnecessary drugs or referral to correct specialty), and ultimately improved patient and physician satisfaction.

#### References

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### For more information, contact:

Victoria McKinney, MS, RN, CNA, BC  
Executive Director  
Women, Infant & Med/Surg. Services  
Ph: 949-365-2143  
Victoria.McKinney@stjoe.org

### About the Author:

Ali Elahi, M.D.



Dr. Ali Elahi is a board-certified neurologist and has been in practice for over 11 years seeing patients with full breadth of neurological conditions. Dr. Elahi began his study of Neuroscience at UCLA and University of Pittsburgh.

He completed medical school education at University of Pittsburgh School of Medicine. Dr. Elahi's interests in Neurology led to his residency training at University of Iowa Hospitals and Clinics.

Dr. Elahi has developed a special interest in stroke and neuromuscular disorders and is certified by the American Board of Psychiatry and Neurology (ABPN). He is also an Expert Witness for Medical Board of California and a certified qualified medical evaluator (QME) for state of California workman's compensation system. Dr. Elahi has given numerous community and hospital grand round lectures on various neurological topics ranging from cryptogenic strokes, Guillian Barre syndrome, migraines, and dementia.

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For feedback or questions related to the content of this article, contact Susan Fox, Mission Hospital's Physician Relations Specialist, at (949) 364-4269 or [susan.fox@stjoe.org](mailto:susan.fox@stjoe.org).