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JAMA Neurol. 2013 Sep 1;70(9):1158-66. doi: 10.1001/jamaneurol.2013.136.

## Seizures and epileptiform activity in the early stages of Alzheimer disease

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PMID: 23835471 PMID: PMC4013391 DOI: 10.1001/jamaneurol.2013.136

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### Abstract

**Importance:** Epileptic activity associated with Alzheimer disease (AD) deserves increased attention because it has a harmful impact on these patients, can easily go unrecognized and untreated, and may reflect pathogenic processes that also contribute to other aspects of the illness. We report key features of AD-related seizures and epileptiform activity that are instructive for clinical practice and highlight similarities between AD and transgenic animal models of the disease.

**Objective:** To describe common clinical characteristics and treatment outcomes of patients with amnesic mild cognitive impairment (aMCI) or early AD who also have epilepsy or subclinical epileptiform activity.

**Design:** Retrospective observational study from 2007 to 2012. SETTING Memory and Aging Center, University of California, San Francisco.

**Patients:** We studied 54 patients with a diagnosis of aMCI plus epilepsy (n = 12), AD plus epilepsy (n = 35), and AD plus subclinical epileptiform activity (n = 7).

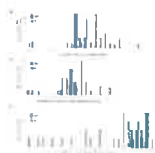
**Main outcomes and measures:** Clinical and demographic data, electroencephalogram (EEG) readings, and treatment responses to antiepileptic medications.

**Results:** Patients with aMCI who had epilepsy presented with symptoms of cognitive decline 6.8 years earlier than patients with aMCI who did not have epilepsy (64.3 vs 71.1 years; P = .02). Patients with AD who had epilepsy presented with cognitive decline 5.5 years earlier than patients with AD who did not have epilepsy (64.8 vs 70.3 years; P = .001). Patients with AD who had subclinical epileptiform activity also had an early onset of cognitive decline (58.9 years). The timing of seizure onset in patients with aMCI and AD was nonuniform (P < .001), clustering near the onset of cognitive decline. Epilepsies were most often complex partial seizures (47%) and more than half were nonconvulsive (55%). Serial or extended EEG monitoring appeared to be more effective than routine EEG at detecting interictal and subclinical epileptiform activity. Epileptic foci were predominantly unilateral and temporal. Of the most commonly prescribed antiepileptics, treatment outcomes appeared to be better for lamotrigine and levetiracetam than for phenytoin.

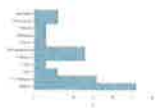
**Conclusions and relevance:** Common clinical features of patients with aMCI- or AD-associated epilepsy at our center included early age at onset of cognitive decline, early incidence of seizures in

the disease course, unilateral temporal epileptic foci detected by serial/extended EEG, transient cognitive dysfunction, and good seizure control and tolerability with lamotrigine and levetiracetam. Careful identification and treatment of epilepsy in such patients may improve their clinical course.

## Figures



**Figure 1. Seizure Onset in Relation to...**



**Figure 2. Distribution of Electroencephalogram Epileptiform Activity**



**Figure 3. Right-Handed, 53-Year-Old Woman Who Presented...**

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