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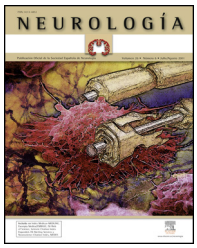

ORIGINAL ARTICLE

Safety study of long-term video-electroencephalogram monitoring☆

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KEYWORDS
Safety;
Status epilepticus;
Traumatic injury;
Video-electroencephalogram;
Sudden unexpected death in epilepsy;
Adverse event;
Epilepsy;
Complications

Abstract
Introduction: The increased morbidity and mortality and poorer quality of life associated with drug-resistant epilepsy justify admitting patients to epilepsy monitoring units (EMU). These units employ methods that promote the occurrence of seizures, which involves a risk of secondary adverse events. The aim of our study was to characterise and quantify these adverse events in a Spanish EMU.
Materials and methods: A descriptive, longitudinal and retrospective study of patients admitted consecutively to our EMU. Patients admitted due to status epilepticus, clusters of seizures, or as participants in a clinical trial were excluded.
Results: We included 175 patients, of whom 92.1% (161) did not suffer any adverse events. Status epilepticus was present in 3.4% (6), 1.7% (3) had traumatic injury, 1.7% (3) had interictal or postictal psychosis, and 1.1% (2) had cardiorespiratory impairment. There were no risk factors associated with these adverse events.
Conclusions: The most frequently identified adverse events were status epilepticus, traumatic injury, interictal or postictal psychosis, and cardiorespiratory disorders. The frequency of these adverse events was similar to that seen in the international literature. The complications detected do not contraindicate VEEGM.
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PALABRAS CLAVE
Seguridad;
Status epilepticus;
Lesión traumática;
Vídeo-electroencefalograma;

Estudio de seguridad en la monitorización por vídeo-electroencefalograma prolongado

Resumen
Introducción: En epilepsia farmacorresistente el incremento asociado de la morbimortalidad y el deterioro de calidad de vida hace necesario el ingreso en Unidades de Monitorización de Epilepsia (UME). En dichas Unidades se practican técnicas que facilitan la aparición de crisis epilépticas, implicando un riesgo de aparición de fenómenos adversos secundarios. El objetivo

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Muerte súbita en epilepsia;
Fenómeno adverso;
Epilepsia;
Complicaciones

de nuestro estudio es caracterizar y cuantificar dichos fenómenos adversos en una UME en España.
Materiales y métodos: Estudio descriptivo, longitudinal y retrospectivo de pacientes consecutivos ingresados en nuestra UME. Se excluyó a los pacientes que ingresaron por motivo de *status epilepticus*, serie de crisis o ensayo clínico.
Resultados: Se incluyeron 175 pacientes. Un 92,1% (161) de los pacientes no presentó ningún fenómeno adverso. Un 3,4% (6) presentó *status epilepticus*, un 1,7% (3) presentó lesión traumática, un 1,7% (3) presentó alteración psiquiátrica inter-postictal, un 1,1% (2) presentó alteración cardiorrespiratoria de riesgo. No se detectaron factores de riesgo asociados a dichos fenómenos adversos.
Conclusiones: Los fenómenos adversos detectados con mayor frecuencia fueron el *status epilepticus*, lesiones traumáticas, alteraciones psiquiátricas inter-postictales y alteraciones cardiorrespiratorias. La frecuencia de aparición de dichos fenómenos adversos fue similar al de series internacionales. Las complicaciones detectadas no contraindican la MVEEG.
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Introduction

Experience with the diagnosis and treatment of epileptic patients shows that approximately one-third of all patients are resistant to pharmacological treatment.[1] Mortality in this group is 2 to 3 times higher than that in the general population.[2,3]

Admitting these patients to an epilepsy monitoring unit (EMU) is justified due to their lower life expectancy[4] and the presence of complications such as sudden unexpected death in epilepsy (SUDEP),[5] status epilepticus, accidents, and suicide. Admission to an EMU is fundamental for pre-surgical and differential diagnoses of drug-resistant epileptic patients.[6,7] In these units, professionals systematically apply techniques intended to trigger seizures. As a result, seizure-related adverse events are also more likely to appear.[8–10]

Recent studies indicate an adverse event rate of 11%. The most frequently observed events included postictal psychosis (1.3%—3.9%), traumatic lesions (2.75%—2.95%), status epilepticus (0.67%—1.97%), and high-risk autonomic alterations (2%).[11,12]

This study aims to describe seizure-related adverse events during video-EEG monitoring (VEEGM), identify those patients with the highest risk of presenting one or more such events, and determine which procedures entail the greatest risk. To our knowledge, this is the first study in the Spanish literature to analyse safety during VEEGM, which may be an important consideration for the elaboration of standards and action protocols.

Materials and methods

This descriptive longitudinal retrospective study analysed the medical history and records of all patients consecutively admitted to the EMU between December 2009 and July 2012 (31 months). Patients admitted to the UME for pre-surgical or differential diagnosis were included in the study. Exclusion criteria were having undergone video-EEG monitoring as part of a clinical study or because of status epilepticus or serial seizures. We documented all events occurring during hospitalisation and analysed seizure-related adverse events with regard to physical safety during VEEGM. The main events selected for analysis were death, myoclonic status epilepticus (MSE), seizure-related traumatic lesions, status epilepticus (SE), high-risk cardiorespiratory changes, and interictal or postictal psychosis. VEEGM was indicated by a team of epilepsy specialists.

Patients were referred by outpatient consults in our centre and by other Catalan or Spanish centres. VEEGM was generally performed over 5 days, but the duration was modified according to the patient's needs.

At the time of admission, doctors recorded the patient's personal history, performed a physical examination, and completed a blood test. All patients underwent a 3T MRI scan according to the epilepsy protocol and most also completed a neuropsychological study. All subjects gave their informed consent. Researchers then placed electrodes according to the international 10-20 or 10-10 system, depending on each case. Sphenoidal electrodes were used in certain patients suspected of having temporal lobe seizures. Patients were assessed in protected and adapted beds with continuous video-EEG monitoring 24 hours a day over 5 weekdays; during this time, they were monitored by specialised technical staff.

Prophylactic anticoagulant treatment was indicated in patients with vascular risk factors or those older than 50 years. Researchers registered and analysed all seizures and adverse events. Walking was restricted during VEEGM. A group of neurologists, nurses, and technical personnel with specific training in epilepsy monitored events experienced by each patient over each full 24-hour period.

Each patient's individual situation was considered in decisions to withdraw AEDs, indicate sleep deprivation, apply the flumazenil test, or induce non-epileptic seizures. Decisions to perform an ictal SPECT study and other diagnostic procedures were also made on a case-by-case basis.

The method employed when discontinuing AEDs was based on each patient's previous seizure frequency, drug half-life, the possibility of seizures due to treatment withdrawal, and history of SE or serial seizures. The flumazenil test was only applied to patients whose epileptic seizures did

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