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ORIGINAL ARTICLE

Emergency electroencephalogram: Usefulness in the diagnosis of nonconvulsive status epilepticus by the on-call neurologist☆,☆☆

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Status epilepticus;
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Abstract
Introduction: We aim to describe the use of emergency electroencephalogram (EmEEG) by the on-call neurologist when nonconvulsive status epilepticus (NCSE) is suspected, and in other indications, in a tertiary hospital.
Subjects and methods: Observational retrospective cohort study of emergency EEG (EmEEG) recordings with 8-channel systems performed and analysed by the on-call neurologist in the emergency department and in-hospital wards between July 2013 and May 2015. Variables recorded were sex, age, symptoms, first diagnosis, previous seizure and cause, previous stroke, cancer, brain computed tomography, diagnosis after EEG, treatment, patient progress, routine control EEG (rEEG), and final diagnosis. We analysed frequency data, sensitivity, and specificity in the diagnosis of NCSE.
Results: The study included 135 EEG recordings performed in 129 patients; 51.4% were men and their median age was 69 years. In 112 cases (83%), doctors ruled out suspected NCSE because of altered level of consciousness in 42 (37.5%), behavioural abnormalities in 38 (33.9%), and aphasia in 32 (28.5%). The EmEEG diagnosis was NCSE in 37 patients (33%), and this was confirmed in 35 (94.6%) as the final diagnosis. In 3 other cases, NCSE was the diagnosis on discharge as confirmed by rEEG although the EmEEG missed this condition at first. EmEEG performed to rule out NCSE showed 92.1% sensitivity, 97.2% specificity, a positive predictive value of 94.6%, and a negative predictive value of 96%.

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Conclusions: Our experience finds that, in an appropriate clinical context, EmEEG performed by the on-call neurologist is a sensitive and specific tool for diagnosing NCSE.

PALABRAS CLAVE
Estatus epiléptico;
Estatus epiléptico no convulsivo;
Electroencefalograma;
Urgencias neurológicas;
Epilepsia;
Síndrome confusional agudo

Uso de la electroencefalografía urgente por el neurólogo de guardia: utilidad en el diagnóstico del estatus epiléptico no convulsivo

Resumen
Introducción: Estudio que describe la experiencia en el uso del electroencefalograma urgente (EEGurg) por la guardia de neurología ante la sospecha de estatus epiléptico no convulsivo (EENC) y en otras indicaciones en un hospital terciario.
Sujetos y métodos: Estudio observacional retrospectivo de los registros de EEG de 8 canales realizados con carácter urgente en pacientes hospitalizados y en Urgencias e interpretados por la guardia de neurología entre julio del 2013 y mayo del 2015. Se recogieron las siguientes variables: sexo, edad, síntomas, diagnóstico inicial, epilepsia previa y causa, ictus previo, neoplasia, tomografía computarizada cerebral urgente, diagnóstico tras EEGurg, actitud terapéutica, evolución, EEG convencional (EEGc) de control y diagnóstico definitivo. Se analizaron los datos de frecuencia, así como la sensibilidad y especificidad en el diagnóstico de EENC.
Resultados: Se recogieron 135 registros de EEGurg realizados a 129 pacientes, el 51,4% hombres, edad mediana 69 años. En 112 casos (83%) la indicación fue descartar EENC por alteración del nivel de consciencia 42 (37,5%), del comportamiento 38 (33,9%) y del lenguaje 32 (28,5%). En 37 (33%) registros se informó como EENC, siendo este el diagnóstico definitivo en 35 (94,6%). En otros 3 casos, el EENC se diagnosticó en el EEGc de control tras pasar desapercibido en la valoración del EEGurg por la guardia. El EEGurg en el diagnóstico del EENC presenta una sensibilidad del 92,1%, una especificidad del 97,2%, un valor predictivo positivo del 94,6% y un valor predictivo negativo del 96% tomando como referencia el diagnóstico al alta.
Conclusiones: En nuestra experiencia, en un contexto clínico adecuado, el EEGurg utilizado por la guardia de neurología es una herramienta sensible y específica en el diagnóstico del EENC.

Introduction

Non-convulsive status epilepticus (NCSE) is defined as an epileptic seizure lasting longer than 30 minutes and with electroencephalogram (EEG) results showing continuous or recurrent epileptiform activity.[1–3] As a clinical syndrome, NCSE includes a series of symptoms related to alterations in mental state,[4,5] behaviour,[6] language,[7] emotions,[8] sensory perception,[9] and consciousness.[10–12] From the perspective of EEG, there has historically been controversy regarding NCSE diagnosis,[13,14] with continuous attempts by the International League Against Epilepsy (ILAE) to define the electrical characteristics of NCSE and to overcome the obstacles to establishing a universally accepted definition.[15,16] This lack of consensus is rooted in the difficulty of assessing EEG patterns associated with NCSE in different contexts of age, brain development, comorbidity, encephalopathies, and epileptic syndromes.[17] A series of EEG patterns associated with the corresponding clinical presentations has recently been published,[18] defining EEG criteria for the diagnosis of NCSE[19] which are applicable to everyday clinical practice.[20] De novo NCSE manifests in nearly 30% of cases[21]; therefore, even in patients with no history of epilepsy, NCSE should be considered in the differential diagnosis of such conditions as ischaemic or haemorrhagic stroke, post-traumatic amnesia, transient global amnesia, autoimmune or infectious encephalitis, toxic-metabolic encephalopathy, and psychiatric disorders[17] as a complication of these conditions and in cases of acute brain damage.[22] In many cases, these are severe and potentially treatable conditions requiring emergency care in order to start specific treatment early, which improves short- and long-term outcomes.[23,24] Several authors propose monitoring with emergency EEG (EmEEG) and a therapeutic trial of intravenous benzodiazepines during the recording if NCSE is suspected.[25–27] The literature establishes no widely accepted time interval between EmEEG (considered to refer to the 24-hour availability of EEG recording and interpretation) being ordered and performed.[27–29] In the past, NCSE was considered a relatively benign condition with very low morbidity and mortality rates[30]; therefore, it was preferred not to treat some cases to avoid the risks associated with antiepileptic drugs (AED) in patients with other disorders.[17,31] NCSE in itself is currently considered to be less responsive to treatment than status epilepticus[26]; prolonged NCSE is associated with refractory symptoms,[32,33] poor prog-