Use of short term video EEG in the diagnosis of attack disorders

A McGonigal, A J C Russell, A K Mallik, M Oto, R Duncan

BACKGROUND

The diagnosis of attack disorders can be difficult, and misdiagnosis of epilepsy is common. Distinguishing epileptic seizures from psychogenic non-epileptic seizures (pseudoseizures; PNES) relies on a detailed history from the patient and eyewitness, but recording typical attacks with inpatient video electroencephalography (video EEG) is frequently required. Access to this expensive resource is limited, with waiting lists of many months in some centres.

METHODS

Clinical neurophysiology medical staff interviewed each patient, to establish the clinical description of the attack, particularly whether one or more types of attack occurred. All patients were asked to bring an eyewitness if possible; if present at the time of recording, their account of the attack was also obtained.

A standard 16 channel EEG with single channel electrocardiogram and simultaneous digital video was recorded, with an average recording duration of 40–50 minutes. If PNES were suspected, simple suggestion techniques were used. If an attack was recorded, it was shown to the eyewitness, to confirm whether typical; if no eyewitness was available at that time, the video was reviewed later. A diagnosis was made only if the recorded attack and EEG findings were unequivocal, and consistent with the available history. If doubt remained, or if not all types of attacks had been recorded, further monitoring was recommended.

RESULTS

SVEEG

One hundred and forty three SVEEG recordings were performed for the investigation of attack disorders during an 18 month period (July 2000 to December 2001). During this period, an additional 15 patients underwent SVEEG as part of a separate randomised controlled trial that has already been reported; these patients were therefore not included in our study. The age range was 14–75 years; 47 patients were male and 96 female.

An attack was recorded in 83 of 143 recordings (table 1). Eleven of these were not clearly confirmed as being typical of the patient’s usual event, and were classed as inconclusive.

<table>
<thead>
<tr>
<th>Type of attack recorded</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNES</td>
<td>51</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>7</td>
</tr>
<tr>
<td>Other ‘not epilepsy’</td>
<td>14</td>
</tr>
<tr>
<td>Inconclusive attack</td>
<td>11</td>
</tr>
<tr>
<td>No attack recorded</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>143</td>
</tr>
</tbody>
</table>

Table 1: Type of attack recorded in 143 short term video EEG recordings, 2000–2001

Abbreviations: EEG, electroencephalography; PNES, psychogenic non-epileptic seizures; SVEEG, short term video electroencephalography
Therefore, a diagnostic event was recorded in 72 of 143 (50.3%).

Epileptic events were recorded in seven patients: complex partial seizures in two, myoclonic jerks in four, and one generalised tonic clonic seizure. The “not epilepsy” group included movement disorders and hyperventilation related symptoms.

Eleven patients who had no attack recorded had a clinical diagnosis suggested by history and EEG data: in 10 this was epilepsy, and in one probable cough syncope. Appropriate specialist follow up was arranged.

Therefore, the total number of SVEEG recordings providing diagnostic information, either from recorded typical events (n = 72) or history/EEG data (n = 11), was 83 of 143 (58%). The remaining 60 recordings were classed as “inconclusive”.

Outcome after “inconclusive” SVEEG
After inconclusive SVEEG, 38 of 60 patients have since had a diagnosis made (table 2). An appreciable number of patients declined or did not attend for clinic review and/or further monitoring (seven of 60).

Further monitoring (videotelemetry and/or ambulatory EEG) was carried out, or is awaited, in 20 of 60 in the “inconclusive” group (table 2); some have had monitoring more than once. The long wait for monitoring in two patients reflects previous failure to attend for the appointment. Further monitoring has also been performed in seven patients with a previous diagnostic SVEEG who have more than one attack type, or who subsequently reported a change in seizure type.

DISCUSSION
SVEEG recording provided a useful yield of recorded attacks in this large series of patients, with habitual diagnostic events positively identified in 50%. Some recordings where no attacks were captured yielded diagnostic information based on history and EEG alone. In these patients, the same information could of course have been gained by clinical consultation and interictal EEG.

Follow up of the original study group at one year indicates that the diagnostic information obtained during SVEEG is robust, with no diagnosis of PNES having been revised (unpublished data, 2002). It is not possible to calculate accurately the proportion of patients who would otherwise have required inpatient video EEG, or the number of “bed days” saved, because not all of the patients who had SVEEG would have required inpatient recording. However, the advantages of SVEEG in terms of earlier diagnosis and lower cost are likely to be considerable.

Although the technique itself is relatively simple and practicable, we would not recommend its use where appropriate clinical and electrophysiological expertise is not available. Expert knowledge of attack disorders and ictal video EEG recording is required. The EEG may be obscured by artefact during attacks, and some types of epileptic seizure may not show changes on surface EEG. It is crucial to obtain evidence that the patient’s habitual type of attack has been recorded, and to perform further recording if there is more than one type of event.

The diagnosis of attack disorders is a difficult and common clinical problem. The correct and timely diagnosis of some types of attacks may improve outcome,4 and saves medical costs.5 SVEEG is a useful diagnostic tool, particularly for suspected PNES, allowing prompt diagnosis and avoiding the need for inpatient video EEG in some patients. The technique complements existing investigative facilities, and may allow better use of the limited and expensive resource of inpatient video EEG.

Authors’ affiliations
A McGonigal, A J C Russell, A K Mallik, M Oto, R Duncan, Regional Epilepsy Service, Institute of Neurology, Southern General Hospital, Glasgow G51 4TF, UK

Competing interest: none declared

Correspondence to: Dr A McGonigal, Regional Epilepsy Service, Institute of Neurology, Southern General Hospital, Glasgow G51 4TF, UK; aileenmcg@hotmail.com

Received 1 August 2003
Accepted 16 September 2003

REFERENCES

Table 2 Diagnostic outcome after inconclusive short term video EEG (n = 60)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further monitoring (n = 20) On further monitoring, diagnostic events were recorded*</td>
<td>8</td>
</tr>
<tr>
<td>No further monitoring (n = 40)</td>
<td></td>
</tr>
<tr>
<td>On further monitoring, no events were recorded</td>
<td>2</td>
</tr>
<tr>
<td>Further monitoring awaited</td>
<td>28</td>
</tr>
<tr>
<td>Clinical diagnosis reached, further monitoring felt to be unnecessary</td>
<td>2</td>
</tr>
<tr>
<td>No further monitoring planned (events too infrequent or patient unsuitable for monitoring); diagnosis unclear, patient under review</td>
<td>5</td>
</tr>
<tr>
<td>Patient declined/did not attend for clinic follow up/further monitoring</td>
<td>7</td>
</tr>
</tbody>
</table>

*Diagnosis after event recorded on further monitoring: 4 patients had epilepsy; 3 had PNES plus epilepsy; 1 had PNES alone.
EEG, electroencephalography; PNES, psychogenic nonepileptic seizures.