How long is long enough? The utility of prolonged inpatient video EEG monitoring

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Introduction

- Video-electroencephalography (EEG) monitoring (VEM) is the deﬁnitive tool for the diagnosis and treatment of both epileptic seizures (ES) and psychogenic nonepileptic seizures (PNES).
- VEM is an investment of patient time and hospital resources, and can present a signiﬁcant cost to payers.
- The average length of stay in an epilepsy monitoring unit (EMU) has previously been reported as 3.4 days in adults, with shorter durations of 1.2-1.5 days reported for pediatric patients.
- There is currently no consensus on the required duration of monitoring to conclusively classify all habitual seizure/spell types.

- Given the changing US healthcare landscape and potential cuts to reimbursements to neurologists, this question is likely to become increasingly relevant in the coming months.

- We sought to determine the beneﬁts of prolonged length of stay, particularly querying whether there was a point at which VEM became futile at yielding a diagnosis.

Methods

- We retrospectively reviewed the medical records of all patients admitted to the adult EMU at UCLA VEM between 12/2004 and 12/2008.
- All patients underwent scalp EEG monitoring for classiﬁcation/certiﬁcation of presumed ES and nonepileptic events.
- We recorded the reason for admission, length of stay, and discharge diagnosis.
- A discharge diagnosis of inconclusive was assigned if patients had none of their habitual epileptiform seizures during the admission.

- For patients with VEM admission during the study period, only the ﬁrst admission was analyzed.
- We progressively analyzed lengths of stay until we discovered signiﬁcant differences in the rates of inconclusive admissions for stays exceeding speciﬁc limits, ranging from > 4 days to 14 days.

- Data entry and statistical analysis were performed using IBM SPSS Statistics Version 19 (IBM, Armonk, NY, U.S.A.).
- All Patients

- Diagnostic

- Inconclusive

- ES

- PNES

- Other NES

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Results

- The majority (333, 55.9%) were admitted for a presurgical evaluation with presumed ES.
- The remaining patients were admitted for differential diagnosis of presumed PNES (150, 25.2%) or spells of other, unknown etiology (113, 19%, see Figure 1).

- Only 596/960 admissions (14.9%) were inconclusive.

- VEM is an investment of patient time and hospital resources, and can present a signiﬁcant cost to payers.

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Discussion

- The diagnosis of PNES did not change for these patients.
- A single patient with presumed PNES was readmitted after an initial inconclusive VEM. During the second VEM, a diagnosis of PNES was made within 4 days.

- VEM is a highly efﬁcacious study, with ~15% of our admissions being inconclusive.
- Our data compares favorably to inconclusive rates of 15-36% reported in previous studies.
- Prolonging VEM appeared to be useful for the proper classiﬁcation of ES.
- Prolonging EMU stays in presumed ES patients can be argued on the grounds that it will ultimately result in cost savings.
- Canadian studies have shown such monitoring and resulting epilepsy surgery result in an incremental cost-effectiveness ratio of $25,020 to $69,451 Canadian dollars ($24,019 to $66,673 US dollars) per quality-adjusted life years (QALYs).
- Conversely, lengthy stays of 5 days for patients with presumed PNES was associated with signiﬁcantly greater chances of an inconclusive admission.
- Such data suggests there may be a dichotomy of patients with PNES: those who have typical spells quickly during monitoring versus those who do not have recorded spells, regardless of the duration of monitoring.
- Patients with PNES have previously been shown to typically have a shorter time to ﬁrst seizure versus patients with ES.

- Given the changing healthcare landscape and potential for reduced reimbursement, it may be more advisable to consider prolonging VEM for patients with presumed ES over patients with presumed PNES.

Table 1. Chances of inconclusive admissions in patients with prolonged EEG stays

- Patients with presumed ES were signiﬁcantly more likely to have an inconclusive admission (24/104, 23% compared to all others (58/446, 13%, p=0.033, see Figure 2).

- Comparing all patients, there was no signiﬁcant difference in the likelihood of having an inconclusive admission if monitoring was continued for any duration, including 5 or more days (62/428 patients, 14.5%) compared to less than 5 days (27/168 patients, 16.1%, p=0.61, see Table 1).

- For patients with presumed PNES, a length of stay ≥ 5 days was associated with a signiﬁcantly increased risk of the stay being inconclusive (22/78, 28% versus 97/922, 12.9%, p=0.026, see Table 1).

- This continued to be true if only patients admitted for a presurgical evaluation with presumed ES were considered (23/283, 8.1% versus 650, 12%, p=0.41, see Table 1).

- The majority (333, 55.9%) were admitted for a presurgical evaluation with presumed ES.

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