

## Can Homemade Video Recording Become More Than a Screening Tool?

A commentary on Derry et al. NREM Arousal Parasomnias and their distinction from nocturnal frontal lobe epilepsy: a video EEG analysis *SLEEP* 2009;32:1637-1644.

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WITHIN HETEROGENEOUS GROUP OF PAROXYSMAL SLEEP-RELATED DISORDERS, NOCTURNAL FRONTAL LOBE EPILEPSY (NFLE) CONSTITUTES A DISTINCT clinical syndrome that has been described only recently and that is increasingly diagnosed in clinical practice. During recent years the application of video-electroencephalogram (VEEG) analysis technique has allowed investigators to obtain an extensive and detailed description of the different clinical features of NFLE.<sup>1-4</sup> NFLE patients typically manifest different sleep-related motor events of increasing complexity and duration, which in some cases may be similar to NREM sleep parasomnias or physiological movements.

NREM arousal parasomnias are generally benign sleep related paroxysmal behaviors with well established features. The standard classification of sleep disorders classified arousal parasomnias into three distinct forms, depending on the amount of motor and autonomic involvement: *confusional arousals, sleepwalking, and sleep terrors*.<sup>5</sup> Although EEG and polygraphic features of NREM parasomnias have been described since the early 1960s,<sup>6,7</sup> only a few papers have reported an exhaustive clinical description of ictal manifestations in arousal disorders, but these reports have not provided conclusive evidence.<sup>8</sup> This is of particular relevance considering that the differential diagnosis among some epileptic events, NREM parasomnias and physiological movements, may still be a clinical challenge.<sup>9</sup> Indeed, a reliable diagnostic instrument and standard criteria for the diagnosis of NFLE and NREM parasomnias are still missing.<sup>10,11</sup>

In this issue of *SLEEP*, Derry and colleagues<sup>12</sup> report the first detailed video-EEG analysis of the behavioral manifestations of NREM parasomnias and compare them with the video-EEG features of NFLE patients. They provide evidence of clinical aspects that clearly distinguish the two phenomena: in particular, on the basis of the semiological features of video recorded events, the authors developed a simple algorithm (Fig. 1) that correctly identifies 94% of the 120 nocturnal episodes analyzed in the study. The authors observed that in NREM parasomnias the recorded events were less intense and complex with respect to the variety of behaviors reported during the anamnestic evaluation, thus confirming the experience in clinical practice. Instead, in NFLE patients, anamnestic semiological data and video-EEG findings were generally concordant. Video analysis

revealed that the behavioral aspects characterizing the onset of the episodes were similar in the two groups of patients. In contrast, the analysis of the evolution and the offset of the events were discriminated between parasomnias and NFLE seizures. This is an important observation, as it may imply that home video recordings can be a useful tool for the differential diagnosis of nocturnal events, even in the case of partial recordings when the onset of the episode is missed.

Derry et al. found that a prolonged duration with a waxing and waning pattern of the episode, verbal interaction, and failure to fully arouse after the event were all features strongly supporting the diagnosis of parasomnia.<sup>12</sup> Head version, hyperkinetic automatisms, and dystonic postures were clinical signs clearly indicating NFLE. On the other hand, the presence of fearful emotional behaviors, sitting, standing, or walking did not discriminate between parasomnias and NFLE: this seems to confirm that epilepsy and parasomnias may share some automatic or complex behaviors that are probably induced by the activation of the same neuronal networks, the so-called *central pattern generators*.<sup>13</sup>

The study of Derry et al. confirms that the differential diagnosis and the interpretation of brief nocturnal episodes may be extremely difficult. It is known that many NFLE patients show frequent brief arousals (lasting about 5 to 10 seconds), accompanied by movements such as trunk and head elevation; these episodes, defined as paroxysmal arousals, can differ within the same individual and can be similar to physiological movements.<sup>8-10</sup> Moreover recent findings indicate that, in a single epileptic patient, highly stereotyped minor motor events can occur in either the presence or absence of an epileptiform discharge.<sup>14</sup> As discussed by authors,<sup>12</sup> it seems that subclinical epileptic discharges can act as an internal nonspecific trigger able to increase arousal fluctuations and to enhance and modulate the occurrence of behaviors that do not have specific ictal epileptic features.<sup>9,14</sup> Therefore, the epileptic origin of these motor events cannot be ascertained only on the basis of single episode video semiological analysis; on the other hand a high number of these movements could represent an indirect marker of epileptiform activity in subjects with a clinical suspicion of NFLE.<sup>14</sup>

Another important implication of the study of Derry et al. is that the classification of NREM parasomnias into strict distinct categories is probably an oversimplification; indeed, their results indicate the presence of a hierarchical continuum between the different behavioral patterns of arousal parasomnias. A similar hierarchical continuum is evident also in NFLE. In fact, it has been shown that the increasing complexity of the motor behaviors in NFLE patients reflects different duration, amplitude,

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and spread of the epileptic discharge within the frontal lobe.<sup>15</sup> A breakdown of boundaries between wakefulness and NREM sleep is considered the main physiopathological mechanism underlying NREM parasomnias: during arousal parasomnias, some cerebral regions (such the motor and cingulate cortex) are activated, while others (the frontoparietal cortices) remain in a state of sleep.<sup>16,17</sup> Therefore, the increasing complexity of NREM parasomnia events, ranging from confusional arousal to deambulatory behaviors, probably reflects a progressive different degree and duration of such a dissociated state.

The results of Derry et al. need to be confirmed by a prospective study: in order to avoid the risk of misdiagnosis and the circularity of interpretations, authors adopted stringent exclusion and inclusion criteria with the risk of artificially separating NFLE and parasomnias. Despite these limitations, the simple algorithm developed by Derry et al., based only on few clinical features detected on video recordings, seems to be a powerful instrument to distinguish between NFLE and NREM parasomnias. In-lab video-EEG recordings of sleep related motor events are considered the gold standard; however this procedure is expensive, time consuming, and requires admission to the hospital with generally long waiting lists. Moreover, in patients with less frequent events, the probability of capturing an event during a single night is very low. Considering the widespread availability of video cameras and videophones, the analysis of homemade video recordings of nocturnal episodes together with the historical features,<sup>18,19</sup> could become an important tool for helping physicians in understanding the complexity of these disorders.

## DISCLOSURE STATEMENT

Dr. Nobili has indicated no financial conflicts of interest.

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