

SLEEP MEDICINE PEARLS

Rhythmic Electroencephalogram Activity during Polysomnography

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A 36-year-old man with no significant past medical history presented to the sleep medicine clinic with a history of loud snoring, frequent awakenings, restless sleep, and excessive daytime sleepiness with Epworth Sleepiness Scale score of 9. Overnight split-night polysomnography (PSG) was performed due to high clinical suspicion for OSA. PSG demonstrated an apnea-hypopnea index (AHI) of 7.0 events/hour. Incidentally, rhythmic

electroencephalogram (EEG) activity was noted by the sleep technician that was concerning for possible “seizure activity.”

QUESTION: What EEG abnormality is seen as depicted by the red arrows in Figure 1 and Figure 2?

Figure 1—Representative recording of a 30-second epoch during N1 sleep.

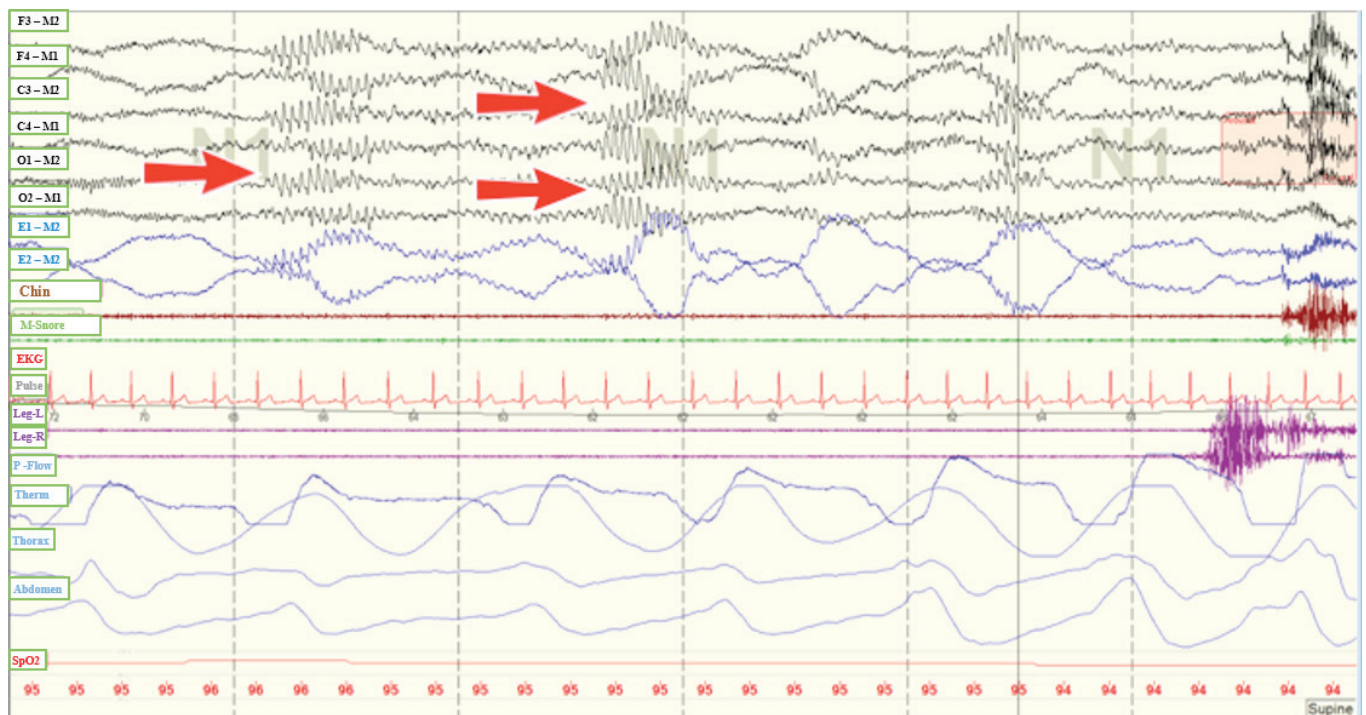
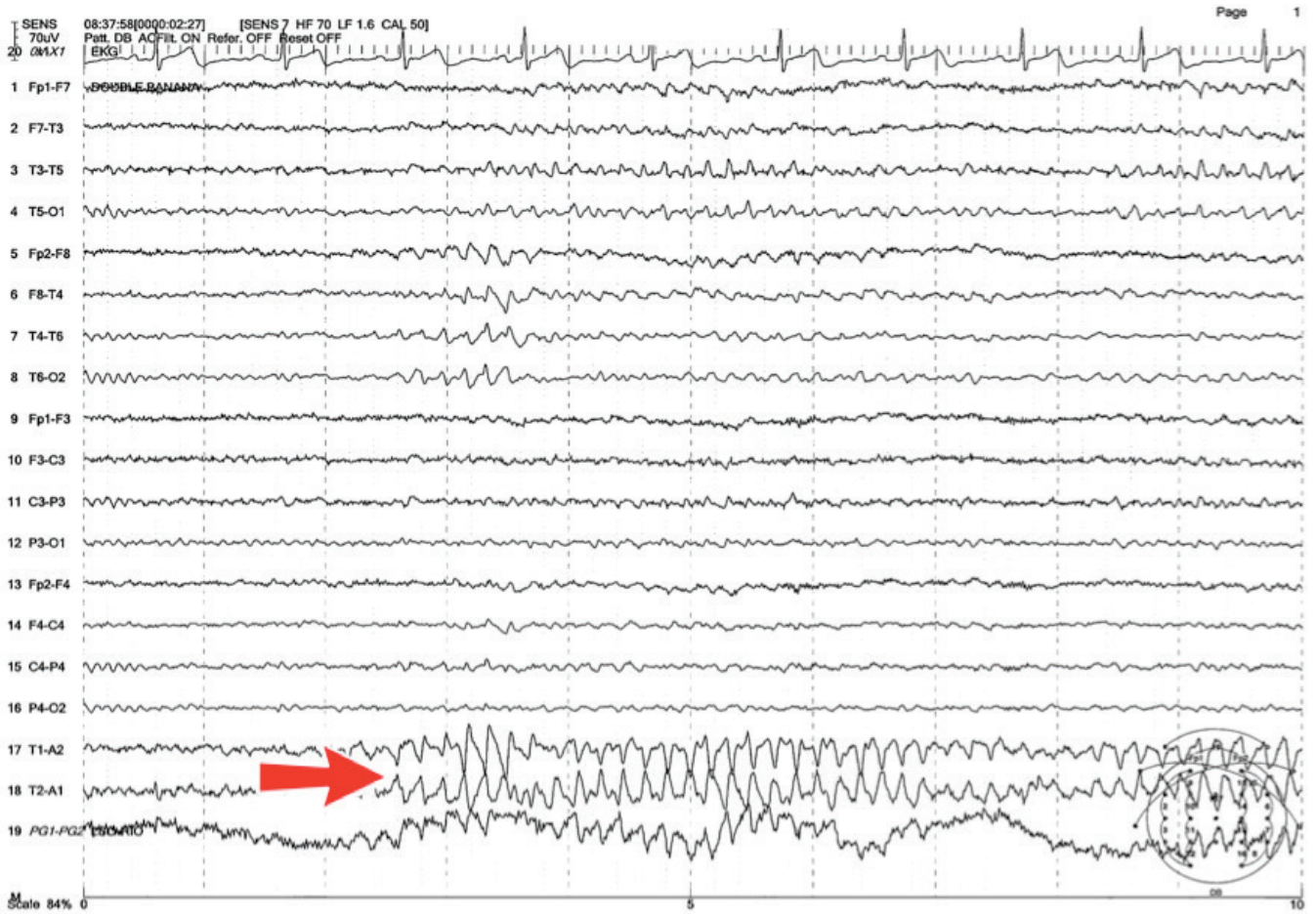


Figure 2—Representative recording of 10-second multi-channel sleep-deprived EEG.



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ANSWER: Rhythmic mid-temporal discharges (RMTD), a benign variant.

DISCUSSION

Figure 1 (red arrow) shows bursts of theta activity seen in the frontal, occipital, and central leads. **Figure 2** (red arrow) shows sharply contoured rhythmic theta activity localized to the right and left temporal region.

RMTD, also known as rhythmic temporal theta bursts of drowsiness is a benign variant with an incidence of 0.5 to 2%.¹ It is commonly seen in adolescents and young adults.² RMTD is characterized by rhythmic theta waves ranging in frequency from 5 to 7 Hz, occurring most prominently over the mid temporal region, lasting from several seconds to up to a minute. Morphologically, they are sharply contoured with a notched or flat topped waves.³ RMTD centers reside within cortical tissues of inferior temporal lobes³ and may generate paroxysms which may be bilateral or unilateral. Bilateral paroxysms may appear independently or simultaneously with variable asymmetry and without evolution.⁴ In our patient, these discharges were seen only during wakefulness and stage 1 NREM sleep. The video PSG did not corroborate any movements suggestive of seizure. A sleep deprived multi-channel EEG with use of additional T1 and T2 electrodes was obtained to better delineate the underlying EEG rhythm.

Due to the rhythmic nature of RMTD, they tend to closely resemble ictal epileptiform or inter-ictal epileptiform discharges (IED). IEDs are characterized by spike or sharp waves, spike and slow wave complexes or polyspike and slow wave complexes in the absence of clinical seizures. Unlike RMTD, generalized epilepsy generates discharges with sudden onset and termination, which are bilaterally symmetrical and synchronous, with a characteristic pattern of evolution. These discharges are clearly distinguishable from the background activity, due to their morphology and higher amplitude. Focal epilepsy has discharges that are lateralized in origin.⁴

CONCLUSIONS

Sleep medicine physicians need to be cognizant of these uncommon rhythmic discharges and be able to differentiate these from rhythmic EEG discharges due to seizures.

CITATION

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ABBREVIATIONS

AHI, apnea-hypopnea index
 EEG, electroencephalogram
 IED, inter-ictal epileptiform discharge
 OSA, obstructive sleep apnea
 PSG, polysomnogram
 RMTD, rhythmic mid-temporal discharge

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