Sleep in Epilepsy

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(Until 15.07.13)

(Until 30.09.13)



Acknowledgment



Patient 1

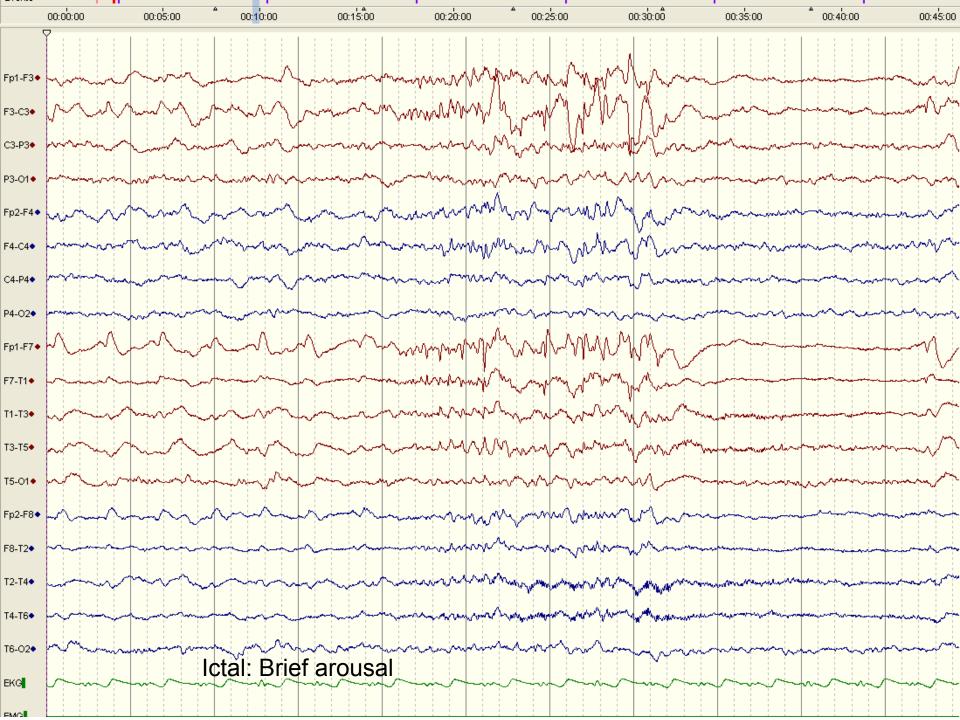


- 5-year old girl
- Frequent awakenings from sleep
- Disturbed night sleep
- Daytime sleepiness and poor school performance
- Normal development
- Normal MRI









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Patient 2



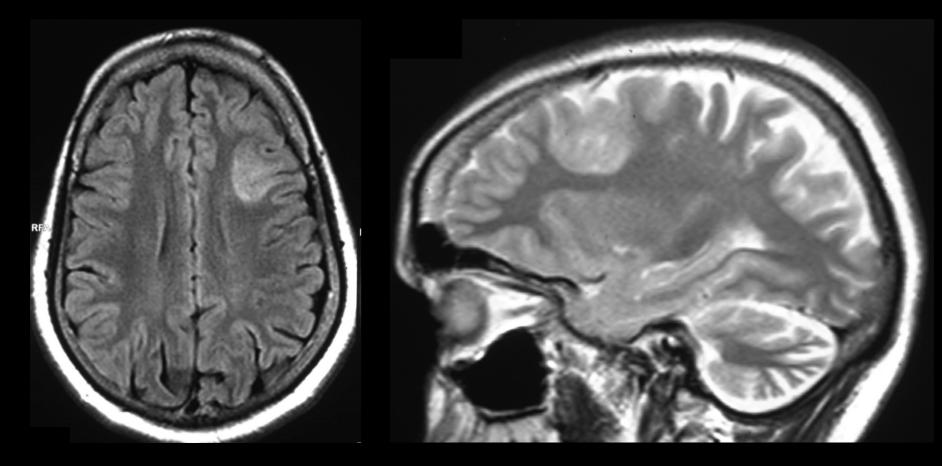
- 35-year old lady.
- Daily nocturnal stereotyped events since age 10 yr.
- Vocalization along with posturing of one upper
- limb and occasional incontinence.
- No day time events, but often somnolent.
- No response to multiple AEDs.
- Suspected to have nonepileptic events.



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Symptomatic localization-related epilepsy: Left frontal focal cortical dysplasia



Patient 3



- 49-year old male
- H/O multiple episodes of febrile seizures
- Recurrent nocturnal events from 35 years of age
- Semiology: loud vocalization, restlessness, may hit other persons
- Frequency: 3-4 per night
- No response to AEDs
- Normal MRI
- DD: Parasomia vs. Nocturnal frontal lobe epilepsy





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Ictal onset: Seizure 3

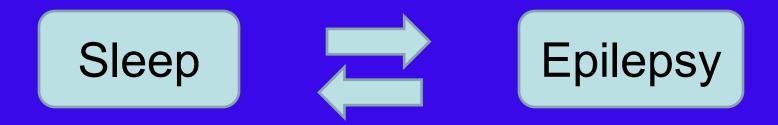
History: Sleep and Epilepsy

• Known since antiquity.

Aristotle and Hippocrates: occurrence of epileptic seizures during sleep.

- Late 19th century: Gowers commented the relationship of seizures to sleep-wake cycle
- Berger's discovery of EEG in 1920s.
- Gibbs and Gibbs (1947): IEDs activation during sleep.
- Janz (1962): differentiated awakening, nocturnal and diurnal epilepsies.

Sleep and Epilepsy



Sleep and epilepsy

Effects of sleep on epilepsy

- Sleep
 - Interictal epileptiform abnormalities in the EEG
 - **Epileptic seizures**
- Sleep deprivation
 - Interictal epileptiform abnormalities in the EEG Epileptic seizures
- Effects of epilepsy on sleep
 - Interictal epileptiform abnormalities in the EEG Epileptic seizures
- Effect of sleep disorders on epilepsy
- Effects of antiepileptic therapy on sleep
- Diagnosis between nocturnal seizures and parasomnias

Effect of sleep stage on eplileptogesis

NREM sleep	REM sleep
Synchronization of EEG	Desynchroniz
More frequent IEDs	Less frequent
Wider spread of IEDs	More localized
Increased likelihood of seizures	Infrequent sei
Greatest potential for epileptogenesis	Least potentia

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Effects of sleep on epilepsy

Interictal epileptiform abnormalities in the EEG

IEDs gets activated in focal and generalized epilepsies >30%

Epilepsy syndromes associated with marked activation

Benign epilepsy with centrotemporal spikes

Landau-Kleffner syndrome

Epilepsy with continuous spike-wave during slow-wave sleep

West and Lennox-Gastaut syndromes

Temporal lobe epilepsy

IEDs maximum during NREM stages 3&4 (N3)

Becomes bilateral during NREM

IEDs least during REM

Effects of sleep on epilepsy Epileptic seizures

Nearly exclusively during sleep

Autosomal dominant nocturnal frontal lobe epilepsy α4 and β2 subunits of ACh nicotinic receptor, chromosome 20

Benign childhood epilepsy with centrotemporal spikes

Effects of epilepsy on sleep Epileptic seizures

Nocturnal GTCS

Disrupted sleep and awakening

Primary GTCS – after seizure

Secondary GTCS – both before and after

Decrease in REM, compensatory increase in NREM stage 2

Nocturnal focal seizures

Similar

Epilepsy without nocturnal seizures

Sleep fragmentation, increased awakening compared to controls

Sleep complaints in persons with seizure disorder

Excessive daytime sleepiness Insomnia Nocturnal spells

Excessive daytime sleepiness in persons with epilepsy

Nearly one-third have elevated scores on ESS

 Multifactorial AEDs Nocturnal IEDs and seizures Associated primary sleep disorders SDB and RLS

Correction of sleep disorders can improve seizure control

Sleep disorders and epilepsy

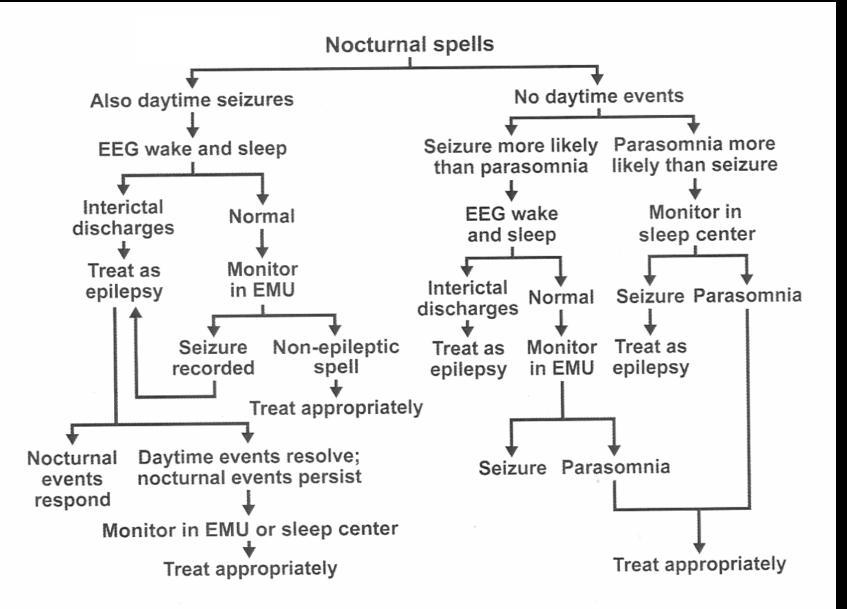
Sleep disordered breathing Valproate related obesity Sedation by BDZ and PB Vagus nerve stimulation (VNS) Restless leg syndrome Worsen with DPH, Zonisamide Benefit with GBP, VPA, CBZ, LTG

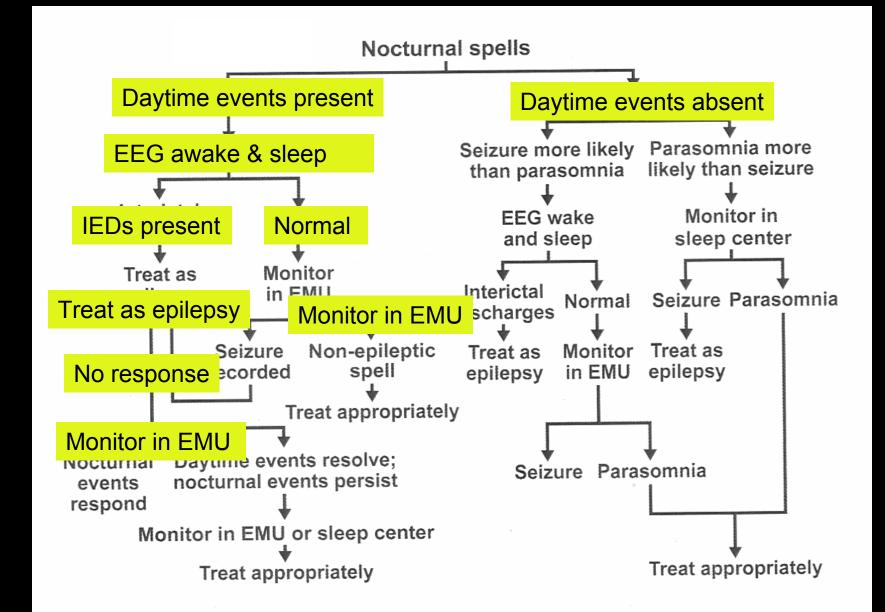


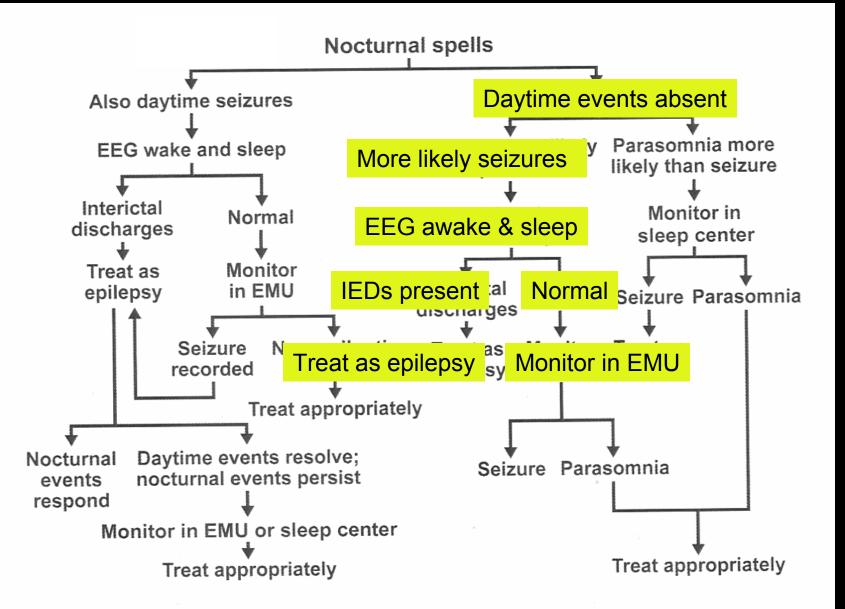
 In general beneficial Decrease sleep latency, increase efficiency Decrease REM, increase NREM stage 2

Old AEDs: VPA most beneficial, DPH least

Insomnia: Felbomate, Lamotrigine, Zonisamide



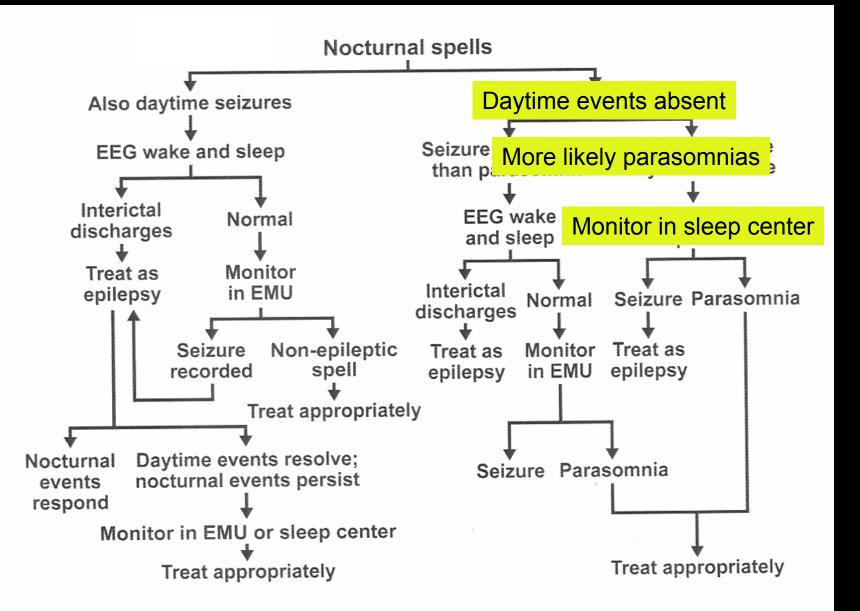




Frontal lobe epilepsy and parasomnia (FLEP) scale

- Age at onset <55 yr
- Duration of events <2 min
- Timing within 30 min of sleep onset
- Prominent dystonic posturing
- Stereotyped events
- Lucid recall

(Derry et al. Arch Neurol 2006;63:705-9)



Conclusions

The interaction between sleep and epilepsy is bidirectional and complex

Sleep is an activator of IEDs and seizures

Routine EEG in persons with suspected seizure disorder should include recording during sleep

Sleep disruption can disturb seizure control

Conclusions

Epileptic discharges alter sleep regulation and provoke sleep disruption

Excessive daytime sleepiness and insomnia in persons with epilepsy often indicate an underlying sleep disorder rather than the effect of epilepsy or AEDs.

Conclusions

Differential diagnosis between nocturnal seizures and parasomnias often need a close interaction between epileptologist and sleep specialist.

