Specific Features of Nocturnal Epilepsy

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Abstract

Nocturnal epilepsy is a complex clinical entity accounting for 7.5% to 45% of all epilepsies, with approximately 80% of these seizures being of focal onset. The relationship between sleep and epilepsy is inherently bidirectional: sleep modulates ictal activity, while seizures disrupt sleep architecture, leading to chronic insomnia in nearly 50% of patients. The clinical spectrum includes three subtypes: sleep-associated epilepsies (occurring primarily during sleep), sleep-accentuated epilepsies (activated by sleep), and awakening epilepsies. Sleep-associated epilepsies are predominantly focal, including benign epilepsy with centrotemporal spikes (BECTS) and self-limited epilepsy with autonomic seizures (SeLEAS), which account for up to 33% of childhood-onset cases. Sleep-related hypermotor epilepsy (SHE) represents 10% of drug-resistant focal epilepsies. In sleep-accentuated epilepsies, such as West syndrome or Lennox–Gastaut syndrome, NREM sleep markedly activates paroxysmal activity. Notably, BECTS, Landau–Kleffner syndrome, and electrical status epilepticus during sleep (ESES) are now considered disorders within the same spectrum, often associated with GRIN2A mutations. Awakening epilepsies, particularly juvenile myoclonic epilepsy (JME), account for 5–10% of all cases, with sleep deprivation serving as a major trigger. Inpatient video-EEG polysomnography remains the gold standard for electroclinical characterization and differential diagnosis from NREM parasomnias and REM sleep behavior disorder. Accurate syndrome classification is essential for therapeutic management, requiring individualized antiseizure medication dosing to ensure peak drug concentrations during critical sleep stages or the transition to wakefulness. This presentation aims to integrate the latest pathophysiological insights into seizure activation during NREM sleep and emphasize the importance of early diagnosis in preventing cognitive decline and physical injuries in this vulnerable patient population.

Keywords: nocturnal epilepsy; sleep; differential diagnosis; polysomnography; electroencephalography

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Specifičnosti noćne epilepsije

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Sažetak

Noćna epilepsija složen je klinički entitet koji obuhvaća od 7,5 do 45 % svih epilepsija, pri čemu je približno 80 % napadaja žarišnog ishodišta. Odnos spavanja i epilepsije po prirodi je dvosmjeran: spavanje modulira iktalnu aktivnost, dok epileptički napadaji narušavaju arhitekturu spavanja, što dovodi do kronične nesanice u gotovo 50 % bolesnika. Klinički spektar uključuje tri podtipa: epilepsije povezane sa spavanjem (*sleep-associated epilepsies*), epilepsije aktivirane spavanjem (*sleep-accentuated epilepsies*) i epilepsije pri buđenju (*awakening epilepsies*). Epilepsije povezane sa spavanjem pretežito su žarišne, uključujući benignu epilepsiju s centrotemporalnim šiljcima (BECTS) i samoograničavajuću epilepsiju s autonomnim napadajima (SeLEAS), koje čine do 33 % slučajeva s početkom u dječjoj dobi. Hipermotorna epilepsija povezana sa spavanjem (SHE) čini 10 % farmakorezistentnih žarišnih epilepsija. Kod epilepsija aktiviranih spavanjem, kao što su Westov i Lennox–Gastautov sindrom, NREM spavanje izrazito aktivira paroksizmalnu aktivnost. Značajno je da se BECTS, Landau–Kleffnerov sindrom i električni status epileptikus tijekom spavanja (ESES) danas smatraju poremećajima istog spektra, često povezanima s mutacijama gena GRIN2A. Epilepsije pri buđenju, osobito juvenilna mioklona epilepsija (JME), čine 5–10 % svih slučajeva, pri čemu je deprivacija spavanja jedan od glavnih okidača. Bolnička video-EEG polisomnografija ostaje zlatni standard za elektrokliničku karakterizaciju i diferencijalnu dijagnozu u odnosu na NREM parasomnije i poremećaj ponašanja u REM spavanju. Točna klasifikacija sindroma ključna je za terapijski pristup, koji zahtijeva individualizirano doziranje antiepileptičkih lijekova kako bi se osigurale vršne koncentracije lijeka tijekom kritičnih stadija spavanja ili prijelaza u budno stanje. Cilj je ove prezentacije objediniti najnovije patofiziološke spoznaje o aktivaciji epileptičkih napadaja tijekom NREM spavanja te naglasiti važnost rane dijagnoze u prevenciji kognitivnog propadanja i tjelesnih ozljeda u ovoj osjetljivoj populaciji bolesnika.

Ključne riječi: noćna epilepsija; spavanje; diferencijalna dijagnoza; polisomnografija; elektroencefalografija

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