

## Viral and Bacterial Infections, Including COVID-19, and Central Disorders of Hypersomnolence

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Central disorders of hypersomnolence are classified as a separate category of sleep disorders in the latest version of International Classification of Sleep Disorders third edition (ICSD3) (1). This category contains narcolepsies type 1 and 2, idiopathic hypersomnia, Kleine-Levin syndrome, hypersomnia due to medical disorders and medications or substances, psychiatric disorders, and insufficient sleep syndrome. Kleine-Levin syndrome and narcolepsy include the ones which can occur as a postinfectious consequence (2-5).

Narcolepsy is presented with excessive daytime sleepiness, sleep attacks, and sleep paralysis that could or could not accompany cataplexy. The cardinal manifestation is excessive daytime sleepiness, which induce the patient an irresistible need to sleep or a sleep attack (1). One of the precipitating factors of this disorder is viral infections. In H1N1 pandemic in China, H1N1 infection and vaccination were suggested as triggers of narcolepsy (5). Furthermore, recent evidence indicates that streptococcal infections and antistreptolysin O (ASO) titer can be associated with narcolepsy (4).

Klein-Levin syndrome is also another disorder of central hypersomnolence that affects patients report previous viral infections (2). This syndrome is characterized by periodic episodes of hypersomnolence, with the repetition period of one to 12 months (1).

Before the first episode, usually a flu-like syndrome is reported (6). However, the pathophysiology of the disorder is unknown (2).

Based on the current evidence, some sleep disorders such as central disorders of hypersomnolence may onset after infection with COVID-19 due to various mechanisms. Central disorders of hypersomnolence have different etiologies, one of them is related to immune system. The immune response to coronaviruses induces local and systemic production of cytokines, chemokines, and other inflammatory mediators.

Up to now, mRNA expression has showed that angiotensin-converting enzyme 2 (ACE2) receptor is found in several parts of central nervous system (CNS) including sleep and wake centers (7). Regarding the severe acute respiratory syndrome coronavirus (SARS-CoV), there may also be a viral interaction with ACE2 receptor of the host cell in COVID-19 infection (8). Sleepiness and lethargy is also reported in the patients with COVID-19 infection (9). Although we can see sleepiness in viral infections, but it is unknown that this disease can lead to long-term effects on sleep-wake centers leading to narcolepsy or Klein-Levine syndrome. Another issue that should be taken into account is future developed vaccines. The probability exists that COVID-19 antibodies may have effects on CNS, and lead to narcolepsy such as H1N1 vaccine. We recommend following patients with a previous history of COVID-19 regarding sleep issues, specially hypersomnolence for future researches as COVID-19 can predispose patients to postinfection hypersomnolence disorders.

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### Conflict of Interests

Authors have no conflict of interests.

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