

The Effects of Modafinil on Circadian Rest-Activity Rhythm in Patients with Narcolepsy

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Objective: Narcolepsy is a central hypersomnia disorder characterized by excessive daytime sleepiness. Although modafinil reduces daytime sleepiness in these patients, its effects on the circadian rhythm remain unknown. We used actigraphy to monitor sleep-wake patterns and investigated the circadian rest-activity rhythm of narcolepsy patients before and after modafinil treatment.

Methods: Patients with type 1 or 2 narcolepsy (NT1, NT2) were enrolled in this prospective study. Their mean age of narcolepsy onset was 13.91 ± 6.41 years, and their current mean age was 21.22 ± 8.84 years. Each participant received a daily dose of 200–400 mg of modafinil every morning for six months and wore actigraphy for 7–14 days before and after modafinil treatment. Parametric and non-parametric analyses were used to analyze the circadian rest-activity rhythm. We used paired sample t-tests for comparing pre- and post-treatment data, as well as independent sample t-tests and chi-square tests to assess differences between groups.

Results: A total of 90 patients were recruited, including 57 with NT1 and 33 with NT2. Patients with NT1 reported more frequent hypnagogic/hypnopompic hallucinations, sleep paralysis, parasomnias, and auditory hallucinations compared to those with NT2. Circadian rhythm analysis revealed significant increases in daytime mean activity and in the average activity during the most active 10 hours (M10). The midpoint time of M10 also shifted significantly earlier. After subgroup analysis by narcolepsy subtype, significant improvements in the rest-activity pattern were observed only in patients with NT1, including increased daytime mean activity and M10, as well as an earlier shift in the midpoint time of M10.

Conclusion: Our findings indicate that modafinil enhances daytime activity and advances narcolepsy patients' wake phase, particularly in those with NT1. Not all parameters of circadian rhythm can be improved with modafinil, which highlights the importance of non-pharmacological interventions for managing the circadian rhythm of narcolepsy patients.

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