Body temperature, activity and melatonin profiles in adults with attention-deficit/hyperactivity disorder and delayed sleep: a case–control study.

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Summary

Irregular sleep–wake patterns and delayed sleep times are common in adults with attention-deficit/hyperactivity disorder, but mechanisms underlying these problems are unknown. The present case–control study examined whether circadian abnormalities underlie these sleep problems in a naturalistic home setting. We included 12 medication-naïve patients with attention-deficit/hyperactivity disorder and delayed sleep phase syndrome, and 12 matched healthy controls. We examined associations between sleep/wake rhythm in attention-deficit/hyperactivity disorder and circadian parameters (i.e. salivary melatonin concentrations, core and skin temperatures, and activity patterns) of the patients and controls during five consecutive days and nights. Daily bedtimes were more variable within patients compared with controls ($F = 8.19$, $P < 0.001$), but melatonin profiles were equally stable within individuals. Dim-light melatonin onset was about 1.5 h later in the patient group ($U = 771$, $Z = -4.63$, $P < 0.001$). Patients slept about 1 h less on nights before work days compared with controls ($F = 11.21$, $P = 0.002$). The interval between dim-light melatonin onset and sleep onset was on average 1 h longer in patients compared with controls ($U = 1117$, $Z = -2.62$, $P = 0.009$). This interval was even longer in patients with extremely late chronotype. Melatonin, activity and body temperatures were delayed to comparable degrees in patients. Overall temperatures were lower in patients than controls. Sleep-onset difficulties correlated with greater distal–proximal temperature gradient (DPG; i.e. colder hands, $r2 = -0.32$, $P = 0.028$) in patients. Observed day-to-day bedtime variability of individuals with attention-deficit/hyperactivity disorder and delayed sleep phase syndrome were not reflected in their melatonin profiles. Irregular sleep–wake patterns and delayed sleep in individuals with attention-deficit/hyperactivity disorder and delayed sleep phase syndrome are associated with delays and dysregulations of the core and skin temperatures.