

The Relationship between Central Adrenal Insufficiency and Sleep-Related Breathing Disorders in Children with Prader-Willi Syndrome

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Background: The annual death rate of patients with Prader-Willi syndrome (PWS) is high (3%). Many deaths of children are sudden and unexplained. Sleep apneas have been suggested to play a role in sudden deaths. Recently, we discovered that 60% of patients with PWS suffer from central adrenal insufficiency (CAI) during stress.

Objective: The aim was to study the relationship between CAI and sleep-related breathing disorders.

Design: In 20 children with PWS who underwent a metyrapone test (30 mg/kg at 2330 h), sleep-related breathing was evaluated by polysomnography before the metyrapone test. In addition, we recorded sleep-related breathing in 10 children with PWS during their metyrapone test. CAI was diagnosed when ACTH levels during the metyrapone test were below 33 pmol/liter at 0730 h. All tests were performed during healthy condition.

Setting: The study was conducted in a pediatric intensive care unit and specialized sleep center.

Results: Median (interquartile range) age was 8.4 yr (6.5–10.2). After metyrapone administration, median (interquartile range) central apnea index (number/hour) increased significantly from 2.2 (0.4–4.7) to 5.2 (1.5–7.9) ($P = 0.007$). The increase tended to be higher in children with CAI [2.8 (2.0–3.9) vs. 1.0 (–0.2 to 2.6); $P = 0.09$]. During polysomnography before the metyrapone test, sleep-related breathing was worse in children with CAI, who had a significantly higher central apnea index and tended to have a lower minimum oxygen saturation compared to those without CAI ($P = 0.03$ and $P = 0.07$).

Conclusions: In children with PWS, the central apnea index increased significantly after metyrapone administration, particularly in those with CAI during stress. In addition, children with CAI had a higher central apnea index compared to those without several months before the metyrapone test.