

Central Adrenal Insufficiency Screening with Morning Plasma Cortisol and ACTH Levels in Prader-Willi syndrome

Written by Moris A. Angulo, Merlin G. Butler, Waheeda A. Hossain, Mariano Castro-Magana, and Jorge Corletto

Reviewed by PWSA | USA's Clinical/Scientific Advisory Board

Central Adrenal Insufficiency (CAI) was identified as a possible risk in PWS in 2009 by a team of researchers in The Netherlands. At that time, PWSA | USA recommended testing all individuals with PWS for this potentially life-threatening deficiency. Since 2009, researchers in other countries have published studies that did not find the high rates of CAI found in the original paper. A review paper, summarizing all such studies, was published in 2016. It suggested that CAI may not be common in the PWS population, especially in adults, but recommended that physicians continue to test for this deficiency. These authors also encouraged more research in this area.

Central Adrenal Insufficiency is caused by the deficiency of pituitary Adrenocorticotropin Hormone (ACTH). The adrenal glands make three hormones – cortisol (important for energy and sugar balance); androgens (male-like hormones that cause growth of underarm and pubic hair) and aldosterone (important in control of salt balance). ACTH controls the adrenal gland's secretion of cortisol. The adrenal glands make adrenaline independently of ACTH.

Cortisol hormone levels vary during the day, with a strong burst in the early morning and variations as needed for physical stress on the body. CAI is a very rare condition and a difficult diagnosis to make. The testing is complicated, and the most accurate tests carry risks or are unavailable in the USA. A recent study published by Angulo and Butler in 2022 confirms that morning (7-9 AM) plasma cortisol and ACTH levels in PWS are comparable with control subjects, i.e., normal. Assessment of morning cortisol and ACTH levels should be considered as initial screening for CAI. Individuals with low levels of should be referred for dynamic testing by an endocrinologist to confirm CAI.

Individuals who take Hydrocortisone (cortisol) pills daily must wear medical alert bracelets and take "stress doses" by mouth or emergency injection in cases of significant illness, injury, or surgery. There may be some individuals who produce normal daily quantities of cortisol, but who need stress dosing. If your child is currently on Hydrocortisone, you should continue this medication and discuss these new findings at your next appointment. It is dangerous to suddenly stop taking this medication. There are people with PWS who clearly have inadequate cortisol production and who benefit from this medication.