

Tissue corticosteroid rhythms are dysregulated mainly during sleep in primary aldosteronism

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Abstract

Primary aldosteronism affects 5–20% of the hypertensive population and is associated with increased cardiovascular and metabolic risk compared with primary hypertension. Alterations in the dynamics of aldosterone secretion are key, but these are not well captured by current diagnostic pathways, and the disease is often missed. In this proof-of-concept study, we utilized ambulatory microdialysis sampling to continuously monitor tissue corticosteroid dynamics in primary aldosteronism over 24 hours. In a cohort of 60 patients, we found prominent and pulsatile nocturnal hypersecretion of aldosterone and the hybrid steroids 18-hydroxycortisol and 18-oxocortisol with a preserved daily rhythm. This was most prominent in unilateral disease, with normalization after adrenalectomy. Our findings confirm that a key pathophysiological feature of primary aldosteronism is disruption of corticosteroid rhythms, rather than persistent elevation of hormones. We show that ambulatory dynamic hormone profiling is a viable technique that offers substantially more information than current diagnostic approaches relying on single time-point hormone measurements. In the future this offers the opportunity to investigate more subtle dynamic phenotypes and potentially earlier detection of disease.

Keywords

Primary aldosteronism, ultradian rhythms, dynamic hormone profiling, aldosterone,