Hormonal Mechanisms

6.2 Comparison of Three Different Doses of ACTH Stimulation During Adrenal Vein Sampling (AVS) in the Work-Up of Primary Aldosteronism

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Introduction. ACTH stimulation has been proposed to overcome the potential biases associated with pulsatile aldosterone secretion during Adrenal Vein Sampling (AVS). Different protocols and doses of synthetic ACTH have been used, but their performance was not systematically assessed thus far.

Aim. To compare the effects of 3 different doses of ACTH on the selectivity (SI) and the lateralization index (LI).

Methods. We prospectively tested the effects of a high dose (HD; 250 microg as an i.v. bolus, n=41), a very low dose (VLD, 250 picog as an i.v. bolus followed by 0.5 picog/min infusion, n= 6) and an intermediate dose (ID 50 microg/hr; n= 7) of synthetic ACTH (Synacthen, Novartis) on the SI and LI in patient referred for primary aldosteronism. Blood sampling for the measurement of plasma aldosterone (PAC) and cortisol (PCC) concentration were obtained at baseline and 30 minutes after ACTH stimulation, using bilaterally simultaneous AVS. The SI was calculated as the ratio of PCC in the right (CRAV) or left (CLAV) adrenal vein and the infrarenal inferior vena cava (CIVC); the LI was assessed as the ratio of PAC to PCC on the dominant (A/Cside) over the contralateral side (A/CCTRL). The diagnosis of APA was based on pathology and follow-up data, according to the criteria of the PAPY Study.

Results. The HD induced a highly significant increase of PCC in IVC (+83%, $P<0.003$) and on the SI on both sides (SIRIGHT +120%, $P<0.0001$; SILEFT +122%, $P<0.0001$), as compared to baseline values. The ID elicited a similar significant increase of PCC in the infrarenal IVC (+82%, $P<0.0001$); it also increased the SI (SIRIGHT +177%, $P<0.0001$; SILEFT +727%, $P<0.0001$). By contrast, no significant change of PCC in IVC and of the SI was seen with the VLD. Both the HD and the ID exerted confounding effects on the LI: APA side would be misclassified in 23 of 35 APA and 2 of 7 APA investigated with HD and ID, respectively.

Conclusions. No significant effects of the VLD were seen on either PAC or PCC. Both HD and ID improve the ascertainment of the selectivity of adrenal vein catheterization during AVS, but such improvement should be weighed against the confounding effect on correct identification of the lateralized aldosterone excess to the APA side. Of concern, misidentification of the APA side could lead to the removal of the healthy adrenal gland instead of the gland harbouring the APA.