

The Effect of Parathyroid Hormone on Aldosterone Secretion in Patients with Primary Hyperparathyroidism

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Abstract : In primary hyperparathyroidism, an increased risk of developing cardiovascular disease may exist due to increased activity of the renin-angiotensin-aldosterone system (RAAS). In adenomatous altered tissue of parathyroid gland, compared to normal tissue, there are two to fourfold increase in the expression of type 1 angiotensin II receptors. As there is a clear evidence of the independent role of aldosterone on the cardiovascular system, the aim of this study was to evaluate the existence of an association between aldosterone secretion and parathyroid hormone in patients with primary hyperparathyroidism. This study included 48 patients with elevated parathyroid hormone who had come to the Department of Nuclear Medicine, Clinical Center of Vojvodina, for Parathyroid Scintigraphy. The control group consisted of 30 healthy subjects who matched age and gender to the study group. All the results were statistically processed by statistical package STATISTICA 14 (Statsoft Inc, Tulsa, OK, USA). The survey was conducted between February 2017 and April 2018 at the Department of Nuclear Medicine and at the Department for Endocrinology Diagnostics, in Clinical Center of Vojvodina, Novi Sad. Compared to the control group, the study group had statistically significantly higher values of aldosterone ($p=0.028$), total calcium ($p=0.01$), ionized calcium ($p=0.003$) and parathyroid hormone (N-TACT PTH) ($p=0.00$), while statistically a significant lower levels in the study group were for phosphorus ($p=0.003$) and vitamin D ($p=0.04$). A linear correlation analysis in the study group revealed a statistically significant degree of positive correlation between renin and N-TACT PTH ($r=0.688$, $p<0.05$); renin and calcium ($r=0.673$, $p<0.05$) and renin and ionized calcium ($r=0.641$, $p<0.05$). Serum aldosterone and parathyroid hormone levels (N-TACT) were correlated positively in patients with primary hyperparathyroidism ($r=0.509$, $p<0.05$). According to the linear correlation analysis in the control group, aldosterone showed no positive correlation with N-TACT PTH ($r=-0.285$, $p>0.05$), as well as total and ionized calcium ($r=-0.200$, $p>0.05$; $r=-0.313$, $p>0.05$). In multivariate regression analysis of the study group, the strongest predictive variable of aldosterone secretion was N-TACT PTH ($p=0.011$). Aldosterone correlated positively to PTH levels in patients with primary hyperparathyroidism, and the fact is that in these patients aldosterone might be a key mediator of cardiovascular symptoms. All this knowledge should help to find new treatments to prevent cardiovascular disease.

Keywords : aldosterone, hyperparathyroidism, parathyroid hormone, parathyroid gland

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