International Journal of Pharmacy and Technology, 2016, vol.8, N2, pages 14643-14649

Evaluation of sympathoadrenal system and adrenal cortex functional activity among children in the age and sexaspects

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Abstract

© 2016, International Journal of Pharmacy and Technology. All rights reserved.The study of relationship between sympathetic-adrenal and pituitary-adrenal systems at the level of the whole organism in ontogenesis is a little-studied problem which has a general biological significance. A comprehensive study of regulatory system functional state of modern schoolchildren will expand the understanding of the neuroendocrine mechanisms of their age development and puberty, which is very important for the scientific foundation of the health care system among younger generation. The aim of research was a comprehensive study of the age and sex characteristics of the sympathetic-adrenal system and the adrenal cortex, the ratio of their functional activity among 10-15 year old boys and girls. The observation among children lasted for 6 years continuously. The content of adrenaline and noradrenaline in daily urine based on fluorimetric method showed the state of the sympathetic-adrenal system. The functional status of the adrenal cortex was assessed by urinary excretion of 17- ketosteroids and 17-oxycorticosteroids using a colorimetric method based on Zimmermann reaction with mdinitrobenzene and and by the reaction with phenylhydrazine after enzymatic hydrolysis (Silber's and Porter's method). The statistical significance of differences was determined by Student's t-criterion. It was shown that the daily excretion of adrenaline varies slightly among the children of both sexes, while the dynamics of norepinephrine is more pronounced and oscillatory in nature, which is consistent with the concept of chromaffin tissue earlier maturation relative to sympathetic innervation in ontogenesis. At the same time they revealed multidirectional changes in the excretion of 17-ketosteroids and 17-oxycorticosteroids among 11-13 year old boys, reflecting the biological antagonism of androgens and glucocorticoids, which have protein-anabolic and catabolic effects on a body. A certain synchronicity was established in the manifestation of the mediator link functional activity of the sympathetic-adrenal system, androgen and glucocorticoid function of the adrenal cortex, which is manifested heterochronically in sex groups among 10- 12 year old girls, and 14-15 year old boys. This confirms the literature data on the presence of close functional relationship between catecholamines and corticosteroids at different levels of neurohumoral regulatory mechanism and shows the features of adaptive reactions of children during prepubertal and pubertal development.

Keywords

10-15 year old boys and girls, Catecholamines, Corticosteroids