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Evidence of a hypertensive peripheral neuropathy in an experimental model of hypertension in rats

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Statement of the Problem: Spontaneously hypertensive rats (SHR), first inbred from Wistar Kyoto rats (WKY) are considered a good experimental model of human essential hypertension. Hypertension is a main risk factor for stroke and vascular dementia and may cause important changes to the cerebrovascular tree, turning the brain more susceptible to infarcts, microaneurysms and ischemia. In spite of the well-documented influence of hypertension on the brain, data on the sensitivity of peripheral nerves in hypertension is scarce. The purpose of this study was to investigate the alterations on the morphology and morphometric data on sural, phrenic and vagus nerves of adult SHR, with well-established hypertension.

Methodology & Theoretical Orientation: Male and female SHR and normotensive WKY rats aged 20 weeks (N = six in each group) were investigated. After arterial pressure and heart rate recordings in anesthetized animals, right and left sural nerves were removed and prepared for epoxy resin embedding and light microscopy. Morphometric analysis was performed with the aid of computer software, and took into consideration the fascicle area and diameter, as well as myelinated fiber number, density, area and diameter.

Findings: Significant differences were observed for the myelinated fiber number and density, comparing different genders of WKY and SHR in all nerves. Also, significant differences for the morphological (thickening of the endoneural blood vessel walls and lumen reduction) and morphometric (myelinated fibers diameter and G ratio) parameters of myelinated fibers were identified.

Conclusion & Significance: Morphological exam of the myelinated fibers suggested the presence of a neuropathy due to hypertension in both SHR genders. These results indicate that hypertension altered important morphometric parameters related to nerve conduction in hypertensive animals. Moreover, the comparison between males and females of WKY and SHR showed that the morphological and morphometric alterations due to hypertension are not gender related.

Biography

Valéria Paula Sassoli Fazan graduated in the School of Medicine of Ribeirão Preto, University of São Paulo, in 1991 and attended the Neurosurgery Residency Program at the same University. She Obtained the M.S. Degree in Morphology in 1995 and Ph.D. Degree in Neurology in 1999, both in the School of Medicine of Ribeirão Preto. Currently she is an Associate Professor in the Department of Surgery and Anatomy and Manager of the Microscopy and Morphometry Laboratory at the Experimental Surgery Center in the School of Medicine of Ribeirão Preto, University of São Paulo. She is proficient with a wide-range of light and electron microscopy techniques including specimen preparation and handling, vacuum evaporation and autoradiography, light microscopy including bright field, dark field, phase, fluorescence and transmission electron microscopy including bright field and dark field. She is expert in neuroscience, particularly in the fields of peripheral nerves and experimental models of neuropathies, digital image processing and analysis, stereology and morphometry.

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