36) Blood Pressure by New Tail Cuff Method in Spontaneously Hypertensive Rats (SHR).

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INTRODUCTION

The measurement of blood pressure in SHR is a technique of basic importance. Tail cuff method (Yamori Y et al. Jpn. Heart J. 15: 209, 1974) widely used for measuring blood pressure in rats, but only systolic blood pressure can be measured by this method. This time a new apparatus (UR-1000), which can detect not only systolic but also mean blood pressure, has been developed, and applied to blood pressure measurement in stroke-resistant SHR (SHRSR), stroke-prone SHR (SHRSP) and Wistar Kyoto (WKY) normotensive control rats.

MATERIALS AND METHODS

In the first experiment, 138 of SHRSP, SHRSR and WKY, which were different in blood pressure levels or stages of hypertension, were used for blood pressure measurement by Type 105 and UR-1000 (UEDA ELECTRONIC WORKS, LTD Tokyo). The procedure for this tail cuff method were as follows; initially a rat was warmed up in a 38 °C - hot box for 10 minutes, and then the rat was held in a rat restrainer and placed in a restraining apparatus which was also kept at 38 °C. The tail was inserted through in the cuff which contained a photoelectric pulse detector, and systolic blood pressure was recorded when the first pulse appeared during the gradual reduction of the cuff pressure once raised high enough. And mean blood pressure was recorded when the oscillations became maximum (YAMAKOSHI et al. Am. J. Physiol. 237 (5) 632, 1979). Thirteen of SHRSR, nine of SHRSP and WKY were used for the second examination, and body weights in these rats were 200-400 g. After anaesthesia, a polyethylene catheter (PE 50 Clay Adams) was inserted into the carotid artery of the rats. The arterial catheter was connected to a transducer (TP 101 T) and pulsatile arterial pressure was recorded on a polygraph (RM-45 Nihonkohden). Both direct arterial pressure from carotid artery and indirect tail pressure were simultaneously recorded on a polygraph and by UR-1000 when rats become conscious.

RESULTS

There was a significant correlation between systolic blood pressures measured by tail pulse pick up method in Type 105 and by photoelectric volume oscillometric method in UR-1000. There was a significant correlation between direct and indirect blood pressures recorded on a polygraph and measured by UR-1000 in mean blood pressures and systolic blood pressures. The means and variances of these blood pressure values obtained by direct and indirect methods were not different significantly. Blood pressure increased sharply for a short time in SHRSR, SHRSP and WKY when rats were held by an investigator to put into a hot box and also when rats were held in a restrainer for measurements of blood pressure. The latter increment of blood pressure continued for 72±7 seconds in average (n=30) and returned to the initial level.

DISCUSSION

This time we observed a sharp, short rise in blood pressure at least for a minute when a rat was gripped with the hand of an investigator and was held in a restrainer. This indicates that blood pressure should be measured longer than one minute after the rat was held in the restrainer. Both systolic and mean blood pressures observed by UR-1000 were confirmed to be correlated well to the direct arterial pressures, so that the new method is useful for taking blood pressure in the rat, especially SHR which are now widely used for blood pressure study.