51) Effects of Renal Sympathectomy on Renal Hemodynamics and Sodium Excretion in Spontaneously Hypertensive Rats
Jiro Kubota, Shinichiro Kubo, Hikaru Nishimura, Masakuni Ueyama, and Keishiro Kawamura.
Third division, Department of Internal Medicine, Osaka Medical College,
Takatsuki City, Osaka-fu 569

In order to investigate the role of the renal nerve activity in SHR, renal functional responses to lowering renal perfusion pressure to the level of that in Wistar Kyoto(WKY) rats were studied in SHR with renal denervation by comparing with those in sham operated SHR at each 8 weeks(early hypertensive) and 22 weeks(established hypertensive) of age. They were bilaterally denervated completely one week before clearance experiments by stripping the renal adventitia and painting with 10% phenol in absolute ethanol. The sham operation consisted of a ventral incision and isolation of the kidneys from adjacent tissues. The completeness of the renal denervation was confirmed by decrease in renal norepinephrine content to less than one tenth of that of non-denervated kidney. Under pentobarbital anesthesia, the adjustable occluder was placed around the aorta just above the renal arteries, by which renal perfusion pressure was altered. Glomerular filtration rate(GFR) was estimated by means of ³H inulin clearance and renal blood flow(RBF) by hydrogen clearance technique. After one-hour equilibration period, baseline renal hemodynamic and excretory parameters were estimated in a control period for 20 minutes. Then renal perfusion pressure was lowered to around 100mmHg by the occluder, and above parameters were estimated for following 20 minutes. At the end of the experiments, plasma renin (PRA) and renal renin activity (KRA) were measured. There were no significant differences as to renal parameters between younger and older non-denervated SHR before aortic constriction. In denervated animals, the younger SHR showed greater increments in RBF(3.79 to 4.26 ml/min/g·kidney, as the mean value), GFR(0.716 to 1.05 ml/min/g·kidney), urine volume (UV) (2.43 to 3.66 μ l/min/g·kidney), and urine sodium excretion ($U_{Na}V$)(0.177 to 0.264 μ Eq/min/g·kidney) than those in the older SHR(RBF: 3.91 to 4.41 ml/min/g·kidney, GFR: 0.713 to 0.975 ml/min/g·kidney, UV: 2.70 to 3.31 μ l/min/g·kidney, $U_{Na}V$: 0.131 to 0.247 μ Eq/min/g·kidney). PRA reduced by denervation clearly(113 to 72.5 ng/ml/h in the younger group and 83.3 to 55.8 ng/ml/h in the older group), while KRA showed no change compared with that in non-denervated counterparts. Along with reduction of renal perfusion pressure, RBF, GFR, UV, and $U_{Na}V$ were reduced significantly except for the attenuated $U_{Na}V$ in the younger SHR. These results suggest that renal sympathetic nerve activity influences the renal hemodynamics, sodium handling, and also renin release.