Clinically hypertensive type of chronic glomerulonephritis has the poor prognosis. To investigate the role of hypertension in chronic glomerulonephritis, we produced nephrotoxic serum nephritis (NTN) in SHR, and reported at the latest council meeting for SHR that NTN had no effect on blood pressure in SHR, but the glomerular changes by NTN was more pronounced in SHR than in control Wistar rats (WR). The present study was attempted to investigate the effect of hypertension on NTN in another type of experimental hypertension (DOCA-salt hypertension). We also produced NTN in Wistar Kyoto rats (WKY) as controls.

Material and method

To produce NTN in DOCA-salt hypertension in rats, 0.8ml of nephrotoxic serum (NTS) was injected intravenously in WR, weighing about 100g. Two weeks after NTS injection, the rats were unilaterally nephrectomized and 10mg of DOCA was injected weekly. 1% NaCl solution was given as drinking water ad libitum (DOCA-salt+NTN group). The following three groups were used as controls: DOCA-salt treated rats without NTS injection (DOCA-salt group), NTS-injected rats (NTN group), and DOCA NTN rats without salt loading (DOCA-NTN group). All the rats were unilaterally nephrectomized. After 8 weeks observation, the rats were killed and blood samples were taken for serum creatinine. The kidney specimen was taken for histological examination. To compare NTN changes in SHR, WKY and WR, NTS was injected similarly. Seven weeks after NTS injection, the rats were killed for histological examination.

Results

In DOCA-salt group the blood pressure elevated gradually in 4 weeks after DOCA-injection then reached a plateau level of 175-185mmHg, while the control NTN group showed no blood pressure changes. Blood pressure elevation was more marked in DOCA-salt+NTN group and similar blood pressure rise was shown in DOCA-NTN group. Serum creatinine was slightly elevated in DOCA-salt and DOCA-salt+NTN groups compared to NTN and DOCA-NTN groups. Glomeruli of NTN and DOCA-NTN groups showed mild mesangio-proliferative changes without crescent formation. In DOCA-salt group, the great majority of glomeruli showed mild mesangio-proliferation and a few glomeruli showed enlarged hyalinizing changes. In DOCA-salt+NTN group, the mesangio-proliferative changes was moderate, and about 30% of glomeruli showed the enlarged hyalinizing changes. The glomerular changes were mild in NTN of WKY and SHR. The glomerular changes were mild in NTN of WR. Proteinuria tended to reduce in the course of NTN in WR, while continued prominently in WKY and SHR.

Discussion and conclusion

It is generally accepted that DOCA injection without salt loading cannot produce hypertension in rats. NTS injection alone could not produce hypertension, as shown in NTN group. However, NTN combined with DOCA injection without salt loading produced a prominent blood pressure elevation in nephrectomized rats. NTN also accelerated the blood pressure rise in DOCA-salt hypertension. The histological glomerular changes in DOCA-NTN group were mild compared to DOCA-salt or DOCA-salt+NTN group. The same dose of NTS produced mesangio-proliferative changes with a high occurrence of crescent formation in WKY as in SHR. Therefore, it may be said that WKY and SHR are more sensitive to NTS injection than WR.