

Sodium Restriction Shifts Circadian Rhythm of Blood Pressure from Non-Dipper to Dipper in Essential Hypertension

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Summary

Sodium restriction has been widely used for treatment of hypertension and renal diseases. Whether sodium restriction can transform the circadian rhythm of blood pressure from non-dipper to dipper, is examined.

Patients (n=42) with essential hypertension were maintained on a high sodium diet (12 to 15 g of NaCl/day) and a low sodium diet (1 to 3 g) for 1 week each. On the last day of each diet, twenty-four-hour blood pressures were measured every hour noninvasively with an automatic oscillometric device. Twenty one patients were classified as non-sodium sensitive while 21 as sodium sensitive, based on more than 10 % change in 24-hour blood pressure by sodium restriction. Nocturnal blood pressure fall was significant in non-sodium sensitive type, while not in sodium sensitive type. Only in sodium sensitive type, there was a significant interaction between sodium restriction and the nocturnal fall, indicating that degree of the nocturnal fall was affected by sodium restriction. Furthermore, changes in the nocturnal fall induced by sodium restriction had a positive relationship with sodium sensitivity ($r=0.38$, $p<0.02$) and a negative relationship with the nocturnal fall before sodium restriction ($r=-0.75$, $p<0.0001$).

These findings show the nocturnal fall different between non-sodium sensitive and sodium sensitive types of essential hypertension. The diminished nocturnal fall, recognized in sodium sensitive type, is restored by sodium restriction, indicating circadian rhythm of blood pressure shifted from non-dipper to dipper patterns. On the other hand, the nocturnal fall is not affected by sodium restriction in non-sodium sensitive type, and the circadian rhythm remains dipper.