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RELATIONSHIP BETWEEN NOCTURNAL POLYURIA AND BRAIN NATRIURETIC PEPTIDE (BNP) IN ELDERLY PATIENTS OF NOCTURIA

Hypothesis / aims of study

A factor reducing the QOL of aged people is nocturia. Nocturnal polyuria, as well as OAB and sleep disturbance, is regarded as an important cause of nocturia. Circulatory dynamics may be associated with nocturnal polyuria in aged people, and hypertension, chronic heart failure, and arteriosclerosis may be major factors. Thus, the relationship between an important marker of chronic heart failure, brain natriuretic peptide (BNP), and nocturnal polyuria was investigated.

Study design, materials and methods

The subjects were 52 patients (male: 44, female:8) in whom the nocturnal urine volume was 400 ml or higher, among patients aged 65 years or older who visited our hospital for nocturia with 2 or more excretions. The patients filled in the frequency volume chart (FVC) for 5 days, and the relationship of the BNP level with the 24-hour urine volume, daytime urine volume, nocturnal urine volume (during sleep), and night/24-hour urine volume ratio was statistically analyzed.

Results

1. 24-hour urine volume: The 24-hour urine volume significantly decreased with increase in the BNP level ($P=0.0055$). 2. Nocturnal urine volume: No significant correlation was observed between the BNP level and nocturnal urine volume ($P=0.6120$). 3. Daytime urine volume: A strong correlation was observed between the BNP level and daytime urine volume, and the daytime urine volume decreased with elevation of the BNP level ($P=0.0011$). (Fig1)
4. Night/24-hour urine volume ratio: Accordingly, when the BNP level increased, the 24-hour urine volume decreased, and slight increase in the nocturnal urine volume significantly increased the night/24-hour urine volume ratio ($P=0.0093$). (Fig2)

Interpretation of results

There were two patterns of nocturnal polyuria in aged people. In one type, not only the nocturnal urine volume but also the daytime urine volume was increased, that is, in polydipsia patients represented by diabetic patients. In the other type, the 24-hour urine volume was not markedly increased, but the daytime urine volume decreased and the nocturnal urine volume increased. The night/24-hour urine volume ratio was nearly normal (35% or less) in the former, but high in the latter (45% or more). In patients with a high night/24-hour urine volume ratio, the BNP level was high in many cases, suggesting that reduction of circulatory function due to hypertension and arteriosclerosis decreases the renal blood flow during the daytime active time, and water retained in the body is excreted during night sleep to adjust the body fluid balance, which may be similar to a biological defense reaction. In patients with a high BNP level, it may be better to avoid forcing reduction of the nocturnal urine volume.

Concluding message

Increase in the BNP level was closely related to decrease in the daytime urine volume, suggesting that in nocturnal polyuria patients with a high BNP level, water retained in the body during the daytime is excreted during the night to adjust the body fluid balance.

Fig 1 BNP and Daytime urine volume ($p=0.0011$)

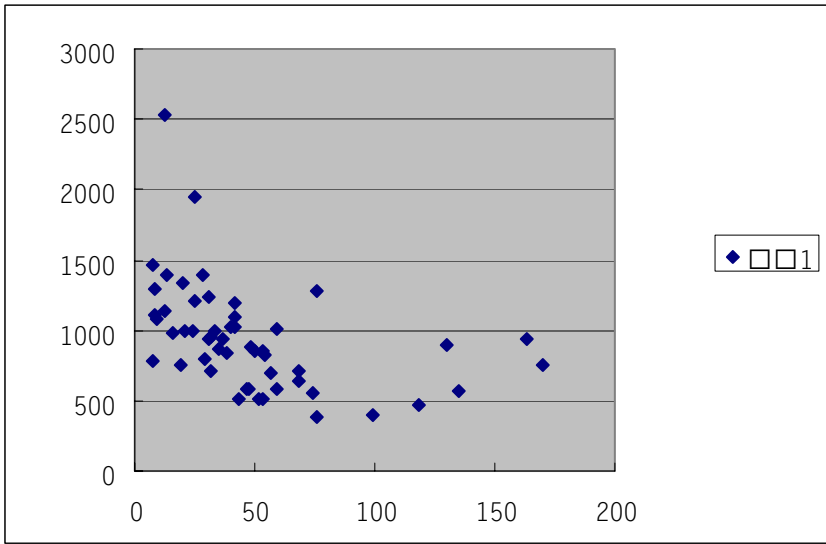


Fig 2 BNPO and Night/24-hour urine volume ratio(p=0.0093)

