

## Clinical Use of the Whole Body Counter at Kyoto University (Measurements of total body potassium and $^{137}\text{Cs}$ contents in normal and diseased subjects)

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Total body content of  $^{40}\text{K}$  and  $^{137}\text{Cs}$  were measured in 297 cases of normal subjects and cases with various conditions by using whole body counter.

The methods and calculation procedure were reported previously, and results were as follows.

### (A) Normal Subjects

One hundred thirty one cases ages ranged from 11 to 76 were served as normal controls, 59 cases of them were male and 72 cases were female.

Total body potassium contents (TBK) were related to sex, age and body weight.

TBK of male subjects was  $119.3 \pm 24.0$  gk and higher than those of female subjects ( $82.7 \pm 13.5$  gk). TBK of teens and the aged were lower than those of adults, and a good correlation ( $r=0.75$ ) was observed between TBK and body weight (BW).

Then, total body potassium concentration (TBK/BW) were compared by age.

TBK/BK of male and female subjects were  $2.08 \pm 0.08$  and  $1.75 \pm 0.04$  gk/kg, respectively.

TBK/BW was highest in high teen group and thereafter it declined gradually by aging, and rapid fall was observed in subjects over 60 years old.

Almost the same tendencies were observed in  $^{137}\text{Cs}$  contents in the body, and total body  $^{137}\text{Cs}$  concentrations of normal subjects were  $0.202 \pm 0.068$   $\mu\text{Ci/kg}$  in male and  $0.145 \pm 0.065$   $\mu\text{Ci/kg}$  in female subjects.

### (B) Cases with various conditions

TBK/BW of 165 cases with various conditions were compared with of normal subjects.

In the cases with neuromuscular diseases, TBK/BW was significantly lower, and in most cases of muscle dystrophy and some of neurogenic muscle atrophy it was distinctly lower but in patients with myasthenia gravis it remained within the normal range.

In the cases with hyperthyroidism, TBK/BW was also significantly lower and in some euthyroid instances at 2 to 4 months after  $^{131}\text{I}$  treatment it did not show apparent elevation. In the cases with thyroid disorders other than hypothyroidism, it remained within the normal range.

In the cases with diabetes mellitus, hypertension and congestive heart failure, TBK/BW remained within the normal range.

In 4 cases with anemia including 2 cases of myelogenous leukaemia, it was significantly higher.

In the cases with renal disorders, TBK/BW was a little higher in most cases of glomerulonephritis, but in the cases with uremia it was not so higher and in 3 cases of them it was found to decrease by the progress of illness.

In the cases with various endocrine disorders, TBK/BK was higher in Addison's disease, primary aldosteronism, pheochromocytoma, adrenal cancer and tetany, and lower in Cushing's syndrome, Sheehan's syndrome and other hypopituitarism, and obesity. A high valued care of adrenal cancer was also associated with aldosteronism and TBK/BW fell down into the normal range after operation.

In the cases with various disease treated heavily by glucocorticoid, TBK/BW was significantly lower.

No correlation was found between serum potassium concentration and total body potassium concentration throughout the normal subjects and the diseased.

The above mentioned results should be very meaningful but some of them have a little discrepancies from our former conceptions. Further investigations with metabolic examination are needed to dissolve such problems.