

Total Body Potassium in the Chronic Fatigue Syndrome

Richard B. Burnet, Barry E. Chatterton, Robert D. Gaffney, Garry C. Scroop.

Endocrine and Metabolic Unit
Royal Adelaide Hospital (R.B.B)

Exercise Physiology Research Unit
Department of Physiology
University of Adelaide (G.C.S)

Department of Nuclear Medicine
Royal Adelaide Hospital (B.E.C, R.D.G)

Normal potassium levels (both intra and extracellular) are essential for initiating a full muscle contraction and neural transmission. Approximately 80% of the body potassium is found in muscle and a further 10% in the brain. The remainder is in the blood stream and other organs. Potassium is primarily an intra cellular ion.

A number of medical conditions that cause low potassium are associated with fatigue. Previous studies in Chronic Fatigue Syndrome (CFS) have not demonstrated an abnormality in the level of serum potassium but the present studies have concentrated on intra-cellular potassium and its relationship with CFS.

An initial study of Total Body Potassium (TBK) measured by whole body counting in 20 matched pairs of patients and controls matched for age weight and sex showed that there was a significant decrease in the values of the those persons who had CFS as defined by the British, Australian and American clinical criteria. Eight pairs subjects in this study had a whole body DEXA scan which showed no significant difference in the amount of lean body mass or total bone mass. There was overlap in the levels of TBK in patients with CFS and controls so further investigations were undertaken to define the abnormality.

Patients with CFS were divided into two groups, those with fatigue symptoms only and those patients who had a mixed symptomatology of fatigue and myalgia. This was defined by patient assessment of their disability at the medical consultation.

Fifty-one subjects with CFS only (29) or myalgia/fatigue (22) were studied with a TBK a full biochemical profile and the results were analysed for these 2 groups. The CFS group with fatigue only, showed a significant reduction in the level of TBK and in one half of these the reduction in TBK was greater than 10% of the normal

estimated for age weight and sex. The serum potassium levels were normal in all subjects.

In the myalgic group there was no reduction in TBK. There was no correlation of the TBK with age, sex, duration of illness, reduction in daily living activities and time for recovery from exercise. Nor was there any correlation with any allergic symptomatology or recurrent chronic infections. There was a strong inverse correlation of the TBK and the total time spent resting ($p=0.02$).

These investigations show that in approximately 50% of subjects with CFS where fatigue is the primary symptom there is a significant reduction in the level of TBK. This decrease in TBK is not found if there are myalgic symptoms even if there is associated fatigue.

Longer term studies are needed to define this abnormality further, whether it fluctuates with the disease and its progression is unknown.

This finding of a lowered TBK has great significance as a possible marker of CFS with fatigue and also points a way to improving therapy by determining the effects of normalising the intracellular potassium.