Serum Myostatin Levels and Grip Strength in Normal Subjects and Patients on Maintenance Haemodialysis

Han DS, Chen YM, Lin SY, Chang HH, Huang TM, Chi YC, Yang WS.

From the Departments of Physical Medicine and Rehabilitation, Internal Medicine, Family Medicine, National Taiwan University Hospital BeiHu Branch, Taipei; Department of Internal Medicine, National Taiwan University Hospital, Taipei; Graduate Institute of Clinical Medicine, College of Medicine, Taipei; Research Centre for Developmental Biology and Regenerative Medicine, National Taiwan University, Taipei, Taiwan.

*correspondence to Dr. Wei-Shiung Yang. wsyang@ntu.edu.tw

Clin Endocrinol (Oxf), in press.

ABSTRACT

Objective: Myostatin, a negative regulator of skeletal muscle growth, may modulate grip strength, an indicator of muscle function. Its serum levels could be modulated by maintenance haemodialysis (MHD).

Design: A descriptive cross-sectional study. Patients: Forty-one normal controls and 60 MHD patients using different dialyzers at a medical centre. Measurements: The grip strength of the dominant hand, body composition, and the pre-dialysis and post-dialysis serum myostatin and IGF-1 levels were measured.

Results: The MHD patients had lower body mass index, IGF-1 level, and grip strength than the normal controls. The patients using the high-flux dialyzer had better grip strength than those using the low-flux (25.5 vs. 19.2 kg). The pre-dialysis myostatin level was higher in low-flux dialyzer than high-flux (31.0 vs. 18.5 ug/ml). Interestingly, the high-flux dialyzer reduced the serum myostatin by 36%, whereas low-flux dialyzer increased it by 25%. The myostatin was inversely related to age and the use of high-flux dialyzer. Furthermore, the grip strength was negatively related to age, female gender, muscle mass, myostatin levels and haemodialysis, but positively to the use of high-flux dialyzer in linear regression. The risk of low grip strength was 7.6 times higher in those with higher serum myostatin with the adjustment of age, gender, muscle mass, haemodialysis and mode of dialysis in a logistic regression.

Conclusions: The mode of dialyzer modulates the blood levels of myostatin. Higher myostatin is associated with lower muscle
function. The use of myostatin assay in various clinical settings merits further investigation.

(The accelerator-brake model proposed in the paper)

Figure 1