

Nutritional status in peritoneal dialysis: studies in body composition, lipoprotein metabolism and peritoneal function.

Johansson AC.

Department of Nephrology, Institute of Internal Medicine, Goteborg University, Sweden.

This thesis is based on clinical studies including virtually all patients treated with peritoneal dialysis in Gothenburg during the 1990s.

The patients had a fundamentally altered body composition compared to healthy subjects, characterised by a reduction in body cell mass and body fat already at start of dialysis.

During PD treatment, a further decrease in body cell mass was observed. Energy stores tended to normalise during the first years of treatment and remained constant thereafter, or declined subsequently. Extracellular water, calculated from the four-compartment model, was increased when patients started PD treatment and increased further, in parallel to the reduction in body cell mass. These alterations were seen in combination with a normal or slightly reduced, body weight.

Standard methods of assessing nutritional status may therefore not be valid in the dialysis population. Prediction equations to estimate total body water, used in measurements of dialysis adequacy, give erroneous results in PD patients, as shown in a study on our PD population. This may have important clinical consequences, especially in wasted patients. Reduced muscle mass is a marker of protein-energy malnutrition, and therefore simple and reliable methods to measure muscle mass are warranted. When lean body mass was calculated from creatinine generation rate and compared to lean body mass estimated from measurements of total body potassium, the agreement between the two methods was low.

Furthermore, when repeated measurements of creatinine generation rate were performed, the variation coefficient was unacceptably high. Thus creatinine generation rate cannot be recommended as a method to evaluate somatic protein status in PD patients. The lipoprotein metabolic derangements are pronounced in PD patients in which a further increase in cholesterol and cholesterol-rich apoB-containing lipoproteins are added to the already pre-existing renal dyslipidemia characterised by increased concentration of triglycerides and triglyceride-rich complex lipoproteins.

There are indications that dialytic variables may influence this development. When peritoneal function was assessed by the Peritoneal Dialysis Capacity test at start of dialysis, it was observed that peritoneal function reflected patient characteristics and co-morbidity. Patients with systemic disease had enhanced diffusion capacity

compared to patients with primary renal disorders. Furthermore, in patients with more severe co-morbidity, peritoneal protein losses were increased.

Finally, elderly patients had ultrafiltration conditions that were different from those of younger patients. Peritoneal function remained essentially stable during medium-long term follow up. Body composition features in dialysis patients are similar to those seen in severe disease in general. Thus, it is difficult to separate the effects of malnutrition from the effects of the underlying disease. Specific standards for nutritional status adapted for patients with renal failure are required.