Malnutrition, chronic inflammation and atherosclerosis in dialysis patients

Sir,

The supplement volume of *Nephrology Dialysis Transplantation* on chronic inflammation, atherosclerosis and immunointervention in dialysis [1,2] has provided readers with an excellent review of this extremely important topic. We would like to contribute two further comments.

Firstly, Wanner and Metzger [1] have given a list of potential causes of high C-reactive protein (CRP) in dialysis patients. We would like to add that metastatic extra-vascular calcification in dialysis patients can also be associated with a systemic inflammatory state [3]. In fact, we reported a case of tumoral calcinosis associated with pyrexia and high CRP in a haemodialysis patient [4]. It is worth remembering this infrequent cause of ‘pro-inflammatory state’ in dialysis patients. Various therapeutic options for this condition would be: intensification of dialysis therapy with low calcium dialysate, aggressive management of hyperphosphataemia with dietary phosphate restriction and phosphate binders, parathyroidectomy, if appropriate, and renal transplantation. Bisphosphonate therapy could be considered in selected cases.

Secondly, we wish to comment on the treatment strategies that could be considered in dialysis patients with MIA (malnutrition, inflammation and atherosclerosis) syndrome [2]. Numerous studies have shown exercise training to be of benefit for dialysis patients [5]. In addition to its well-known beneficial effects on cardiovascular fitness and mortality [6], exercise also has an anabolic effect and has been shown to reduce muscular atrophy in dialysis patients [7]. This latter effect of exercise is, at least in part, probably due to its immunomodulatory effects, as aerobic exercise training has been shown to reduce elevated circulating tumour necrosis factor-α (TNF-α) levels concomitant with improvement in exercise capacity in patients with heart failure [8]. In addition, resistance exercise training has been shown to reduce skeletal muscle TNF-α protein and mRNA levels in frail elderly humans [9].

Studies such as these suggest that exercise training may have an anti-inflammatory effect and could play an important role in attenuating ‘pro-inflammatory cytokine’-induced muscle wasting and cardiovascular mortality in dialysis patients. Consequently, we feel that well-conducted studies on the effect of exercise training on pro-inflammatory cytokines, malnutrition and cardiovascular mortality in dialysis patients would be of immense value. Also, we feel that exercise rehabilitation should be considered an important intervention in the management of inflammation, malnutrition and cardiovascular disease in dialysis patients.