Vascular Calcification in Chronic Haemodialysis Patients

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Vascular calcification in patients with chronic kidney disease was mentioned for the first time in the 19th century when Virchow described the appearance of metastatic calcification in patients with kidney failure. The subject has gained great interest in recent years as many studies described that a high percentage of patients on chronic haemodialysis show vascular calcification, the extent of which correlated with the extent and severity of angiographically documented atherosclerosis lesions, which significantly increases cardiovascular mortality.[1,2] Cardiovascular disease and stroke are the leading causes of death in chronic haemodialysis patients, where its risk is 10 -20 times than in the age- and sex-matched general population.[3]

Vascular calcification can occur as a "normal" consequence of aging. In chronic haemodialysis patients, mineral metabolism abnormalities in the form of hyperphosphataemia, elevated calcium x phosphorus product, or calcium load in the form of phosphate binders have been emphasized as risk factors for vascular calcification.[3] Other risk factors, such as age, diabetes mellitus, dyslipidemia, hypertension and smoking, may play a role in vascular calcification.[4]

The population of diabetic patients has increased dramatically, and the leading cause of end-stage renal disease is diabetic nephropathy, in Japan, United States and Europe.[5] Diabetes was strongly associated with the prevalence of calcification, particularly in small calibre arteries. In fact, the risk of having any type of vascular calcification increased from 18 to 38 times in all comparisons carried out between diabetic and non-diabetic chronic haemodialysis patients.[4] It is very interesting to know the specific factors affecting vascular calcification in diabetic haemodialysis patients. Sutandar W found that diabetic haemodialysis patients may be more at risk for peripheral artery calcification, at lower serum calcium, phosphorus and calcium x phosphorus product, but Ishimura E et al showed that poor glycaemic control, rather than calcium and phosphate concentrations, is a predictor of peripheral vascular calcification in diabetic patients on haemodialysis.[5,6]

Attempts to lower calcification should have a beneficial effect on both cardiovascular and overall survival in chronic haemodialysis patients. In daily practice there is a list of modifiable factors that can be controlled adequately to reduce vascular calcification. Because of the high prevalence of hyperphosphatemia in chronic haemodialysis patients and the implications of high phosphate in vascular events and in the pathogenesis of secondary hyperparathyroidism, most strategies have concentrated on the control of serum phosphorus. In this regard, the role of non-calcium phosphate binders should be explored further. Diabetes is a significant independent risk factor for increased vascular calcification and the glycaemic control remains critical in diabetic patients on chronic haemodialysis.

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