PREVALENCE OF HYPERCALCEMIA AND ITS POSSIBLE ASSOCIATIONS IN CHRONIC HEMODIALYSIS PATIENTS AT AIN SHAMS UNIVERSITY HOSPITALS

Thesis

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Protocol

Introduction

Abnormal mineral metabolism in patients with end stage renal disease ESRD is associated with bone and cardiovascular disease. Serum measurements of calcium , phosphorus, and parathyroid hormone (PTH) is associated directly with bone disease, cardiovascular outcomes, and mortality.(1)

Secondary hyperparathyroidism is common in patients with chronic kidney disease, affecting most of those who are receiving hemodialysis.(2)

Bone disease is the most widely recognized consequence of secondary hyperparathyroidism. Several reports indicate, however, that alterations in calcium and phosphorus metabolism, as a result of either secondary hyperparathyroidism or the therapeutic measures used to manage it, contribute to soft-tissue and vascular calcification, cardiovascular disease, and the risk of death.(3,4)

Episodes of hypercalcemia and hyperphosphatemia are often aggravated by the use of large doses of calcium as a phosphate-binding agent, particularly in combination with vitamin D sterols, which increase the absorption of calcium and phosphorus.(5)

Vascular calcification, a widely recognized and common complication of chronic kidney disease (CKD), increases the risk for cardiovascular morbidity and mortality. Although the causes of vascular calcification in CKD remain to be elucidated, associated risk factors include age, hypertension, time on dialysis, and abnormalities in calcium

(Ca) and phosphorus (P) metabolism, resulting in a raised serum Ca-P product (Ca x P).(6)

Anaemia accompanies abnormal mineral metabolism during progressive renal failure, largely due to erythropoietin deficiency, marrow fibrosis, blood loss, malnutrition and shortened red blood cell survival. Several investigators have suggested a link between mineral metabolism and anaemia .Hyperparathyroidism is usually listed as a contributor to renal anaemia and as a possible reason for impaired response to recombinant human erythropoietin (rHuEpo) in patients with renal disease. Possible pathogenic links between anaemia and iPTH include reduced erythropoiesis due to calcitriol deficiency, direct or indirect effects of iPTH on erythropoietin release and shortened red blood cell survival.(7)

Left ventricular hypertrophy is very common in both predialysis and postdialysis patients. It occurs secondery to pressure overload from hypertension, stiffened blood vessels, or aortic valve stenosis. Disordered mineral metabolism has also been associated with left ventricular hypertrophy with identified risk factors including elevated calcium phosphate product, and elevated serum parathyroid hormone. Left ventricular hypertrophy is seen most frequently in ESRD and, together with increased cardiomyocyte Ca^{++} content, contributes to systolic and diastolic dysfunction, myocardial ischemia, and increased cardiac mortality in ESRD.(8)

The mechanisms by which hyperparathyroidism could favor LVH are theoretically several and include direct trophic effects on myocardial myocytes and on interstitial fibroblasts and indirect effects such as an increase in blood pressure via hypercalcemia, anemia, and large and small vessel changes.(9)

Aim of the work:

The aim of this thesis is to define the prevalence of hypercalcemia and its possible associations in hemodialysis patients in Ain shams university hospitals.

Patients & methods:

Our study will include all patients receving regular hemodialysis in Ain shams university hospital & Ain shams specialized hospital

All patients will be subjected to the following:

Full history and clinical examination stressing on:

- Hemodialysis duration.
- Etiology of chronic renal failure.
- Drug history.

Laboratory investigations including:

- Serum creatinine.
- Blood urea nitrogen.
- Calcium.
- Albumin.
- Phosphrous.
- Alkaline phosphatase.
- Parathyroid hormone .

Exclusion criteria:

Patients on hemodialysis less than three months duration.

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List of Abbreviations

1,25(OH)2D3	1,25-dihydroxy calcitriol
Ca	Calcium
Ca × P	calcium-phosphorus product
CaR	calcium sensing receptor
CKD	Chronic kidney disease
CRF	chronic renal failure
CRI	Chronic renal insufficiency
CVD	Cardiovascular disease
CUA	Calcific uremic arteriolopathy
DOPPS	Dialysis Outcomes and Practice Pattern Study
ESRD	End stage renal disease
FDA	Food and drug administration
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HDF	haemodiafiltration
iPTH	Intact parathyroid hormone
K/DOQI	Kidney Disease Outcomes and Quality Initiative
LDL	Low density lipoproteins
LHD	long haemodialysis
NDHD	nocturnal daily haemodialysis
NKF	National Kidney Foundation
nPCR	Normalized protein catabolic rate
P	Phosphorous
QB	Pump speed
rHuEpo	Recombinant human erythropoietin
RXR	retinoid X receptor
SDHD	short daily haemodialysis
SHPT	Secondary hyperparathyroidism
VDR	vitamin D receptor
VDRE	vitamin D response element

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