Study of effect of dialysate calcium concentration on cardiac arrhythmia in prevalent hemodialysis patients

Thesis

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List of Abbreviations

ACE-I	Angiotensin Converting Enzyme Inhibitor
ACS	Acute Coronary Syndrome
AES	atrial extrasystole
AF	Atrial Fibrillation
AHD	Atherosclerotic Heart Disease
AMI	Acute Myocardial Infarction
ARBs	Angiotensin Receptor Blockers
AVC	Aortic Valve Calcification
AVC	Aortic valve calcification
BD	bicarbonate dialysis
BP	blood pressure
Ca2+	Ionized calcium
CAD	Coronary Artery Disease
CBC	complete blood picture
CHF	Congestive Heart Faliure
CKD	Choronic Kidney Disease
CVD	Cardiovascular Disease
ECG	Electrocardiographic

ESRD	End-Stage Renal Disease
GN	glomerulonephritis
HCV	hepatitis C virus infection
HD	Hemodialysis
HTN	Hypertension
IDH	intradialytic hypotention
IHD	Ischemic Heart Disease
K/DOQI	Kidney Disease Outcomes Quality Initiative
K+	Potassium
LVH	Left Ventricular Hypertrophy
LVPs	Late ventricular potentials
MAC	Mitral annular calcification
Mg	Magnesium
MI	Myocardial Infarction
Na+	sodium
NO	nitric oxide
PTH	parathyroid hormone
P-wave SAECG	P-wave signal-averaged electrocardiogram
QTc	Corrected QT dispertion
QTd	QT dispertion

RRT	Renal Replacement Therapy
SCA	sudden cardiac arrest
SCD	sudden cardiac death
SD	standard deviation
TPN	Total Parentral Nutrition
USRDS	United States Renal Data System
VES	ventricular extrasystoles
VHD	Valvular Heart Disease

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INTRODUCTION

Cardiovascular mortality is considered the main cause of death in patients receiving dialysis and is 10 to 20 times higher in such patients than in the general population **(Dinanda et al., 2009).**

It is appreciated and accepted that this mortality may be due in part to the presence of excess vascular calcification, particularly in the form of extensive coronary artery calcification, which can be observed even in very young dialysis patients**(Behdad et al., 2012).**

Published guidelines suggest that calcium dialysate concentrations should be lowered as a means of controlling vascular complications and soft tissue calcification. However, this adjustment is likely to worsen the prolongation of QT intervals, which has been acknowledged as a source of increased risk for ventricular tachyarrhythmias and sudden death. The clinical trials showed that low calcium concentrations in dialysate can be a promoter of arrhythmias and are associated with increased risk for sudden cardiac arrest **(Franklin 2011).**

There is no consensus regarding the optimal dialysate calcium concentration during haemodialysis. Low dialysate calcium concentration may predispose to acute arrhythmias, whereas high dialysate calcium concentration increases the long-term risk of soft tissue calcifications **(Gianmario et al., 2011).**

The choice of the dialysate calcium will depend on several factors, including parathyroid hormone status and vitamin D status, type and severity of concomitant bone disease, presence or absence of arterial calcification, dietary habits, therapeutic treatment and dialysis modality. From a practical point of view, a relatively high dialysate calcium concentration in the range of of 1.50-1.75 mmol/L (3.0-3.5 mEq/L) should probably be preferred in haemodialysis patients with high serum PTH levels who are not prescribed calcium-based phosphate binders or high doses of active vitamin D sterols, and in those who are receiving a calcimimetic. In those who are treated with high doses of calcium-based binders and/or active vitamin D derivatives or who have a very low serum PTH level, the optimal dialysate calcium concentration is probably lower, in the range of 1.25-1.50 mmol/L (2.50-3.0 mEq/L)**(Drüeke and Touam 2009).**

AIM OF THE WORK

The aim of the study is to assess the possible effect of dialysate calcium concentration on cardiac arrhythmia in prevalent hemodialysis patients.

Review of Literature