Angiopoietin-2 and Vascular Disease in Patients with Chronic Renal Failure on Regular Hemodialysis.

Thesis

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Abstract

Atherosclerosis is common in patients with chronic kidney disease (CKD), and cardiovascular disease (CVD) represents a major cause of death **.**

Accelerated atherosclerosis in patients with chronic kidney disease (CKD) is still incompletely understood.

Recently, the balance between Ang-1 and Ang-2 has been found in favor of Ang-2 in atherosclerotic plaques **.**

The aim of this study was to detect the relation between serum level of angiopoietin-2 and atherosclerosis detected by carotid intima-media thickness (CIMT) in patients with end-stage renal disease (ESRD) on regular hemodialysis.

Our study included 40 end-stage renal disease (ESRD) patients on regular hemodialysis treatment using low flux membrane dialyzers and A-V shunts as vascular access for hemodialysis.

We found that Serum Angiopoietin-2 was increased in ESRD patients on HD compared with controls. Moreover, Angiopoietin-2 was found to be significantly correlated with CIMT indicating that it may play a role in development of atherosclerosis (detected by CIMT) in ESRD patients on HD.

Key words:

Chronic kidney disease, atherosclerosis, angiopoietin-2, hemodialysis

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List of abbreviations

ADMA: *Asymmetric dimethylarginine.*

Ang1: *Angiopoietin-1.*

Ang2: *Angiopoietin-2.*

AOPP: *Advanced oxidation protein products.*

ASE: *American Society of Echocardiography.*

BP: *Blood pressure.*

BTP: *Beta-Ttrace Protein.*

BUN: *Blood urea nitrogen.*

Ca: *Calcium.*

CAD: *coronary artery disease.*

CBC: *Complete blood count.*

CHF: *Congestive heart failure.*

CIMT: *Carotid artery intima-media thickness.*

CKD: *chronic kidney disease.*

CRF: *Chronic renal failure.*

CRP: *C-reactive protein.*

CVD: *Cerebrovascular disease.*

CysC: *Cystatin C.*

dsDNA*: double-stranded DNA.*

DTPA: *Diethylenetriamine pentaacetic acid.*

EGF: *Epidermal growth factor.*

ECs: *Endothelial cells.*

ESRD: *End-stage renal disease.*

FGFs: *Fibroblast growth factors.*

GFR: *Glomerular Filtration Rate.*

Hct: *Hematocrit.*

Hcys: *homocystine.*

HOMA: *Homeostasis model assessment method.*

HD: *Hemodialysis.*

HDL: *High density lipoprotein.*

Ig: *Immunoglobulin.*

IL: *Interleukin.*

IMT: *Intima-media thickness.*

kDa: *kilo Dalton.*

Kg: *kilogram.*

LDL: *Low-density lipoprotein.*

L-PGDS: *Lipocalin-type urinary prostaglandin D synthase.*

LV: *Left ventricle.*

LVH: *Left ventricular hypertrophy.*

MDRD*: Modification of Diet and Renal Diseases.*

MI: *Myocardial infarction.*

MPO: *Myeloperoxidase.*

NO: *Nitricoxide.*

P: *Phosphorus.*

PMA: *Phorbol 12-myristate 13-acetate*

PPV: *Positive predictive value.*

PTH: *Parathyroid hormone.*

PTX3: *Pentraxin-3.*

RRT: *Renal replacement therapy.*

RTKs: *Receptor tyrosine kinases.*

S.Cr: *serum creatinine.*

SD: *standard deviation.*

SLE: *systemic lupus erythromatosis.*

SNP: *Single nucleotide polymorphism.*

T3: *Triiodothyronine.*

Tc^{99m}*: technetium 99 metastable.*

TNF*: Tumor necrosis factor.*

U-alb: *Urinary albumin excretion.*

VCAM*: Vascular cell adhesion molecule.*

VEGF: *Vascular endothelial growth factor.*

WBC: *white blood cell count.*

WPB: *Weibel-Palade bodies*

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INTRODUCTION
&
AIM OF THE WORK

Introduction

Atherosclerosis is common in patients with chronic kidney disease (CKD), and cardiovascular disease (CVD) represents a major cause of death ***(Raine et al, 1992)***.

Accelerated atherosclerosis in patients with chronic kidney disease (CKD) is still incompletely understood.

The angiopoietins were originally discovered as ligands for Tie receptors, a family of receptor tyrosine kinases (RTKs) that are selectively expressed within the vascular endothelium ***(Beecken et al, 2000).***

The angiopoietins are protein growth factors that promote angiogenesis, the formation of blood vessels. There are now four identified angiopoietins: Ang1, Ang2, Ang3, Ang4 ***(Thurston G, 2003).***

Angiopoietin-1 (Ang-1) and Angiopoietin-2 (Ang-2) are antagonistic gatekeepers of endothelial activation and thus are potential important factors in accelerated atherosclerosis ***(Makinde 2008)***.

Recently, the balance between Ang-1 and Ang-2 has been found in favor of Ang-2 in atherosclerotic plaques ***(Post et al, 2008).***

Aim of the work

The aim of this study is to detect the relation between serum level of angiopoietin-2 and atherosclerosis detected by carotid intima-media thickness (CIMT) in patients with end-stage renal disease (ESRD) on regular hemodialysis.

Review of literature

CHRONIC KIDNEY DISEASE