

# **Prevalence of cerebrovascular accidents in patients under regular haemodialysis**

**Thesis**

Submitted for partial fulfillment of master degree of nephrology.

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"واتقوا الله و يعلم الله"

(البقرة : ٢٨٢ )

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## **List of Abbreviations**

ABI	Ankle Brachial Index
ACEI	Angiotensin Converting Enzyme Inhibitor
BMP	Bone Morphogenic Protein
Ca X Po <sub>2</sub>	Calcium Phosphorous
CAD	Coronary Artery Disease
cAMP	Cyclic Adenosine Monophosphate
CKD	Chronic Kidney Disease
CRP	C Reactive Protein
CVD	Cardiovascular Disease
DM	Diabetes Mellitus
DNHD	Daily Nocturnal Hemodialysis
DOPPS	Dialysis Outcomes and Practice Patterns Study
DRG	Diagnosis Related Group
e GFR	Estimated Glomerular Filtration Rate
EBCT	Electron Beam Computed Tomography
EKG	Electrocardiogram
ESKD	End Stage Kidney Disease
ESRD	End Stage Renal Disease
GFR	Glomerular Filtration Rate
GN	Glomerulonephritis

Hcy	Homocysteine
HDL-C	High Density Lipoprotein Cholesterol
HTN	Hypertension
IC	Intermittent Claudication
LDL-C	Low Density Lipoprotein Cholesterol
Lp(a)	Lipoprotein A
LVH	Left Ventricular Hypertrophy
MI	Myocardial Infarction
MSCT	Multi-Slice Computed Tomography
NCEP	National Cholesterol Education Program
PAD	Peripheral Arterial Disease
PAOD	Peripheral Arterial Occlusive Disease
PPG	Photo Plethysmograph
PVD	Peripheral Vascular Disease
RAS	Renin Angiotensin System
RRT	Renal Replacement Therapy
SHARP	Study Of Heart And Renal Protection
SPP	Skin Perfusion Pressure
TBI	Toe Brachial Index
TCOM	Transcutaneous Oxygen Monitoring
TCPO <sub>2</sub>	Transcutaneous Partial Oxygen Pressure
VSMC	Vascular Smooth Muscle Cells

# **Introduction**

## **and**

### **Aim of work**

## **Introduction**

Cerebral and peripheral vascular diseases are important causes of morbidity and mortality in patients with renal failure. Stroke is not uncommon in the dialysis population as hypertension is the major risk factor of Cerebral vascular disease, hypotensive episodes on hemodialysis can also precipitate cerebrovascular events. ( **Oxford handbook of dialysis, second edition ٢٠٠٤**)

Patients at most risk are those with poorly controlled hypertension, diabetes, the elderly ,smokers and those with other vascular diseases. ( **Oxford handbook of dialysis, second edition ٢٠٠٤**)

In a study done by Collins AJ, et al.٢٠٠٨, concerning causes of death in patients on hemodialysis, showed that the causes of death were : infection (٤٣,٨%), cardiovascular diseases (٢١,٩), and cerebrovascular accidents (٩,٤%). ( **Collins , et al. United States Renal Data, ٢٠٠٨**)

During a hemodialysis session, some patients gets higher blood pressure than the beginning one & others gets lower blood pressure than the beginning one. The first type can be caused by mechanical effect of dialysis machine & sympathetic stimulation. High levels of hypertension with the used heparin may lead to cerebrovascular accident ( stroke). the second type can be caused by over drainage of patient's fluid leading to hypotension.( **Oxford handbook of dialysis, second edition ٢٠٠٤**)

Hypertension in chronic hemodialysis patients contributes significantly to their morbidity and mortality. Epidemiological studies have consistently shown that although treated, blood pressure frequently remains inadequately controlled in a high proportion of hemodialysis patients. ( **Cheigh, et al., ١٩٩٢**)

Air embolism during hemodialysis session is rare, as air detectors will clamp venous blood lines if air is detected in the return circuit. In sitting position, air tends to move upwards into cerebral venous circulation and may cause fitting and coma .( **Oxford handbook of dialysis, second edition ٢٠٠٤**)

Diagnostic testing for a stroke includes imaging tests, such as a CT or MRI and cerebral angiogram of the brain. A cerebral angiogram is an imaging test that reveals obstructed or narrowed arteries in the brain and can show blood flow or obstruction through the arteries ( **United States Renal Data System ٢٠٠٨ Am J Kidney Dis.**)

Management of stroke occurred in patient on hemodialysis is **the same** as for other patients. A CT scan should be performed before the next hemodialysis session to avoid the use of heparin if there has been a cerebral hemorrhage. Heparin should probably also be avoided after an ischemic stroke to prevent hemorrhagic conversion.( **Oxford handbook of dialysis, second edition ٢٠٠٤**)

Concerning prognosis of stroke , no decision on the long-term outcome should be made immediately, as the prognosis is very variable.( **Oxford handbook of dialysis, second edition ٢٠٠٤**)

## **Aim of work**

To study the prevalence of cerebrovascular accidents in patients under regular hemodialysis & its relation to factors related to dialysis e.g. ( Heparin – blood flow rate on machine – lines ).

# Chapter I

Review of Vascular diseases and its implications in patients with CKD.

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