Incidence of Persistent Atrial Fibrillation in Haemodialysis Patients

Thesis

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List of Abbreviations

Abb.	Full term
ACEIs	Angiotensin converting enzyme inhibitors
ACS	Acute coronary syndrome
AF	Atrial fibrillation
AV	Arterio venous
AV	Atrio ventricular
AVF	Arterio venous fistula
BMI	Body mass index
CABG	Coronary arteries bypass graft
CAD	Coronary artery disease
CI	Confidence interval
CIEDs	Cardiac implantable electronic devices
CIN	Contrast induced nephropathy
CKD	Chronic kidney disease
CRP	C - reactive protein
CV	Cardiovascular
CVD	Cardiovascular disease
D.M	Diabetes mellitus
eGFR	Estimated glomerular filtration rate
ESKD	End stage kidney disease
ESRD	End stage renal disease
EUHRA	European heart and rhythm association
FGF	Fibroblast growth factor
GN	Glomerulonephritis
HBg	Hemoglobin
HD	Hemodialysis
HDL	High density lipoprotein
HR	Hazardous ratio
HTN	Hypertension

ICD	Implantable cardioverter-defibrillator
IDH	Intradialytic hypertension
IDH	Ischemic heart diseases
IHD	Ischemic heart disease
IL-6	Interleukin 6
IV	Intra venous
LT	Left
LV	Left ventricle
LVH	Left ventricular hypertrophy
LVH	Left ventricular hypertrophy
MIA	Malnutrition, inflammation, atherosclerosis
MW	Molecular weight
NSTE ACS	Non ST elevation acute coronary syndrome
OAC	Oral anticoagulant
OR	Odds ratio
PTH	Parathyroid hormone
RCC	Renal cell carcinoma
RR	Risk ratio
RRT	Renal replacement therapy
S.Ca	Serum calcium
S.K	Serum potassium
S.Mg	Serum magnesium
S.Na	Serum sodium
S.PO4	Serum phosphorus
SCD	Sudden cardiac death
SHARP	Study of heart and renal protection
STEMI ST	Segment elevation myocardial infarction
TIA	Transient ischemic attack
TNF	Tumor necrosis factor
USRDS	United states renal data system
V.T	Ventricular tachycardia
VKAs	Vitamin k antagonists

INTRODUCTION

Chronic kidney disease patients usually experienced several comorbid conditions including cardiovascular disorders and at final end-stage renal disease (ESRD) stage, cardiovascular mortality accounts for about 50% of total mortality .End-stage renal disease (ESRD) patients commonly have a higher risk of developing cardiovascular diseases than general population. Chronic kidney disease is an independent risk factor for atrial fibrillation (AF); however, little is known about the AF risk among ESRD patients with various modalities of renal replacement therapy ***(Chen et al., 2016).***

Atrial fibrillation (AF), the most common sustained arrhythmia in clinical practice ***(Tsagalis et al., 2011).*** Atrial fibrillation is a serious problem, especially in patients on dialysis. The prevalence of AF in this group of patients is higher than in general population and associated with increased mortality ***(Franczyk et al., 2017).***

Haemodialysis (HD) is associated with cardiovascular structural modifications; moreover, during HD, rapid electrolytic changes occur. Both factors may favour the onset of atrial fibrillation ***(Simonetha et al., 2005).***

Factors contributing to the occurrence of AF in patients undergoing dialysis include: age, presence of coronary heart disease, echocardiographic abnormalities (low ejection fraction,

atrial enlargement, valvular calcification, left ventricular hypertrophy), heart failure, chronic obstructive pulmonary disease, hypertension, stroke, malnutrition (low levels of albumin, total cholesterol and high-density lipoprotein (HDL), secondary hyperparathyroidism, low pre dialysis systolic blood pressure, duration of renal replacement therapy as well as the method of renal replacement therapy (more frequent in haemodialysis patients) ***(Franczyk et al., 2016).***

Patients who have both atrial fibrillation (AF) and renal failure have an increased risk of thrombo-embolism. Renal failure is also a risk factor for bleeding, which makes decisions regarding thrombo prophylaxis complicated ***(Leif et al., 2015)***.

Clinical trial data support the use of anticoagulant agents to prevent stroke in AF patients. Although several guidelines recommend anticoagulant use for stroke prevention as the primary management for patients with AF, it is controversial in haemodialysis patients with AF ***(Hasegawa et al., 2016).***

In routine practice, warfarin is widely used in dialysis patients with atrial fibrillation (AF) for stroke prevention though the ratio of risks to benefits remains unclear. Recent cohort studies investigating the association between warfarin use and the risks of stroke and bleeding in dialysis patients with AF present conflicting results ***(Liu et al., 2015).***

Aim of the Work

To detect the incidence of AF in hemodialysis patients during six months.

CARDIOVASCULAR COMPLICATION IN HEMODIALYSIS PATIENTS

Hemodialysis is a process of removal of waste products and toxic substances from the body using an extracorporeal system. During the procedure, lots of hemodynamic and metabolic changes occur in the body as a result of which patients undergoing hemodialysis may suffer from complications both acutely during or just after dialysis as well as in long term. Hemodialysis is a complex procedure and can cause many complications most of which are not life threatening. With proper monitoring and immediate treatment these complications can be overcome without causing interruption in hemodialysis ***(Fatima et al., 2018).***

Cardiovascular problems are responsible for about 60% of mortality rate in patients with end stage renal disease under hemodialysis .Accelerated atherosclerosis is indeed more common in these patients compared to the normal population. Moreover, chronic inflammation may be an important risk factor of atherosclerosis, so inflammatory markers such as interlukin-6 (IL6) and C-reactive protein (CRP) could increase in hemodialysis patients. Duration of chronic kidney disease (CKD) or hemodialysis also may be a risk factor of cardiovascular and mortality in these patients. Diabetic nephropathy is cardinal cardiovascular risk factor in CKD and hemodialysis patients. Some other cardiovascular risk factors in

these patients would be secondary hyperparathyroidism and high Ca×P product, chronic hypertension, hyperlipidemia, long term anemia, large weight gain between dialysis sessions, and high cardiac output due to arterio venous fistulae. Hypertrophy of left ventricle and left ventricular dysfunction are shown poor prognostic factors that could increase morbidity and mortality in hemodialysis individuals ***(Momeni, 2016).***

Epidemiology:

It should now be clear that there is a close relationship between CKD and increased risk of cardiovascular disease: Major cardiac events actually represent almost 50 % of the causes of death in CKD patients In fact, we find a cardiovascular involvement in each stage of CKD, In part due to aging population, and in part linked to higher rates of diabetic, dyslipidemia and hypertensive patients among the CKD population ***(Di Lullo et al., 2015).***

Table (2): Cardiovascular risk according to chronic kidney disease stage

CKD stage	eGFR (ml/min/1.73 m^2)	Cardiovascular risk (odds ratio)
1	>90	0.5–0.8
2	60–89	1.5
3	30–59	2–4
4	15–29	4–10
5	<15	10–50
ESRD	RRT	20–1,000

CKD chronic kidney disease, *eGFR* estimated glomerular filtration rate, *ESRD* end-stage renal disease, *RRT* renal replacement therapy

Compared with renal transplant recipients, dialysis patients have significantly higher rates of all-cause mortality (6.3–8.2 vs 1.1–1.5 times greater than the normal population) [8] and a lower 5-year survival probability after the initiation of CVD (0.18 vs. 0.47) ***(Bethesda, 2007).***

Risk factors

The etiology and pathogenesis of the cardiovascular issues are multifactorial. Patients with chronic kidney disease (CKD) demonstrate altered pulmonary and cardiac status even

prior to beginning hemodialysis, as compared to non-CKD patients. Factors, other than the typical comorbidities, have been implicated as playing a role in the higher than expected rate of cardiovascular complications in the CKD population, including volume overload, anemia, and uremia. Interestingly, arterio- venous (AV) access construction is also associated with an increased risk of cardiovascular death. Renal transplant has been shown to drastically improve the clinical picture, even if the access is not ligated ***(Rivero et al., 2017).***

Nontraditional risk factors, including persistent low-grade inflammation, are critical in the pathogenesis of atherosclerosis, vascular calcification, and other causes of CVD and may also contribute to protein-energy wasting and other complications in chronic kidney disease (CKD) patients. Inflammatory biomarkers, such as high sensitivity C-reactive protein and interleukin-6, independently predict mortality in these patients. The causes of inflammation in CKD are multifactorial and include imbalance between increased production (due to multiple sources of inflammatory stimuli such as oxidative stress, acidosis, volume overload, co-morbidities, especially infections, genetic and epigenetic influences, and the dialysis procedure) and inadequate removal.

Patients with volume overload were found to use significantly more antihypertensive medications and diuretics but had higher systolic blood pressures and an increased arterial stiffness than patients without volume overload. In a