

# *Stroke and Atrial Fibrillation in Dialysis Population*

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## **Abstract**

***Introduction:*** *The dialysis population have a risk 5-10 fold higher for developing cardiovascular disease than age matched controls. Patients in dialysis have a risk for stroke 10 time more then the general population. Cardio-embolic stroke in dialysis population count a high percentage perhaps of the increased prevalence of atrial fibrillation.*

***Methods:*** *A search in the literature for different study who combined AF with chronic Kidney disease, dialysis and stroke. We compare it with our findings in a retrospective study from November 2008 to December 2019 which included 1732 patients. From analyzed data, 70 patients experienced a cerebrovascular event during this period. we compared data with a control group of 70 patients without stroke.*

***Results:*** *In our study 1732 patients who was treated in American Hospital during November 2008-december 2019 were observed. 70 patients had a cerebro-vascular*

accident (CVA). In 16 patients who experienced CVA, AF was present. In the control group AF was present in 7 patients.

**Discussion:** In different study the presence of AF at baseline it's more associated with a high mortality but there are no clear evidence of association between the presence of AF and stroke. The presence of AF represents a marker of comorbidity and advanced age rather than a cause of mortality. Its possible that hemodialysis –related AF may carry a lower risk of stroke than AF in general population.

**Key words:** atrial fibrillation, hemodialysis, stroke

## Introduction

For every 10 ml/min/1.73 m<sup>2</sup> reduction in glomerular filtration rate (GFR), the risk of stroke increases by 7% (11). For this reason Chronic Kidney Disease (CKD ) staging may also be a useful clinical tool for identifying people who may benefit most from interventions to reduce cardiovascular risk. (11) Patients on hemodialysis carries up a risk for stroke 10 time higher than those with normal function.(6). The risk factor for CVA in hemodialysis may differ when compared to the general population. Patients on dialysis and End stage Renal Disease, (ESRD) are at 5-10 fold higher risk for developing cardiovascular disease(CVD) than age matched controls(15). Clinically , CVD in this population manifests as coronary artery disease, arrhythmias, stroke or congestive heart failure. Beyond the traditional risk factors (Diabetes Mellitus and hypertension) uremia-specific factors that arise from accumulating toxins also contribute to the pathogenesis of CVD(15). Stroke risk in dialysis patients appears to be greater than that for CAD. The risk of stroke in ESRD is 5-10 time higher than general population (6). Whereas the relative risk of myocardial infarction in ESRD is 2.5-3 fold (16-7)

Risk appears to be proportionally increased for both ischemic and hemorrhagic strokes (7). Causes of hemorrhagic stroke may differ from ischemic stroke in patients in long term dialysis therapy and thus acquired risk factors could account for this later hemorrhagic stroke risk (7). Reason could include excess vascular calcification and stiffness,(18-19) leading to worsening hypertension. This combined with the use of anticoagulation on dialysis therapy, could increase hemorrhagic stroke (13)

Cardio-embolic strokes account for a relatively large proportion of ischemic strokes within the dialysis population (7), perhaps because of the increased prevalence of atrial fibrillation (15) . Cardio-embolic risk factors , in the CHOICE study, such as arrhythmias, left ventricular hypertrophy, valvular disease, and congestive heart failure, were not significantly different between individuals who experienced a cerebrovascular event versus those who did not , suggesting that

these aspects may not be correctly identified in dialysis patients (7). Measurement of cardiac function by echo-cardiography, chest radiography and physical examination is suggested for all patients before initiating hemodialysis therapy.

Having CKD/ESRD is associated with an increased prevalence of AF and vice versa (20). The prevalence of AF in patients with advanced CKD has been reported 4-21% and in dialysis patients 7-27 % (20). The presence of AF confers a high risk of stroke in patients with CKD and ESRD. (20).

Different studies have reported the incidence of AF in ESRD patients varying from 1.0 to 14.8 per 100 person-years (26-28-29) Goldstein et al (29) reported an AF incidence of 148/1000 person-years in a Medicare database with a total of 258,605 elderly ESRD patients. Wizemann et al (30) using the data from international Dialysis Outcomes and Practice Patterns Study to analyzed the incidence, prevalence, and outcomes of AF among HD patients. Age, gender, racial, and geographical factors might considerably influence the incidence of AF among different population studies

The decision to anticoagulate patients with AF and ESRD is much more controversial given the associated increased bleeding risk (21). Patients on hemodialysis are at particularly high risk of suffering a serious bleed, which may outweigh any stroke risk reduction conferred by anticoagulation (22). Furthermore, the risk for vascular calcification may be enhanced by warfarin use (21).

There are two different opinions on the use of anticoagulation in AF patients on dialysis: -is safe and beneficial the use (23) and the other that the risks are not justified given the poorly benefits that are documented (24). The second opinion is the one predominating

All the currently available non-vitamin-K-oral anticoagulation's have a degree of renal excretion, and all trials have excluded patients with advanced CKD (21). So this agents should be used as they were studied in their respective trials and should not be used in patients with advanced CKD (estimated GFR<30 ml/min/1.73m<sup>2</sup>) (25).

There have also been reports of worsening renal function in patients with CKD treated with aspirin (31).

As for the anticoagulation in AF, the decision to treat with antiplatelet agents to prevent ischemic stroke is probably best individualized.

## **Methods/ Results**

We conducted a retrospective, qualitative and descriptive study which involved 1732 patients treated frequently 3 times a week in 5 hemodialysis centers in American Hospital during November 2008 to December 2019. From the analyzed

data 70 patients experienced a cerebro-vascular accident during this period of time. We compared the data with a control group of 70 patients, from this population, without a stroke event.

## Discussions

There is evidence that there is no increased rate of stroke in patient with AF when compared with non AF on survival analysis (14). The presence of AF at baseline its more associated with a high mortality but there are no clear evidence of association between the presence of AF and stroke (14) the presence of AF represents a marker of comorbidity and advanced age rather than a cause of mortality (14). Hemodialysis favors the AF through rapid shifts in fluid and electrolytes (potassium), and episodes of AF are common during dialysis . Although hemodialysis-induced AF may contribute to the increase in stroke risk in those initiating dialysis, it must be acknowledged that patients are anticoagulated during their dialysis sessions. It is possible that hemodialysis – related AF may carry a lower risk of stroke than AF in general population.

With the recent emergence of novel oral anticoagulants, there is an urgent need for a better understanding of the complex inter-relationship among CKD, atrial fibrillation, stroke, and bleeding risk. This knowledge is paramount to optimize the potential benefits of treatment and minimize the potential harms in this very high-risk and growing population (21)

In our study we found that AF was present in 16 patient from the 70 patients who experienced stroke events. In the control group AF was present in 7 patients. The mean age of the stroke group was 57.6 years. AF in our stroke group its related with comorbidity and age. In the control group the mean age is 53.69 years and AF was presented in 7 patients.

The risk of stroke declined by 2 months after initiation of dialysis, then fluctuated and gradually stabilized at approximately twice the baseline rate 1 year after initiation (10)

Although AF has little to no impact on the risk of stroke in patients on dialysis, AF is associated with adverse events (26). AF is associated with all-cause mortality (hazard ratio, 1.32-1.82) and cardiovascular events (hazard ratio, 1.39-2.15) in patients on dialysis (26). Interestingly, in a study on this issue, the incidence of non-cardiovascular death has seemed higher in patients with AF (103.0 per 1,000 patient years) than in those without AF (37.9 per 1,000 patient years), although AF was found to not be associated with the risk of non-cardiovascular death in another study (26-27). The presence of AF may indicate a poor prognosis in patients on dialysis (26).

Clinical diagnosis of AF is largely based on electrocardiogram, so we believed our study could represent most of the AF population. Finally, our study lacked specific data on dialysis vintage, fluid management during dialysis sessions, and intradialytic hemodynamic change, and we did not analyzed specific medications which might influence AF in this population.

In conclusion, increased risk of AF is noted among ESRD patients on dialysis especially with certain comorbidities. Although we can only show a relationship, not causality, between dialysis and incident AF, this relationship is clinically crucial since it can help physicians to pay more attention on AF related morbidity and mortality among dialysis patients.

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