

Is Under-Diagnosis And Under-Recognition Of CKD Playing A Role In Higher Prevalence Of Atrial Fibrillation?

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Abstract

Chronic Kidney Disease and Atrial Fibrillation have high prevalence in elderly population and have bi-directional relationship. Baseline Kidney disease is a proven risk factor for subsequent Atrial fibrillation and baseline Atrial Fibrillation is a proven risk factor for subsequent chronic kidney disease. However Chronic Kidney Disease in elderly continues to be underrecognized, underdiagnosed and under treated. Subsequent to the diagnosis of CKD, measures should be employed to prevent the progression of CKD since delaying the progression of CKD could have a positive impact in the incidence of Atrial fibrillation.

INTRODUCTION

Chronic Kidney Disease (CKD) is common, but underrecognized in the health care system. Underrecognition of CKD leads to underdiagnosis and undertreatment with subsequent accelerated loss of kidney function and increased incidence of End Stage Renal Disease (ESRD)(1). Over the years, several studies have demonstrated the increased prevalence of Atrial Fibrillation in CKD patients with and without dialysis (2,3,4). The Niigata preventive medicine study by Hiroshi Watanabe et al demonstrated close bi-directional relationship between chronic kidney disease and atrial fibrillation. Despite this we see a substantial delay in the diagnosis of CKD especially in Stage 3 CKD (5). The focus of this article is to highlight the association between CKD and Atrial Fibrillation and insist on the importance of early diagnosis of CKD and evidence based interventions to delay the progression of CKD.

PREVALENCE OF CHRONIC KIDNEY DISEASE IN ELDERLY

Age presents one of the most important factors that affect kidney function. Generally, kidney function is stable after infancy until late adulthood (6). GFR declines by 1ml/min/1.73 M.SQ per year after the age of 30 years in healthy persons (7). The decline in kidney function is thought to be related to the aging associated structural changes in the kidney along with treatable conditions like diabetes and hypertension, which are the two most common causes of CKD (8). The prevalence of CKD increases with age in all populations, particularly among elderly people

aged 70 years or older.

Accurate detection of CKD in elderly is inadequate. In 2002 the kidney Disease Outcomes Quality Initiative (K/DOQI) of the National Kidney Foundation (NKF) developed a practice guideline for CKD (9). Based on this guideline, the median prevalence of CKD is estimated to be increasing with age from 7.2% in people aged 30 years to 35.8% in people aged 65 years or older (10).

The National Kidney Foundation Kidney Early Evaluation Program (KEEP), a free community screening program aimed at early detection of CKD among high-risk individuals estimates a prevalence rate of 26% in US and the same study in the rest of the world shows an estimate between 22% and 33%(11). The prevalence of CKD is even higher in elderly population with comorbid conditions. The KEEP study reported 44% prevalence of CKD in elderly patients with comorbid conditions (12). This is substantially high when compared to the younger population. CKD does disproportionately burden the elderly. CKD is becoming a major public health problem worldwide. The current burden of the disease might be due to a change of the underlying pathogenicity of CKD. Current evidence suggests that hypertension and diabetes are the two major causes of kidney diseases worldwide (13, 14).

DISEASE MAGNITUDE OF ATRIAL FIBRILLATION IN ELDERLY

The prevalence of Atrial fibrillation increases with age from about 5% in people aged 65 years to about 10 % in people

aged 80 years (15). The prevalence of atrial fibrillation is on the rise because of the aging population (16). By year 2050, there will be estimated 5.6 million people in the United States with atrial fibrillation (17). Nonvalvular atrial fibrillation increases the risk of ischemic stroke by approximately 5-fold and causes an estimated 15% of all strokes in the United States. In people aged 80 to 89 years, this proportion is even higher, approximately 24% (18)

ASSOCIATION OF CHRONIC KIDNEY DISEASE WITH ATRIAL FIBRILLATION

The increased incidence and prevalence of Atrial Fibrillation (AF) in dialysis patients is reported extensively in the medical literature (16,2,3,4). This association between Atrial fibrillation and CKD is not limited to dialysis patients alone but in all stages of CKD (19,20)

The Niigata preventive medicine study by Hiroshi Watanabe et al demonstrated close bidirectional relationship between chronic kidney disease and atrial fibrillation. Baseline kidney disease is a risk factor for subsequent new onset AF and baseline AF is a risk factor for subsequent development of chronic kidney disease (21). The incidence of AF increased as baseline GFR declined demonstrating a linear relationship. Although hypertension and diabetes are known as strong risk factors for subsequent AF and CKD (22,23,24,25), both associations are significant in subjects even without hypertension or diabetes. This association between CKD and Atrial fibrillation in nondialysis patients is established by Ananthapanyasut et al in the 'Prevalence of Atrial Fibrillation and its predictors in non dialysis patients' study as well (26). The older the age in people with CKD the greater the prevalence of Atrial Fibrillation (26)

In elderly, the association of atrial fibrillation and CKD poses some challenges in terms of treatment. The CHADS-2 score (CHF, Hypertension, Age>75, Diabetes Mellitus, Prior stroke or Transient Ischemic Attack) is a validated predictive instrument used to assess stroke in patients with Atrial Fibrillation (12) but this has not been studied in dialysis patients or ESRD (End Stage Renal Disease). Also studies such as Stroke Prevention and Atrial Fibrillation (SPAF) study III and Anticoagulation and Risk Factors in Atrial Fibrillation Study (ATRIA) which demonstrated the use of coumadin in Atrial fibrillation in lowering thromboembolic events with an acceptable risk of bleeding have excluded elderly patients with late-stage CKD (27,28).

EVIDENCE OF UNDER DIAGNOSIS OF CKD

1. Only 7% of medicare beneficiaries had claims with a CKD diagnosis while the prevalence is substantially high in the same group of population (11)
2. The Renal Detection and Referral Study (RADAR study) reported 75.3% of stage –3 CKD and 42.4% of stage-4 CKD as undiagnosed (29). This study shows there is a substantial degree of under diagnosis of kidney disease in general population.
3. Cohen et al reported underdiagnosis of CKD in the nursing home population. According to the study 15.7% of the nursing home population were under diagnosed and only 9.6% were diagnosed appropriately (30)
4. Due to the asymptomatic nature of this disease, CKD is not frequently detected until its later course, resulting in lost opportunities for prevention.

INTERVENTIONS FOR DELAYING THE PROGRESSION OF CKD IN ELDERLY

The major outcomes of CKD include progression to renal failure, complications of decreased kidney function and cardiovascular disease. The rate of progression of CKD is influenced by a wide variety of potentially modifiable risk factors, including blood pressure control (31-32-33); proteinuria (33); hyperglycemia (34); dietary intake; obesity; the activity of the rennin –angiotensin-aldosterone system (35,36,37); and smoking. Effective interventions at its early stage including prescribing ACE (Angiotensin Converting Enzyme Inhibitor) or ARB (Angiotensin Receptor Blocker), aggressively controlling blood pressure, advising tight glycemic control in people with diabetes, providing referral for dietary counseling, monitoring and treating cardiovascular risk factors (smoking, hypercholesterolemia, hypertension) have proven benefit (38).

CONCLUSION

Extensive review of the literature clearly demonstrates the bi-directional relationship of CKD and Atrial fibrillation. This relationship is significantly stronger in the elderly population. This could be secondary to the higher prevalence of both CKD and Atrial fibrillation in elderly. Although hypertension and diabetes are known as strong risk factors

for subsequent AF and CKD, both associations are significant in subjects even without hypertension or diabetes. With the evidence available at this point in time it is definitely appropriate to assume that under diagnosis of CKD is contributing to the increased incidence of Atrial Fibrillation.

Our efforts should now be focused on early detection of CKD. In 2002 the kidney Disease Outcomes Quality Initiative (K/DOQI) of the National Kidney Foundation (NKF) developed a practice guideline for diagnosing CKD. According to this guideline, CKD is defined as either kidney damage or glomerular filtration rate (GFR) below 60ml/min/1.73 m.sq. Unfortunately despite the presence of clear guidelines, CKD continues to be underdiagnosed. To overcome this, a comprehensive strategy needs to be employed.

1. Primary care physicians should rely on estimated GFR for kidney function assessment.
2. CKD screening strategies for high-risk patients

with diabetes and hypertension should be employed.

3. In early CKD stages, focus on good glycemic control and use ACE inhibitor/ARB to delay the progression of CKD.
4. Early nephrology consultation when the etiology of CKD is not clearly defined and in cases of rapidly worsening CKD.

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References

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