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Review Article

A literature review about cardiovascular risk in patients with kidney disease

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ABSTRACT

More than 700 million individuals are thought to have chronic kidney disease (CKD) globally, and the incidence is continuing to rise as a result of an aging population and the spread of chronic illnesses like diabetes and hypertension. The most common cause of morbidity and death in nephropathy patients is cardiovascular disease. In clinical practice, managing nephropathy and cardiovascular risk in nephropathic patients is a significant problem. Each patient needs a thorough examination and specialized treatment. To lower the risk of cardiovascular events in nephropathy patients, cardiovascular risk factors must be prevented and promptly treated. To increase the quality of life and survival of nephropathic patients, it is crucial to recognize and treat cardiovascular problems.

Keywords: Kidney, Cardiovascular risk, Risk factors

INTRODUCTION

Millions of individuals throughout the world suffer from the prevalent clinical illness known as chronic kidney disease (CKD). More than 700 million individuals are thought to have CKD globally, and the incidence is continuing to rise as a result of an aging population and the spread of chronic illnesses like diabetes and hypertension. Numerous illnesses, including diabetes, hypertension, autoimmune conditions, and infections, can lead to nephropathy.[1-3]

The most common cause of morbidity and death in nephropathy patients is cardiovascular disease. Nephropathy patients are more likely to develop peripheral vascular disease, cerebrovascular illness, and coronary heart disease. This connection has a complicated underlying etiology that includes a number of cardiovascular risk factors, such as hypertension, dyslipidemia, persistent inflammation, and endothelial dysfunction.[4]

Therefore, it is crucial to properly diagnose and treat cardiovascular risk in order to lower cardiovascular morbidity and mortality and enhance the quality of life for nephropathy patients. To stop renal disease from progressing and lower cardiovascular risk in nephropathy patients, early identification of cardiovascular risk factors and proper treatments are essential.[5]

The most important elements of cardiovascular risk in nephropathic patients will be covered in this literature review article, including its epidemiology, clinical importance, cardiovascular pathophysiology, screening, therapy, and consequences. Current guidelines for the management of cardiovascular risk in patients with nephropathy will be emphasized after a review of the most recent data in the medical literature.

METHODS

To carry out this literature review, we searched the MEDLINE and PubMed databases using the MeSH terms "chronic kidney disease", "nephropathy", "cardiovascular

risk" and "cardiovascular disease". We included human studies published in English in peer-reviewed medical journals between 2010 and 2022.

Cardiovascular pathophysiology in renal patients

Numerous pathophysiological alterations linked to nephropathy enhance these individuals' risk of cardiovascular disease. In addition to proteinuria, decreased glomerular filtration rate (GFR) can also result in endothelial dysfunction, chronic inflammation, and renin-angiotensin-aldosterone system (RAAS) activation. Nitric oxide production is reduced and reactive oxygen species are produced more often in endothelial dysfunction, which speeds up the development of atherosclerosis. Chronic inflammation, which is linked to the activation of inflammatory cells and the release of pro-inflammatory cytokines, is prevalent in nephropathy patients. Vasoconstriction, salt retention, and the synthesis of the hormone aldosterone are all brought on by the activation of the RAAS system, which also causes arterial hypertension and ventricular dysfunction.[6-8]

Table 1: KDIGO ml/min/1.73m^2.

Stadium	Glomerular filtration rate (GFR)	Description
1	≥90	Kidney damage with normal or increased kidney function
2	60-89	Kidney damage with mild decrease in kidney function
3a	45-59	Moderate decrease in kidney function
3b	30-44	Severe decrease in kidney function
4	15-29	Advanced renal failure
5	<15	End-stage renal failure

Screening

Nephropathy patients' cardiovascular risk must be properly assessed in order to identify risk factors early and implement the right interventions. According to current recommendations, all CKD patients should have their cardiovascular risk factors assessed. These risk factors include hypertension, dyslipidemia, diabetes mellitus, smoking, and obesity. Additionally, it is advised that people with cardiovascular disease risk factors or symptoms have their coronary heart disease evaluated.[9,10]

Management

The detection and management of cardiovascular risk factors, such as hypertension, dyslipidemia, diabetes mellitus, and smoking, are the cornerstones of cardiovascular risk management in nephropathy patients. Antihypertensive medications that block the RAAS system, such as ACE inhibitors or angiotensin II receptor antagonists (ARBs), are advised for the treatment of nephropathy patients since they have been found to lower their risk of cardiovascular disease. In order to lower cardiovascular risk, careful glycemic management is advised for diabetes mellitus patients.[11]

Complications

Cardiovascular problems, such as coronary heart disease, cerebrovascular disease, peripheral vascular disease, and heart failure, are more common in nephropathy patients. The most frequent cardiovascular consequence in nephropathy patients is coronary heart disease, which is linked to accelerated atherosclerosis, endothelial dysfunction, and chronic inflammation in these individuals. Other frequent consequences in nephropathy patients include cerebral and peripheral vascular disease, which are linked to atherosclerosis and endothelial dysfunction. Patients with nephropathy may develop heart failure, a condition that is linked to ventricular dysfunction and uncontrolled hypertension.[12]

Early risk factor identification and adequate treatments are the cornerstones of the management of cardiovascular problems in nephropathy patients. To lower the risk of cardiovascular events, it is advised that individuals with coronary heart disease be treated with antiplatelet medications and/or statins. Diuretics, ACE inhibitors, ARBs, and beta-blockers are used to treat heart failure patients because they have been proved to lower mortality and improve symptoms.[13]

DISCUSSION

A frequent and severe consequence of diabetes, hypertension, and other chronic disorders is nephropathy. Due to the numerous risk factors and pathophysiological changes brought on by kidney disease, patients with nephropathy have a higher risk of cardiovascular disease. To lower the risk of cardiovascular events in these individuals, it is crucial to do an adequate evaluation of cardiovascular risk and manage risk factors appropriately.[14]

High blood pressure is a major risk factor for nephropathy sufferers. In individuals with nephropathy, adequate blood pressure management has been found to lower the risk of cardiovascular events. To lower the risk of cardiovascular events, individuals with renal disease should aim for blood pressure of less than 130/80 mmHg.[15]

Dyslipidemia is a significant additional risk factor in nephropathy patients. Dyslipidemia is more common in nephropathy patients, which may be due to the kidneys' impaired ability to excrete lipids. It has been demonstrated that statin medication lowers the risk of cardiovascular events in people with renal disease. To lower the risk of cardiovascular events, statin therapy is advised for individuals with nephropathy and coronary heart disease.[16]

Additionally, typical in nephropathy patients, anemia has been linked to a higher risk of cardiovascular disease. Erythropoiesis-stimulating medications should be administered to nephropathy and anemia patients in order to enhance quality of life and lower cardiovascular risk.[17]

For nephropathy patients, cardiovascular disease is the main cause of mortality. Nephropathy patients are more likely to experience cerebrovascular accidents, heart failure, and coronary heart disease. The most frequent cardiovascular consequence in nephropathy patients is coronary heart disease. Due to the presence of several risk factors, such as high blood pressure, dyslipidemia, and diabetes, patients with nephropathy have a greater incidence of coronary heart disease.[18]

Another typical cardiovascular consequence in nephropathy patients is heart failure. Multiple risk factors, including as excessive blood pressure, anemia, and coronary heart disease, enhance the risk of heart failure in nephropathy patients. The use of diuretics, ACE inhibitors, ARBs, and beta-blockers, which have been demonstrated to lower mortality and improve symptoms in these patients, is the cornerstone of the care of heart failure in patients with nephropathy.[19]

CONCLUSION

As a result of diabetes, hypertension, and other chronic conditions, nephropathy is a frequent and significant consequence. Due to the numerous risk factors and pathophysiological changes brought on by kidney disease, patients with nephropathy have a higher risk of cardiovascular disease. To lower the risk of cardiovascular events in these individuals, it is crucial to do an adequate evaluation of cardiovascular risk and manage risk factors appropriately. In people with nephropathy, it's crucial to treat risk factors such high blood pressure, dyslipidemia, and anemia. Additionally, these individuals frequently have heart failure and coronary heart disease, which should be properly treated to lower the risk of cardiovascular events. In clinical practice, managing nephropathy and cardiovascular risk in nephropathic patients is a significant problem. Each patient needs a thorough examination and specialized treatment. To lower the risk of cardiovascular events in nephropathy patients, cardiovascular risk factors must be prevented and promptly treated. To increase the quality of life and survival of nephropathic patients, it is crucial to recognize and treat cardiovascular problems.

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