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Evaluation of chronic kidney diseases and realted comorbidities

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ABSTRACT

Chronic kidney disease (CKD) is commonly comorbid with hypertension, diabetes, and cardiovascular disease (CVD). However, the extent of comorbidity in CKD across a range of concordant (shared pathophysiology and/or treatment) conditions and discordant (unrelated pathophysiology and/or different or contradictory treatment) conditions is not well documented. Kidney diseases are emerging non-communicable ailments in Saudi Arabia and rest of the world. Among top ten diseases in 2017 in Saudi Arabia, chronic kidney disease was the 4th common cause of most of the deaths in the kingdom. Hence, the study aimed at determining the major concomitant chronic disorders and their association with kidney diseases in Hail region.

Keywords: Chronic kidney disease (CKD), hypertension, diabetes, and cardiovascular disease (CVD) etc.

INTRODUCTION

Chronic kidney disease (CKD) is a type of kidney disease in which there is gradual loss of kidney function over a period of months to years.[1] Initially there are generally no symptoms; later, symptoms may include leg swelling, feeling tired, vomiting, loss of appetite, and confusion.[2] Complications can relate to hormonal dysfunction of the kidneys and include (in chronological order) high blood pressure (often related to activation of the Renin-Angiotensin-Aldosterone system),bone disease, andanemia.[3][4] Additionally CKD patients have markedly increased cardiovascular complications with increased risks of death and hospitalization.[5]

Causes of chronic kidney disease include diabetes, high blood pressure, glomerulonephritis, and polycystic kidney disease.[5][6] Risk factors include a family history of chronic kidney disease. Diagnosis is by blood tests to measure the estimated glomerular filtration rate (eGFR), and a urine test to measure albumin.[7] Ultrasound or kidney biopsy may be performed to determine the underlying cause. Several severity-based staging systems are in use.

Screening at-risk people is recommended.[8] Initial treatments may include medications to lower blood pressure, blood sugar, and cholesterol.[9] Angiotensin converting enzyme inhibitors (ACEIs) or angiotensin II receptor antagonists (ARBs) are generally first-line agents for blood pressure control, as they slow progression of the kidney disease and the risk of heart disease.[10] Loop diuretics may be used to control edema and, if needed, to further lower blood pressure. NSAIDs should be avoided.[11] Other recommended measures include staying active, and certain dietary changes such as a low-salt diet and the right amount of protein. Treatments for anemia and bone disease may also be required. Severe disease requires hemodialysis, peritoneal dialysis, or a kidney transplant for survival.[12]

Risk Factors

Kaur and Sharma informed us that in the 21st century there are many types of booming in an individual's life due to the wide variety of changes taking place due to hereditary issues and lifestyles. Our study provides additional evidence that low HDL cholesterol and high triglyceride levels are associated with an increased risk of CKD and microalbuminuria. Experimental studies on animals indicate that obesity is associated with a slowing down of renal activity. Our analysis indicated that abdominal obesity is characterized on the basis of waist circumference, i.e.102 cm or more in men and 88 cm or more in women was associated with 2-fold increase in odds of CKD. This evidence advises

that abdominal obesity can be an important modifiable risk factor for CKD in addition to diabetes and hypertension, which have been cited in earlier research [13]. A classic western starvation and absorption of high sodium and potassium are undoubtedly associated with an increase in microalbuminuria and a rapid decline in kidney activity [14]. People with acute kidney injury (AKI) (i.e., stones in kidney) usually suffer with great pain so they prefer non-steroidal anti-inflammatory drugs (NSAIDs) as the first choice of medical treatment. Sometimes apparently quick-and-easy medical treatment creates a serious medical complication and results in CKD [15]. The authors reported about receptors, which are the exogenous binding sites for both synthetic and natural cannabinoids that are used for diversion purposes. They mainly pointed out that the endcannabinoid system (ECS) is present in the kidney and it has recently emerged as an important player in the prognosis of diabetic nephropathy, drug nephrotoxicity, and progressive CKD. Various disorders directly or indirectly affected due to water can cause kidney disease, e.g., high temperatures frequently lead to water scarcity in many places in tropical regions, which results in dehydration of the human body and finally has a severe impact on the kidneys.

Various Stage-Wise Risk Factors for CKD

There are 4 main stages-wise risk factors for CKD:
(1) susceptibility factors, including family history of CKD, low birth weight, reduction in kidney mass, older age, ethnic origin (black, white, and coloured), and low income or lack of awareness, (2) Initiation factors, including high blood pressure, diabetes, systemic infection, drug toxicity, autoimmune diseases, urinary tract infections, urinary stones, and lower urinary tract obstruction, (3) Progression factors, including smoking, higher level of proteinuria, high blood pressure, and poor glycaemic control in diabetes, and
(4) end-stage factors, including late referral, lower dialysis dose, temporary vascular access, anaemia, and low serum albumin level.

Symptoms and Complications of CKD

Webster et al. [16] have mentioned some symptoms of CKD. In brief, they are the appearance of anaemia, cognitive changes, hypertension, gastrointestinal disturbances, shortness of breath, change in kidneys, change in output, itch and cramps, damage to glomerular capillary wall and tube, and also peripheral oedema due to sodium. The complications of CKD are mainly anaemia, bone diseases, CVD, and cancer diseases.

Prevention by Using Modern Techniques

Foremost are control of blood pressure preferably with agents that block the renin-angiotensin pathway, lipid-lowering therapy (irrespective of the starting cholesterol concentration), and good glycaemic control (lowers the incidence of major atherosclerotic events in patients with CKD). Correction of acidosis is thought to slow the decline in

GFR, but this requires confirmation. An easy approach is to take the optimum intake of salt and protein. Finally, self-management is necessary, and support groups can work to improve the lifestyle and dietary habits of CKD victims. In addition, patients should be aware of the disease, must adhere to treatment, and keep an eye on the indices of glycaemic and blood pressure control. The cost-effectiveness of a self-management intervention for people with stage 3 CKD is currently being investigated in a randomized clinical trial. A multidisciplinary approach is required to develop treatment strategies [17]. In both diabetes mellitus types 1 and 2, slowing the rate of progressive renal injury with RAAS inhibition has been intimately affiliated with the stabilization or reduction of proteinuria. It may be aberrant to interpret reductions in albuminuria as a surrogate for developed renal function. Although few authors argue that experimental evidence suggests that proteinuria has direct toxic impacts, currently there is no clear evidence that establishes a cause and effect role for CKD. For this reason, the necessity of the antiproteinuric properties of ACE inhibitors and ARBs is unclear. Metabolic derangements of CKD are taken into account during the prescription and self-management, which include acid base, phosphate, dietary protein, vitamin D, parathyroid hormone, anaemia, and uric acid, [18-20]. Early prediction of CKD is a challenging task for researchers and one which can be possible by implementing advanced technical tools such as machine learning, artificial intelligence techniques, data mining, etc., some of which have already been implemented in this area of CKD [21]. In the study by Murshid et al. [22], the authors proposed novel technical tools such as decision trees, logistic regression, naïve Bayes, artificial neural networks, and data mining tools which are used to build an automated diagnostic system which simplifies the lengthy process in health care. The operation behind the automated diagnostic system is to process the data from the system database and give early predictive automated results which is more precise compared to the traditional diagnostic system.

CONCLUSION

CKD with its high prevalence, morbidity and mortality is an important public health problem. It is associated with high expenditure among Indian patients. Higher stages of CKD have higher economic burden especially on the lower middle class.CKD was found to be associated with high OOP expenditure among Indian patients. Furthermore, the direct cost of treatment was found to be affected by haemodialysis, treatment support by employer, patients with habits such as smoking and alcohol. Patients with co morbidities and patients with ESRD. Although CKD is generally progressive and irreversible patients are advice regarding nutrition, life style changes and compliance with treatment this might slow progression, enabling patients to live longer without complication and need for renal replacement therapy.

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