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Short Communication Article

Connection between chronic kidney disease and non-alcoholic fatty liver disease: A brief notes to know

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ABSTRACT

Recent years have observed a rise in interest to know about the connections between non-alcoholic fatty liver disease (NAFLD) and a number of other illnesses. The correlation with chronic kidney disease (CKD) came to light as a noteworthy finding in terms of its frequency and importance. Numerous clinical studies show that NAFLD is linked to higher rates of both liver-related morbidity and mortality as well as an increased chance of acquiring other significant extra-hepatic disorders. Chronic kidney disease (CKD) is known to be more common in those with non-alcoholic fatty liver disease (NAFLD), and metabolic dysfunction can also cause CKD. The impact of non-alcoholic fatty liver disease (NAFLD) on the prevalence of chronic kidney disease (CKD) is prevalent. The purpose of this essay is to outline some important aspects of this topic and to report on the pathophysiology of the association between fatty liver disease and CKD.

INTRODUCTION

The possible link between NAFLD and CKD has recently attracted considerable scientific interest. The finding of a connection between harm to the liver and the kidneys will facilitate the early detection of renal illness and the choice of therapies that address both conditions, potentially having significant therapeutic and preventive effects [1]. Non-alcoholic fatty liver disease (NAFLD) is becoming more common worldwide, affecting both adults and children [2]. According to current estimates, this liver disease affects about 25% of adults worldwide [3]. Those with NAFLD have a prevalence of CKD that ranges from 20% to 55%, while that of the non-NAFLD population is between 5% and 35%. Numerous studies have demonstrated a strong correlation between the severity of NAFLD and the advancement of CKD stages [4-7]. One of the most global public health concerns is chronic kidney disease (CKD), which can result in renal failure, cardiovascular disease, and early mortality [8, 9]. NAFLD is the underlying cause of a growing number of extrahepatic symptoms, according to recent

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investigations. Type II diabetes mellitus (T2DM), cardiovascular disease (CVD), and several other serious chronic illnesses, such as chronic kidney disease (CKD), are primarily associated with non-alcoholic fatty liver disease (NAFLD) [10-12]. Perhaps a separate risk factor for CKD is fatty liver disease and the severity of CKD may also have a negative impact on NAFLD long-term clinical outcomes by raising the probability of all-cause mortality [13, 14]. Still, in order to allocate organs and provide the best possible care for patients with liver illness, more updated research for predicting GFR must be created.

2. Epidemiology: The epidemiological link between NAFLD and chronic kidney disease (CKD) that has emerged in recent years has drawn the interest of scientists, who are wondering if NAFLD can serve as a stand-in diagnostic for CKD. The prevalence of NAFLD in the current population is between 30%–40% in males and 15%–20% in women. It is significantly more common in patients with type 2 diabetes, occurring in as many as 70% of these patients [15]. Chronic kidney disease (CKD) affects more than 25% of those over 65 in Western nations, and up to 16% of adults of all ages are affected [16, 17]. Numerous extensive cross-sectional community and hospital-based investigations involving individuals without and with diabetes revealed that patients with non-alcoholic fatty liver disease (NAFLD) had a prevalence of CKD ranging from roughly 20% to almost 55%, while patients without NAFLD had a frequency of 5–35% [15, 18-21]. To verify the causal link between NAFLD and CKD, large prospective studies on histologically identified NAFLD patients that include CKD incidence in their long-term outcomes are required [22].

3. Raised prevalence of chronic renal disease risk factors in NAFLD patients: Adults and children with non-alcoholic fatty liver disease (NAFLD) often meet the diagnostic criteria for the metabolic syndrome, which includes obesity, hypertension, atherogenic dyslipidemia, and dysglycemia. As a result, these patients have a number of cardiovascular disease (CVD) risk factors [23-25]. There is a nearly universal correlation between NAFLD and insulin resistance, despite obesity, and patients with NAFLD also have higher levels of insulin resistance than control subjects without steatosis [24-26]. Potential confounding variables such age, sex, race, education, body mass index, alcohol and tobacco use, prior CVD, and physical activity weren't associated with this risk. The number of metabolic syndrome clinical features, HOMA insulin resistance, or fasting insulin levels, and the risk for incident CKD were found to have strong, graded associations, indicating a pathophysiological basis for these findings. Furthermore, the higher risk of chronic kidney disease (CKD) persisted even after controlling for incident diabetes (an additional recognized CKD mediator) and hypertension (a possible cause and consequence of renal disease) [27]. Extensive investigations conducted in populations have demonstrated that NAFLD is independently linked to a higher prevalence of CKD, using elevated blood liver enzyme levels as surrogate markers for the condition (which should be taken cautiously) [28, 29]. The existence of the hepato-renal syndrome, which is defined by the occurrence of rapid and progressive renal impairment in patients with decompensated cirrhosis, gives credence to the well-established pathophysiological relationships between the liver and the kidney in humans. Understanding a cause-and-effect link is currently very difficult due to the clear participation of common risk factors in a complicated multisystem syndrome that includes NAFLD and CKD.

4. Possible mechanism behind this correlation: The underlying mechanisms that are putatively responsible for the observed association between NAFLD and kidney disease are not fully

understood. Potential explanations include the systemic release of pro-inflammatory, profibrogenic, and anti-fibrinolytic molecules such as fetuin-A, fibroblast growth factor (FGF)-21, tumor necrosis factor (TNF)-a, transforming growth factor (TGF)-b, and plasminogen activator inhibitor-1 (PAI-1), which can all exacerbate renal injury. Increased reactive oxygen species, advanced glycation end products, and C-reactive protein (CRP) are other potential mechanisms [10, 30]. Reactive oxygen species (ROS) are believed to be produced by oxidative stress, and in particular, mitochondrial dysfunction, which contributes to the pathophysiology of NAFLD and the development of CKD. Another important cause of ROS (reactive oxygen species) in NAFLD patients is increased visceral adipose tissue. The production of ROS affects the insulin signaling pathways that result in tissue inflammatory infiltration and insulin resistance [31, 32]. Increased levels of ROS, oxidative stress and inflammatory response are thought to be involved in the development and progression of CKD, too [32]. Remarkably, new research suggests that oxidative stress and inflammatory biomarkers (malondialdehyde [MDA], advanced oxidant protein products [AOPP]) may be able to determine individuals who are more likely to develop fatty liver and chronic kidney disease (CKD) [33, 34].

5. Pharmacologic agents for CKD and NAFLD:

Pharmacotherapy has emerged as a key component in the care of NAFLD and CKD, including lipid-lowering, blood pressure control, glucose-lowering, and weight loss [35]. Modern drug delivery system playing a crucial role to develop newer drug and suitable doses to recover complex diseases [36]. As vitamin E is a well-known scavenger of free radicals, its use in the therapy of NASH has been anticipated. In a prior study, we found that in adult NASH patients who were not responsive to nutritional intervention, vitamin E administration for a year decreased blood transaminase activity and transformed growth factor-beta1 [37]. Glutathione (GSH) Glutathione (GSH), L-glutamyl-L cysteinyl-glycine, is a tripeptide present in every cell of the human body, and also has an anti-oxidative effect. Oral GSH treatment (300 mg/day) for 4 months has been shown in a pilot research to reduce ALT levels and hepatic steatosis in Japanese patients with non-alcoholic fatty liver disease (NAFLD) who do not have severe fibrosis or uncontrolled diabetes. Extensive clinical trials are required to confirm its effectiveness [38]. GFT505's Elafibranor In mice models of NAFLD, elafibranor, an unlicensed dual agonist of PPARa/d receptors, has been demonstrated to ameliorate steatosis, inflammation, and fibrosis [39]. Approved agents for dyslipidemia Ezetimibe, a potent inhibitor of cholesterol absorption, has been explored for the treatment of NASH/NAFLD, but conflicting results exist [40]. Beside this, a lot of drugs are available to treat NAFLD with their evident therapeutic effect.

Although there is no specific cure for chronic kidney disease (CKD), medication can help manage many of the issues that lead to the illness and its complications. Medication including vitamin D, steroid, antihypertensive drugs, antilipidemic drugs, vitamin C, dialysis and also kidney transplantation in case of failure.

CONCLUSION: A growing quantity of research indicates that NAFLD and CKD are related, and this could have a substantial effect on the prognosis of individuals who have both diagnoses. For these patients to be managed effectively, it is imperative that this relationship be identified early on through appropriate assessment of renal function. Therefore, it is clinically important to assess kidney function in people with NAFLD. Finally, new research indicates that some medication classes, that target metabolic risk factors may help people with NAFLD and CKD in

both their kidneys and liver. Large, prospective studies are unquestionably necessary to reach safer results that can be immediately implemented in routine clinical practice.

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