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STRATEGIES FOR RHEUMATOID ARTHRITIS CARE IN PATIENTS WITH CHRONIC KIDNEY DISEASE: A COMPREHENSIVE REVIEW

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ABSTRACT

Rheumatoid arthritis a chronic inflammatory disease that mostly affects the synovial joints and is generally caused by a confluence of environmental and genetic variables, including tobacco use. It causes an oxygen shortage in the synovial fluid, which increases the synthesis of chemicals that cause pain, such as cyclooxygenase (COX) 2 and matrix metalloproteinases (MMPs). Medications that help preserve joint function include biologic and targeted synthetic disease-modifying antirheumatic medicines (DMARDs). Chronic kidney disease is characterized by an enduring issue affecting the structure and function of the kidneys for a period exceeding three months. The main reasons behind kidney damage in rheumatoid arthritis (RA) are persistent inflammation and exposure to substances that harm the kidneys. Additionally, rheumatoid arthritis has links to conditions such as glomerulonephritis, drug-related kidney issues, and secondary amyloidosis. The prevalence of chronic kidney disease (CKD) is higher among individuals with RA compared to the general populace.

KEYWORDS : Rheumatoid arthritis, disease-modifying antirheumatic medicines (DMARDs), Chronic kidney disease.

INTRODUCTION

Chronic inflammation is the hallmark of rheumatoid arthritis (RA), a chronic inflammatory disease. This is a chronic inflammatory disease that mostly affects the synovial joints and is generally caused by a confluence of environmental and genetic variables, including tobacco use. It usually begins in small joints and can spread to larger ones. Skin, eyes, heart, kidneys, and lungs are just a few of the organs it can damage. Deformities and significant discomfort are frequently brought on by joint damage, which includes bone and cartilage erosion as well as weakening tendons and ligaments. Both joint dysfunction and extended disability may arise from this persistent and incapacitating inflammatory disorder. Early detection and intervention are essential to prevent serious injury and maintain essential body functioning throughout time.[1]

One of the first things noticed in rheumatoid arthritis is that the synovial tissue develops new blood arteries, which permit certain immune cells to enter the synovial fluid. Tumour necrosis factor (TNF) and other inflammatory chemicals initiate angiogenesis, a process that is essential for maintaining the extremely damaging synovium. These chemicals stimulate endothelial cells to produce adhesion molecules during angiogenesis, which facilitates cell migration into the synovium.

In spite of this, rheumatoid arthritis causes an oxygen shortage in the synovial fluid, which increases the synthesis of chemicals that cause pain, such as cyclooxygenase (COX) 2 and matrix metalloproteinases (MMPs). This exacerbates the synovium's inflammation. Early in the disease's course, the infiltration of these inflammatory cells into the synovial membrane thickens the synovial tissue, increases monocyte activity, and forms tiny projections into the joint space.[2]

Management of rheumatoid arthritis

Prompt diagnosis and early treatment are key to controlling RA and preventing irreversible joint damage. The principal objective of first therapy is to mitigate discomfort and diminish inflammation.[2]

With innovative therapeutic methods, the pharmaceutical industry has advanced significantly. Finding a permanent treatment is difficult, nevertheless, because of our limited knowledge of the molecular pathways underlying antibody actions. The best course of action is early detection, a well-balanced combination of pharmaceutical and non-pharmacological therapy, and ongoing evaluations of the safety and effectiveness of the treatment.

Remission is the main goal of treatment, with the least amount of side effects possible. Medications that help preserve joint function include biologic and targeted synthetic disease-modifying antirheumatic medicines (DMARDs), which are classified as non-biologic DMARDs by the American College of Rheumatology (ACR), as well as standard synthetic DMARDs. Additional therapy such as glucocorticoids

(GCs) and nonsteroidal anti-inflammatory medications (NSAIDs) are used to reduce inflammation when symptoms of rheumatoid arthritis (RA) are not well controlled.

Making an early and precise diagnosis is essential to the successful management of any disease, as symptoms and indicators of one condition often mimic those of another. To establish an appropriate diagnosis, it is important to apply and interpret ACR-EULAR criteria correctly, measure diagnostic biomarkers, and correlate the results with imaging techniques. Prompt diagnosis is associated with greater benefit from nonpharmacological therapies, according to available research.

The primary objective of rheumatoid arthritis (RA) treatment is to initiate strong pharmacological regimens with the goal of achieving total remission or, in the absence of remission, a marked decrease in clinical symptoms. Research results have led to new therapeutic methods and enhanced comprehension of the underlying mechanisms, improving the management of RA. However, many RA sufferers are not helped by the drugs that are available today. The dearth of information necessary to completely manage the illness emphasises the necessity for novel medication development and a greater emphasis on personalised treatment.[3]

CHRONIC KIDNEY DISEASE

A structural or functional problem with the kidneys that lasts longer than three months is the hallmark of chronic kidney disease. A GFR (glomerular filtration rate) of less than 60 mL/min/1.73 m^2, albuminuria (urine albumin of 30 mg/24 hours or urine albumin-to-creatinine ratio [ACR] of 30 mg/g), abnormalities in urine appearance, tissue findings, or imaging that point to renal damage, renal tubular issues, or a history of kidney transplantation are some of the indicators that are involved in this. Renal replacement therapy (dialysis or transplantation) may become necessary as a result of this progressive loss in kidney function. Pathological abnormalities revealed by imaging tests or kidney biopsies, anomalies in urinary sediment, or elevated rates of excretion of albumin in the urine are all considered forms of kidney disease.

Additional evaluations are necessary to differentiate between acute kidney injury (a sudden decline in kidney function within 2–7 days) and acute kidney disease (damage or decreased function lasting $\leqslant$3 months) when the length of kidney disease is unknown. Chronic kidney disease (CKD) is a chronic condition that lasts for a long time. It can be challenging to identify the cause of chronic kidney disease (CKD), which is often categorized by the location of anatomic abnormalities and the presence or absence of systemic disorders. Diabetes, autoimmune diseases, malignancies, persistent infections, and genetic illnesses that impact more than just the kidneys are examples of systemic diseases. The anatomical locations are divided into cystic/congenital, vascular, glomerular, and tubulointerstitial disorders. Understanding the etiology of CKD can have a significant impact on the prognosis and available treatment options.[4]

When it comes to managing their treatment, monitoring, and referrals, people with Chronic Kidney Disease (CKD) benefit from the use of staging and updated risk assessment tools that take into account characteristics such as albuminuria and GFR. Reducing cardiovascular risks, controlling albuminuria with certain drugs, avoiding kidney-harming substances like some painkillers, adjusting medication dosages, and keeping an eye out for complications related to chronic kidney disease (CKD) like elevated potassium levels, metabolic problems, mineral imbalances, and anaemia are the best ways to manage the disease. It is critical to seek specialized care from a nephrologist as soon as possible for those who are at high risk of developing chronic kidney disease (CKD), such as those with extremely low estimated GFR, high albuminuria, or a rapid deterioration in kidney function.[5]

Management of Chronic Kidney Disease

End-stage renal disease (ESRD) might be slowed down in its progression by treating chronic kidney disease (CKD). There are still few treatment options available, though. The best supporting data is for blood pressure management with drugs such as angiotensin II receptor blockers (ARBs) or angiotensin-converting enzyme (ACE) inhibitors. Managing blood sugar levels in individuals with diabetes seems to have promise for delaying progression. Many metabolic abnormalities linked to chronic kidney disease (CKD), including acidosis, hyperphosphatasemia, and low vitamin D levels, may be targets for treatment. Drugs targeting various potentially harmful systems and processes, including as oxidation, endothelin, fibrosis, and advanced glycation end products, are in varying stages of research. Inadequate use of currently available medications, patient education regarding their illness, and the shift to ESRD care present major practical hurdles in attaining better outcomes, in addition to the dearth of proven effective treatments.[6]

Treatment for Rheumatoid Arthritis in Chronic Kidney Disease patients

Primary causes of these kidney-damaging effects of rheumatoid arthritis (RA) are chronic inflammation and exposure to substances that damage the kidneys. RA has also been connected to glomerulonephritis, drug-induced kidney disorders, and secondary amyloidosis. Chronic kidney disease (CKD) is more common in RA patients than in the general population.

A high correlation has also been observed between RA and an elevated risk of heart-related complications, according to mounting data. Atherosclerosis, or the hardening of the arteries, is a major precursor to heart disease because of the systemic inflammation that characterizes RA. A greater emphasis is therefore being placed on controlling cardiovascular risk factors in patients with RA by seeking an early remission through the use of a variety of anti-inflammatory therapy, such as biologic medicines and disease-modifying antirheumatic medications (DMARDs).

The source of kidney difficulties in rheumatoid arthritis (RA) patients is unclear, but may be connected to kidney-damaging medicines, amyloidosis-associated secondary kidney problems, or other medical diseases. According to new research, people with long-term inflammatory diseases such as psoriasis and ankylosing spondylitis had a greater incidence of chronic kidney disease (CKD) than people in general. Anti-inflammatory drugs such as TNF-α antagonists have the potential to stop the progression of chronic kidney disease, and persistent inflammation throughout the body may be a factor in the progressive loss of kidney function.[7,8]

Researchers looked at the incidence of chronic kidney disease (CKD) and factors impacting the course of CKD in patients with well-managed rheumatoid arthritis (RA) who were taking biologic disease-modifying antirheumatic medicines (bDMARDs). According to the findings, 8.0% of RA patients who began and kept on bDMARDs for five years experienced the development of CKD. This underlines how crucial it is to stop the progression of CKD by managing disease activity, particularly by lowering inflammation and minimizing the use of NSAIDs.

The main causes of the relationship between rheumatoid arthritis and different kidney issues are toxicity, drug exposure, and chronic inflammation. Significantly, the group with CKD progression showed higher mean CRP (C-reactive protein) levels than the non-progressing group, indicating a connection between persistent inflammation and the advancement of CKD. The study also showed that among bDMARDs, using the IL-6 inhibitor tocilizumab independently promoted a slower progression of CKD. These results suggest that targeting CRP levels with IL-6 suppression may be useful for controlling the course of CKD.[9]

REFERENCE

1. Bullock Jacqueline et al. *Rheumatoid arthritis: A brief overview of the treatment*, Medical principles and practice. 2019 Mar; 27(6): 501-507.
2. Chauhan K, Jandu JS, Brent LH, Al-Dhahir MA. Continuing Education Activity. Treasure Island (FL): 2021.
3. Radu AF, Bungau SG. *Management of rheumatoid arthritis: an overview*. Cells. 2021 Oct 23;10(11):2857.
4. Vaidya SR, Aeddula NR. *Chronic renal failure*.
5. Chen TK, Knicely DH, Grams ME. *Chronic kidney disease diagnosis and management: a review*. Jama. 2019 Oct 1;322(13):1294-304.
6. Turner JM, Bauer C, Abramowitz MK, Melamed ML, Hostetter TH. *Treatment of chronic kidney disease*. Kidney international. 2012 Feb 2;81(4):351-62.

7. Sumida K, Molnar MZ, Potukuchi PK, Hassan F, Thomas F, Yamagata K, Kalantar-Zadeh K, Kovesdy CP. *Treatment of rheumatoid arthritis with biologic agents lowers the risk of incident chronic kidney disease*. Kidney international. 2018 May 1;93(5):1207-16.

8. Chiu HY, Huang HL, Li CH, Chen HA, Yeh CL, Chiu SH, Lin WC, Cheng YP, Tsai TF, Ho SY. *Increased risk of chronic kidney disease in rheumatoid arthritis associated with cardiovascular complications–a national population-based cohort study.* PloS one. 2015 Sep 25;10(9):e0136508.

9. Hanaoka H, Kikuchi J, Hiramoto K, Saito S, Kondo Y, Kaneko Y. *Decreased chronic kidney disease in rheumatoid arthritis in the era of biologic disease-modifying anti-rheumatic drugs.* Clinical Kidney Journal. 2022 Jul;15(7):1373-8.