Corticosteroids Versus Other Immunosuppressive Agents in Renal Disease: A Comparative Study

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ABSTRACT:

Objective:
To critically compare corticosteroids with other immunosuppressive agents used in immune-mediated renal diseases, with emphasis on therapeutic efficacy, relapse prevention, and safety profiles.[1,2]

Results:
Evidence from randomized controlled trials and meta-analyses indicates that non-steroidal immunosuppressive agents, including mycophenolate mofetil, cyclophosphamide, calcineurin inhibitors, and biologic agents, demonstrate superior remission rates and reduced relapse frequency when compared with corticosteroid monotherapy in diseases such as lupus nephritis and membranous nephropathy.[1,3,5] Corticosteroids remain effective for rapid disease control but are associated with significant long-term adverse effects.[2,4] Each immunosuppressive class exhibits distinct safety concerns, requiring individualized treatment selection.[2,4]

Conclusion:
While corticosteroids continue to play a vital role in the management of renal diseases, steroid-sparing immunosuppressive agents offer improved long-term outcomes and reduced toxicity in selected patient populations. Optimized combination therapy and careful monitoring are essential for maximizing therapeutic benefit while minimizing adverse drug reactions.[2,4,13]

Keywords: corticosteroids, immunosuppressive agents, renal diseases, lupus nephritis, safety, efficacy

INTRODUCTION:

Immune-mediated renal diseases constitute a significant cause of chronic kidney injury and progression to end-stage renal disease. Conditions such as lupus nephritis, IgA nephropathy, and membranous nephropathy are characterized by immune dysregulation, leading to inflammation and structural kidney damage.[10,14] Immunosuppressive therapy remains the cornerstone of treatment aimed at inducing remission and preserving renal function.[2,4]

Corticosteroids have historically been used as first-line agents due to their potent anti-inflammatory and immunosuppressive properties. However, prolonged corticosteroid exposure is associated with serious adverse effects including metabolic disturbances, osteoporosis, infection risk, and cardiovascular complications.[2,4] Advances in immunopharmacology have led to the development of alternative

immunosuppressive agents with targeted mechanisms of action, prompting a shift toward steroid-sparing therapeutic strategies.[1,2] This review compares corticosteroids with other immunosuppressive agents used in renal diseases, focusing on efficacy and safety outcomes reported in current literature.[1,2]

MATERIALS AND METHODS:

This narrative review was conducted by analyzing published systematic reviews, meta-analyses, and randomized controlled trials that evaluated corticosteroids and other immunosuppressive agents in the treatment of immune-mediated renal diseases. Relevant studies were identified through peer-reviewed databases and included comparative data on clinical efficacy, relapse rates, and adverse drug reactions.[1,2,4]

INCLUSION AND EXCLUSION CRITERIA:

Inclusion criteria:

- Published randomized controlled trials, meta-analyses, and systematic reviews[1,2,5]
- Studies involving patients with immune-mediated renal diseases[10,14]
- Articles comparing corticosteroids with one or more immunosuppressive agents[1,3]
- Studies reporting outcomes related to remission, relapse, or safety[1,2,4]

Exclusion criteria:

- Non-comparative studies
- Studies unrelated to renal diseases
- Preclinical or animal studies
- Case reports and opinion articles

RESULTS:

Comparative Efficacy:

Multiple large-scale analyses have demonstrated that immunosuppressive agents such as mycophenolate mofetil and cyclophosphamide achieve higher renal remission rates than corticosteroid monotherapy in lupus nephritis.[1,5,6] Network meta-analyses have shown that calcineurin inhibitors, including tacrolimus and cyclosporine, are effective alternatives for inducing remission, particularly in patients with refractory disease.[1,3]

In membranous nephropathy, calcineurin inhibitors and antimetabolites have demonstrated improved response rates compared with corticosteroids alone.[7,11] The use of combination regimens has been associated with sustained remission and improved renal outcomes.[11,12]

Relapse Prevention:

Relapse remains a major challenge in the long-term management of renal diseases. Evidence suggests that maintenance therapy with non-steroidal immunosuppressive agents reduces disease flare rates when compared with corticosteroid-based regimens.[1,11] Mycophenolate mofetil and cyclophosphamide, in particular, have been associated with lower relapse frequency and prolonged remission duration.[1,6,11]

Safety and Adverse Drug Reactions:

Corticosteroids are associated with a broad spectrum of adverse effects, including hyperglycemia, hypertension, weight gain, osteoporosis, and increased susceptibility to infection.[2,4] In contrast, other immunosuppressive agents present more specific toxicity profiles. For example, cyclophosphamide and azathioprine are commonly associated with bone marrow

suppression, while calcineurin inhibitors carry a risk of nephrotoxicity.[2,4] Despite these risks, targeted immunosuppressive therapy may reduce cumulative corticosteroid exposure and associated long-term complications.[2,4,13]

CONCLUSION:

Corticosteroids remain an important component of immunosuppressive therapy in renal diseases due to their rapid anti-inflammatory effects. However, increasing evidence supports the use of alternative immunosuppressive agents to achieve superior remission rates and reduce corticosteroid-related toxicity.[1,2] Individualized treatment selection based on disease type, patient characteristics, and safety considerations is essential. Steroid-sparing strategies represent a significant advancement in improving long-term renal outcomes and patient quality of life.[2,4,13]

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