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EFFECT OF RAMIPRIL IN KIDNEY TRANSPLANT PATIENTS: A SYSTEMATIC REVIEW

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Objectives: Kidney transplantation is acknowledged as a major therapeutic advance although it leaves many complications of end stage renal disease. Angiotensin-converting enzyme inhibitors may reduce the risk of end-stage renal disease in kidney transplant patients. This systematic review determines the effect of ramipril in kidney transplant patients.

Methods: We conducted a systematic review of all studies published between 2000-2020 through a comprehensive search on PubMed and Cochrane Library. Terms used in this research were included MeSH headings for ramipril and kidney transplantation. Articles including kidney transplant patients that received ramipril were included. We identified two eligible studies. Risk of bias analysis was performed using Cochrane Risk of Bias Tool.

Results: : 476 patients were included in our systematic review. 138 patients received 10 mg of ramipril once daily as initial dose then lowered to 5 mg once daily for 52 weeks. 103 patients received 5 mg of ramipril twice daily for up to 4 years. 235 patients were in placebo group. The patients received immunosuppresive agents such as sirolimus, tacrolimus, prednisone, mycophenolate, cyclosporine, azathioprine. Clinical outcomes, such as proteinuria, glomerular filtration rate, adverse events were provided in both studies. Up to 24 weeks, a significantly higher proportion of patients in ramipril group did not have proteinuria compared to placebo group. At 52 weeks, the proportion of patients with proteinuria remained numerically higher in placebo group, but the difference was not statistically significant. No significant differences were observed in GFR change from baseline between the ramipril and placebo in both studies. Adverse events were more common in the ramipril group.

Conclusions: The findings of this systematic review conclude that the benefit of ramipril are noted in early 24 weeks and discontinued the weeks after. Further studies are warranted to provide long-term data about the effect of ramipril in kidney transplant patients.

Figure 1. Systematic Review Flowchart

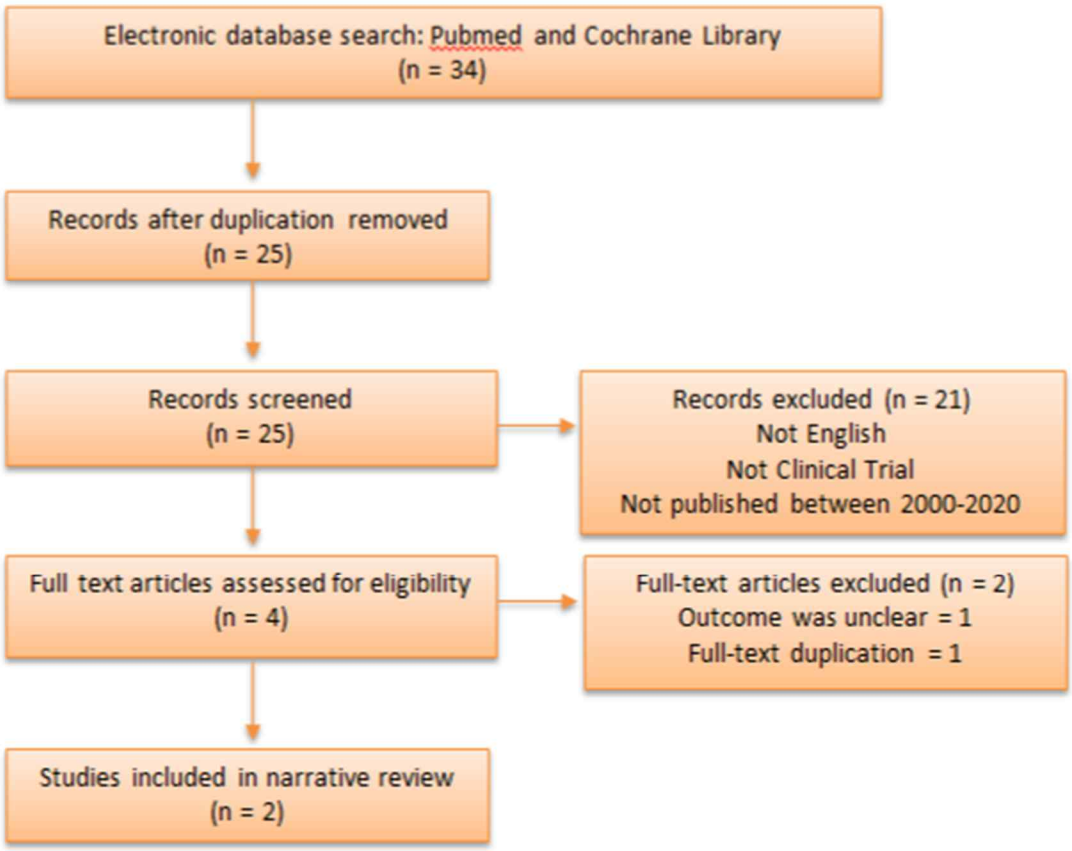

Table 1. Studies included in systematic review

NO	TITLE	AUTHOR (YEAR)	STUDY DESIGN	STUDY POPULATION	INTERVENTION	OUTCOME
1.	Effect of Ramipril on Urinary Protein Excretion in Maintenance Renal Transplant Patients Converted to Sirolimus	D. A. Mandelbrot, et al (2015)	RCT	264 patients post kindey transplantation	138 patients received 10 mg of ramipril once daily as initial dose then lowered to 5 mg once daily for 52 weeks, 126 patients received placebo	No significant differences were observed between ramipril and placebo for change in glomerular filtration rate. Up to 24 weeks, a significantly higher proportion of patients in ramipril group did not have proteinuria compared to placebo group. Adverse events were more common in the ramipril group than in the placebo group.
2.	Ramipril versus placebo in kidney transplant patients with proteinuria: a multicentre, double-blind, randomized controlled trial	Greg A Knoll, et al (2015)	RCT	212 patients post kidney transplantation	103 patients received 5 mg of ramipril twice daily for up to 4 years, 109 patients received placebo	There was no significant difference in the rate of measured GFR decline between the two groups. Up to 6 months, there was a significant reduction of proteinuria in ramipril group compared to placebo group. Adverse events were more common in the ramipril group than in the placebo group.