

Reassessing Renal Artery Stenting and Sacubitril/Valsartan Use in Hemodialysis patients: A Critical Review

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Abstract: *This article critically evaluates the use of renal artery stenting and sacubitril/valsartan in hemodialysis patients. It explores the risks and benefits, considering recent studies and clinical trials. The focus is on the potential impact on patient outcomes, particularly in managing renovascular hypertension and cardiovascular complications associated with chronic kidney disease.*

Keywords: Renal Artery Stenting, Sacubitril/Valsartan, Hemodialysis, Renovascular Hypertension, Chronic Kidney Disease

It is well established that drugs blocking the renin-angiotensin-aldosterone system (RAAS) improve the prognosis of patients with chronic kidney disease (CKD). However, combining medications from this group increases the risk of side effects, particularly hyperkalemia, especially since the therapy with mineralocorticoid receptor antagonists (MRAs) has gained a prominent position alongside other RAAS blockers. With an aging population, increasing comorbidities, and rapid progress in pharmacotherapy, particularly with the emergence of fixed combinations, clinicians face a growing challenge in finding a balance between the positive effects and mitigating the consequences of treatment.

A contemporary approach removes the taboo from using angiotensin-converting enzyme inhibitors (ACEi) and sartans in patients with CKD and renovascular hypertension (RVH). Renal artery stenting along with concurrent use of ACEi or sartans has shown benefits in reducing vascular stiffness in these patients, thereby improving blood pressure regulation in our study of arterial stiffness in atherosclerotic renovascular hypertension (1).

The potential usefulness and efficacy of the angiotensin receptor–neprilysin inhibitor (ARNI) sacubitril-valsartan in patients with preserved ejection fraction (HFpEF) remain unclear, and data on whether it could provide benefits to patients undergoing hemodialysis are still lacking.

The purpose of this article is to examine the efficacy and safety of renal artery stenting and the use of sacubitril/valsartan in hemodialysis patients, with a focus on renovascular hypertension and associated cardiovascular risks.

The methodology of this review includes a thorough analysis of recent clinical trials, studies, and medical literature focusing on the use of renal artery stenting and sacubitril/valsartan in hemodialysis patients. This encompasses both observational studies and controlled trials to provide a comprehensive overview of the topic.

CKD was more common in HFpEF than in HF with mid-range EF (HFmrEF) and HFrfEF (2) and also associated with an increased risk of mortality and poor cardiovascular outcomes.

Recently, PARADIGM-HF Clinical Trials demonstrated that the angiotensin receptor–neprilysin inhibitor LCZ696 was superior to enalapril in reducing the risks of death and hospitalization for patients with HFrfEF (3).

However, the effect of sacubitril-valsartan on HFpEF remains controversial. The PARAMOUNT-HF trial demonstrated that ARNI resulted in a lower level of N-terminal pro-B-type natriuretic peptide (NT-proBNP), a larger reduction in left atrial size, and greater improvement in the New York Heart Association (NYHA) functional class than valsartan (4). In contrast, recent data from the PARAGON-HF trial did not demonstrate a positive protective role of sacubitril/valsartan on hospitalizations for HF and death from cardiovascular causes among patients with an EF of 45% or higher (5). At present, data on patients with severe renal insufficiency treated with sacubitril/valsartan are lacking, since patients with severe renal insufficiency with a glomerular filtration rate (GFR) below 30 ml/min/1.73 m² of body surface area are usually excluded from trials.

We should take into consideration that a certain number of patients on peritoneal dialysis and hemodialysis have renovascular hypertension, which is often resistant to conventional drug therapy. The practice is not yet established, and it might be worth considering an endovascular intervention and stenting in patients on peritoneal dialysis and hemodialysis, precisely for the regulation of arterial hypertension. If sartan has proven benefits in blocking the renin-angiotensin-aldosterone system (RAAS), and considering that patients with renovascular hypertension have elevated levels of NTproBNP, which is a predictor of cardiovascular outcomes for himself, I believe the scientific community should consider introducing sacubitril/valsartan into the drug therapy of patients on peritoneal dialysis and hemodialysis, as well as endovascular interventions in these patients.

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During our research, we demonstrated that vascular stiffness decreases after stenting and the introduction of telmisartan into the drug therapy of patients with chronic kidney disease and renovascular hypertension (1).

Patients with renovascular hypertension (RVH) on a chronic hemodialysis program often experience hypertension that is refractory to available medication therapy. This is crucial when deciding on the treatment method, referencing studies that favor medication therapy over endovascular intervention. The rationale is that due to the cytokine storm causing reversible changes in the kidney, renal function will not recover through intervention. Meanwhile, the positive effect of reducing arterial stiffness through renal artery stenting has been repeatedly proven in our patients.

The vicious cycle of the negative impact of the renin-angiotensin-aldosterone system (RAAS) does not cease with the transition to hemodialysis or peritoneal dialysis. From my perspective, none of these therapeutic approaches in hemodialysis patients should not be prematurely dismissed. This article's significance lies in its detailed analysis of emerging treatments in nephrology, providing insights into the potential advantages and limitations of renal artery stenting and sacubitrilvalsartan therapy in hemodialysis patients, thereby contributing to informed clinical decision-making.

In conclusion, while renal artery stenting and sacubitrilvalsartan hold promise for managing renovascular hypertension and cardiovascular risks in hemodialysis patients, further research is necessary to confirm their efficacy and safety. This review underscores the need for comprehensive clinical evaluations and larger-scale studies to fully understand their potential in nephrology.

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