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Renoprotective Effects of Febuxostat and Allopurinol in patients with Hyperuricemia and Chronic Kidney Disease: A Meta-Analysis

Sherida Edding, Brian Michael Cabral, Monica Therese Cating-Cabral
Department of Internal Medicine, St. Luke's Medical Center - Global City, Philippines

Objectives: Hyperuricemia is associated with rapid deterioration of renal function in patients with chronic kidney disease (CKD). The two most common urate-lowering drugs available in the market are allopurinol and febuxostat. Trials have shown that the individual drugs have potential to slow down progression of renal function in patients with CKD and hyperuricemia. However, it is unclear which drug is more effective because of insufficient direct comparison between the two. Hence our study aims to perform a meta-analysis of RCTs to assess the renoprotective and urate-lowering effects between the two drugs in patients with CKD and hyperuricemia.

Methods: A comprehensive literature search of RCTs using PubMed was performed with the following search terms: febuxostat, allopurinol, chronic kidney disease, renoprotection. Four RCTs were selected and analyzed using Cochrane Revman v5.3. Outcomes assessed were change in serum creatinine, estimated glomerular filtration rate, proteinuria and serum uric acid levels from baseline to 3 months post-initiation of therapy.

Results: Four RCTs comprising of 486 patients were selected - 247 treated with febuxostat and 239 with allopurinol. No significant differences were found in the changes in serum creatinine (mean difference -0.04; CI -0.15-0.07; P = 0.51) and eGFR (mean difference 1.57; CI -0.83,3.97; P = 0.20) from baseline to 3 months between the two groups. Decrease in proteinuria was significantly observed more in the febuxostat group (mean difference -50.13; CI -90.54,-9.71, P = 0.02). Similarly, serum uric acid levels were significantly more reduced in the febuxostat group (mean difference -1.11; CI -1.53,-0.68, P < 0.00001).

Conclusions: Our study showed that febuxostat is non-inferior in terms of delaying renal function decline but it offers a better anti-proteinuric as well as a urate-lowering effect. However, more studies are needed to assess the efficacy of febuxostat across the spectrum of chronic kidney disease, including those requiring hemodialysis.