

**Abstract Submission No.: A-0453**

**Comparative analysis of the impact of febuxostat and allopurinol on glomerular filtration rate and hyperuricemia in chronic kidney disease patients**

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**Objectives :** To compare the efficacy of febuxostat against allopurinol on the progression of CKD and hyperuricemia

**Methods :** A retrospective case-record study was performed at our tertiary care hospital between January 2019 and December 2022 visiting the renal clinic following institutional ethical approval. In this study, we assessed the impact of febuxostat versus allopurinol on the progression of CKD and hyperuricemia in stage 3–4 CKD patients treated with either medication for a minimum of 6 months due to hyperuricemia (>7 mg/dL). Baseline characteristics, serum uric acid (SUA), serum creatinine, and estimated glomerular filtration rate (eGFR) at entry and six months were compared. The primary outcome focused on the decline in eGFR, with secondary outcomes including reductions in SUA and adverse events.

**Results :** Among 101 patients, febuxostat was given to 54 patients, while 47 were in the allopurinol group. The mean doses of febuxostat and allopurinol were  $43.70 \pm 14.5$  mg and  $108.51 \pm 40$  mg, respectively. After 6 months, the median rate of eGFR decline was 1.2 mL/min/1.73 m<sup>2</sup> (IQR 1.2, 5.5) for the febuxostat group and 3.1 mL/min/1.73 m<sup>2</sup> (0.6, 6.2) for the allopurinol group. Still, this difference did not reach statistical significance ( $P = 0.136$ ). The febuxostat group exhibited a significantly greater mean reduction in SUA ( $3.9 \pm 1.7$  mg/dL) compared to the allopurinol group ( $2.1 \pm 1.0$  mg/dL) ( $P = 0.004$ ). Notably, both medications were well-tolerated with no reported serious adverse events.

**Conclusions :** Febuxostat reduced hyperuricemia more effectively than allopurinol in patients with stage 3 and 4 CKD, but there was no significant difference in the progression of CKD. Large randomized trials and long-term follow-up are necessary to determine whether febuxostat has a beneficial effect on the progression of CKD.

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**Table 1. Baseline characteristics of the patients.**

Characteristics	Febuxostat <i>n</i> = 54	Allopurinol <i>n</i> = 47	<i>P</i>
Sex (males) (%)	43 (79.6)	40 (85.1)	0.62
Age in years*	57.2±12.7	51.7±13.1	<b>0.03</b>
BMI (kg/m <sup>2</sup> )*	25.6±4.2	24.6±4.1	0.34
Proteinuria >1000 mg/day (%)	24 (44.4)	26 (55.3)	0.32
Albumin (g/dL)*	4.2±0.5	4.1±0.4	0.79
Diabetic kidney disease (%)	21 (38.8)	15 (31.9)	0.52
Hypertension (%)	49 (90.7)	44 (93.6)	0.71
Ischemic heart disease (%)	10 (18.5)	9 (19.1)	0.53
Alcohol (%)	28 (51.8)	27 (57.4)	0.66
Smoking (%)	18 (33.3)	17 (36.1)	0.33
Nonvegetarian diet (%)	38 (70.3)	32 (68)	0.81
Dose (mg)*	43.7±14.5	108.5±40.8	--
Diuretics (%)	26 (48.1)	22 (46.8)	0.52
Calcium channel blockers (%)	42 (77.7)	37 (78.7)	0.55
ACE and ARB inhibitors (%)	11 (20.3)	9 (19.1)	0.56
Beta blockers (%)	15 (27.7)	15 (31.9)	0.65
Baseline SUA (mg/dL)*	7.7±0.6	7.7±0.5	0.93
Baseline eGFR (mL/min/1.73 m <sup>2</sup> )	60.2±9.8	59.4±9.9	0.71
Mean duration of follow up (months)	6.8±1.2	6.5±1.6	0.58

\*Mean±Standard Deviation (SD). Bold text indicates significance at *P* < 0.05.

BMI: Body mass index, ACE: Angiotensin-converting enzyme inhibitors, ARB: Angiotensin receptor blockers, SUA: Serum uric acid, eGFR: estimated glomerular filtration rate.