Is diuretic use beneficial or harmful for patients with chronic kidney disease?

Chronic kidney disease (CKD) is a global health concern that arises as a result of a number of different insults to renal function.¹ Progression of CKD to end-stage renal disease is a costly and important clinical event with substantial morbidity.² Additionally, increase in demand for renal replacement therapy (RRT) makes it important to investigate factors associated with the progression of CKD and the prognosis of earlier stages of CKD.

A retrospective study was conducted of subjects with an estimated glomerular filtration rate (eGFR) between 15 and 59 mL/min/1.73 m² during a 2-year study period from a hospital database. A total of 621 patients of mean age 61.09±6.57 years were identified. At baseline, 438 patients (70%) were at CKD stage 3 and 183 (30%) were at CKD stage 4. At the end of follow-up, CKD progression was observed in 372 patients (59.9%) while 113 (18%) died. To determine the factors independently associated with CKD progression, a series of logistic regression analyses was performed. Higher systolic blood pressure (HR 1.06, p=0.04), diabetes mellitus (HR 2.01, p=0.02), use of diuretics (HR 2.01, p=0.01), high serum phosphate (HR 1.24, p=0.01), heavy proteinuria (HR 3.09, p=0.03) and microscopic haematuria (HR 2.07, p=0.02) were associated with CKD progression. Surprisingly, the use of diuretics was observed as an independent determinant of CKD progression.³

In order to confirm our findings, we further conducted a prospective observational study by recruiting patients with

CKD visiting the outpatient nephrology clinic at Hospital Universiti Sains Malaysia. A total of 312 patients (mean age 64.5 ± 6.43 years, 57% male) with mean eGFR 24.5 ± 11.2 mL/min/ 1.73 m² were recruited; 144 patients (46%) were prescribed diuretics and were followed up for 1 year. At the end of follow-up, patient outcomes were assessed in terms of decline in eGFR, initiation of RRT and death. The use of diuretics was significantly associated with a decline in eGFR, with diuretic users having an annual decline in eGFR of -3.5 ± 1.6 mL/min/ 1.73 m² compared with -1.6 ± 0.77 mL/min/ 1.73 m² among diuretic non-users. A total of 36 patients (11.5%) initiated RRT, and the need for RRT was greater among diuretic users (30 diuretic users vs 6 non-users). Overall, two deaths (0.64%) occurred in the current study, both of whom were on diuretic therapy. Poor renal outcomes among diuretic users might be attributed to various other confounding factors such as hypervolaemia, higher systolic blood pressure and proteinuria.^{4,5} However, the attribution of all confounders was adjusted in all statistical analyses and, despite adjustment, diuretics were found to be independently associated with poor renal outcomes in non-dialysis-dependent patients with CKD.

The purpose of this study is not to challenge the potential benefits of diuretics in patients with CKD. However, we made an attempt to highlight the potential risks of diuretics to draw the attention of health-care professionals towards the dark side of diuretic therapy that can be potentially fatal for patients in the long term.

EAHP Statement 4: Clinical Pharmacy Services

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REFERENCES

- 1 El Nahas AM, Bello AK. Chronic kidney disease: the global challenge. *The Lancet* 2005;365:331–40.
- 2 Ojo A. Addressing the global burden of chronic kidney disease through clinical and translational research. *Trans Am Clin Climatol Assoc* 2014;125:229.
- 3 Khan YH, Sarriif A, Adnan AS, et al. Progression and outcomes of non-dialysis dependent chronic kidney disease patients: a single center longitudinal follow-up study. *Nephrology* 2017;22:25–34.
- 4 Hur E, Usta M, Toz H, et al. Effect of fluid management guided by bioimpedance spectroscopy on cardiovascular parameters in hemodialysis patients: a randomized controlled trial. *Am J Kidney Dis* 2013;61:957–65.
- 5 Alvarez-Lara MA, Martín-Malo A, Espinosa M, et al. Blood pressure and body water distribution in chronic renal failure patients. *Nephrol Dial Transplant* 2001;16(Suppl 1):94–7.