Vasopressin: a novel target for the prevention and retardation of kidney disease?


Summary provided by
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Introduction

After several decades during which little attention was paid to fluid intake vasopressin and/or urine concentration in clinical practice, interest in vasopressin has renewed with the availability of new, potent, orally active vasopressin-receptor antagonists—the vaptans—and with the results of epidemiological studies evaluating copeptin (a surrogate marker of vasopressin) in large population-based cohorts.

Key Findings

Several experimental studies in rats and mice over the past 20 years have shown that, in addition to its positive action on water conservation, vasopressin, acting via vasopressin V2 antidiuretic receptors, contributes to the progression of chronic kidney disease; in particular, to autosomal dominant polycystic kidney disease. New epidemiological studies now suggest a role for vasopressin in the pathogenesis of diabetes mellitus and metabolic disorders via activation of hepatic V1a and/or pancreatic islet V1b receptors. The first part of this Review describes the adverse effects of vasopressin, as revealed by clinical and experimental studies in kidney diseases, hypertension, diabetes and the metabolic syndrome. The second part provides insights into vasopressin physiology and pathophysiology that may be relevant to the understanding of these adverse effects and that are linked to the excretion of concentrated nitrogen wastes and associated hyperfiltration.

Relevance for Healthy Hydration

The issues of optimal water intake and vasopressin-receptor antagonism may therefore represent novel frontiers in the effort to slow progression of chronic kidney disease (CKD). Until now, efforts to retard (or even prevent) progression of CKD have mainly focused on reducing protein consumption, and more recently, on lowering blood pressure and renin–angiotensin-system (RAS) blockade. Various cohort studies have revealed associations between high copeptin level or low water intake and the prevalence or incidence of hyperglycaemia, type 2 diabetes and the metabolic syndrome. Collectively, the studies reviewed here suggest that more attention should be given to the fluid intake vasopressin–thirst–urine concentration axis in clinical investigations and in patient care. Whether water supply or selective blockade of the different vasopressin receptors may provide therapeutic benefits beyond their present indication in hyponatraemia requires new clinical trials.

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