Clinical physiology of the kidney, electrolytes and lithiasis. The “old” meets the “new”

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Fluid and electrolyte disorders are common in both the outpatient and inpatient settings. Traditionally, the nephrologist has been regarded as the most skilled and knowledgeable specialist in the evaluation of abnormalities of the “milieu interieur”, mastering even complex fluid and electrolyte disorders with a sound understanding of renal physiology. Despite traditionally being regarded as “settled”, old paradigms are challenged, and renal physiology is currently being re-shaped by research at the clinical and molecular level. Steps are being taken towards the application of the tenets of personalized medicine to the field of fluid and electrolyte disorders, including elucidation of the role of genetics on renal handling of electrolytes [1, 2]. For instance, knowledge coming from genome-wide association studies is starting to allow the elucidation of the complex interplay between urinary sodium excretion and renal function through Mendelian randomization studies [3]. The role played by the gut microbiome in the gut-kidney axis and its relevance in the development of electrolyte and acid–base abnormalities is another field with potential for growth.

Nephrolithiasis is another condition in which the nephrologist plays a prominent role. Familiar concepts such as filtered loads, fractional excretions, tubular reabsorptions, acid–base determinations and diagnostic short-term interventions help underpin the pathophysiology of certain types of kidney stones, thereby guiding the search for optimal

therapeutic strategies. Steps are being taken also in this field to integrate modern omics approaches to the more traditional toolset available to the clinical nephrologist [4–6], in order to improve the understanding of a disease that can potentially lead to chronic loss of kidney function [7].

We can thus foresee a future in which knowledge of an individual’s genetic background, metabolic profile and gut microbiome could be integrated to deliver optimal medical care.

The Topical Collection “Clinical Physiology of the Kidney, Electrolytes and Lithiasis” of the Journal of Nephrology aims to provide up-to-date information on this growing and exciting field connecting one of the oldest and most distinctive areas of Nephrology with the new approaches of personalized medicine. It will welcome original research and expert reviews on diagnostic and therapeutic aspects of fluid, electrolyte and acid–base disturbances and nephrolithiasis, in particular with regard to the additional benefits that can be provided by genomics, proteomics, metabolomics and microbiome investigations.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent For this type of study formal consent is not required.

Thematic Series: Clinical Physiology of the Kidney, Electrolytes and Lithiasis.

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