Usefulness of ultrasound imaging in overhydrated nephropathic patients

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We read with interest the paper published in this journal by Prencipe et al. [1] reviewing the usefulness of ultrasound in the assessment of fluid overload in nephropathic patients. Although we agree on the general purpose of the authors to encourage the use of ultrasound in nephrology, we have some technical observations to point out.

The first observation is about inferior vena cava (IVC) diameter measurements. The authors state that a collapsibility index (CI) above 0.75 suggests over-hydration, whereas a value below 0.4 would be consistent with dehydration: such assumption needs to be taken with caution. Indeed the IVC diameter and collapsibility depend on a number of variables, which include intravascular volume reflected by central venous pressure (CVP), but also left heart chambers pressure, intra-thoracic pressure and intra-abdominal pressure. CVP, which is the main factor influencing IVC collapsibility has long been shown to be unreliable as a single indicator of body fluid status [2]. IVC collapsibility is also influenced by the contractile function of the heart downstream: even in a patient with normal intravascular volume the IVC can be collapsed owing to over-enhanced stroke volume [3], and on the other hand patients with heart failure have wide and non-collapsing IVC because of reduced heart contractile function [4]. It should also be observed that IVC reflects only the intravascular part of the body fluid volume [5]. Because of

these limitations studies on IVC ultrasound to estimate volume status in dialysis patients have yielded conflicting results [5–7]. IVC ultrasound is certainly useful in assessing volume status, but its results should be put in the wider frame of all available clinical and ultrasound data, particularly about cardiac function—otherwise IVC diameters alone can be misleading.

The second observation is about the statement that a study of the peritoneum in search of edema can also be performed with a high-frequency probe: it is certainly possible to identify superficial free fluid in this way, but only a low frequency probe has enough wavelength to scan deep regions of the abdomen and pelvis in search of free fluid [8]. Scanning with a linear probe risks to be insensitive, and the regular abdominal probe remains the preferred choice.

Finally, the authors conclude that there are currently no studies in the literature reporting statistically significant data on the accuracy of US imaging in the assessment of hydration status in uremic patients: however, there have been several studies published about the usefulness of ultrasound of the lung and echocardiographic parameters in this setting [9–14]. While some studies have found that lung B-lines are strongly influenced by left ventricular function [15], our group confirmed correlation of lung ultrasound with hydration status also in well compensated hemodialysis patients [7].

Even with these observations we congratulate the authors for their interesting review, and look forward for more studies on these subjects.

Compliance with ethical standards

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

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