Ancient wisdom on volume control

Sir,
The Invited Comment by Professors A. Levey and G. Eknoyan on ‘Cardiovascular disease in chronic renal disease’ [1] was elegant and stimulating. Their emphasis on the fluid overload as a risk factor for CVD in CRD patients, and the need for a strict ‘dry weight’ as a treating agent urged me to add a historical comment on their findings. Hence, I present two passages from the work ‘Questiones medicae et problemata physica’ [2] written by Cassius Iatrosophista, a medical writer of the second century AD. These kind of writings summarized the state of the art in medicine, in the style of questions and appropriate answers, an easy way to memorize the current knowledge. Its use was widespread during Late Antiquity and the Middle Ages, and even beyond [3].

The first passage (Section 4: lines 1–8) reads:

‘Why do the patients with hydrops (ascites and/or oedema) become thirsty, although, it has to be said, that there is an excess of underlying water? (It happens) because this urge (for thirst) is due to a desire for water in its proper site and not in its improper. The water (they have) set aside is gathered in an unnatural location. And the relaxation of the feeling of thirst happens (only) when water is presented in the normal location, or (it can be said) that the water isn’t allocated into the proper ducts but it is diffused outside them. Hence, they are thirsty as if they hadn’t being drinking’.
From the aforementioned passage we gather that at such an early date there was a feeling that the extra fluid in an oedematous state is accumulated outside the blood vessels (third compartment?) being improperly diffused through the capillaries pores, and also that thirst is due not to a lack of total body fluids, but to a relative dehydration (causing an increase of osmolality). A factor that contributes to the intradialytic weight gain of our chronic dialysis patients, a risk factor for CVD. We all know that the standard treatment in such cases is the use of ultrafiltration through an artificial semi-permeable membrane, or, in patients on peritoneal dialysis, through a natural membrane. The doctors in the second century did not have such an artificial device available to them, nor did they know the use of the peritoneum. They used another natural membrane, the patients own skin, to abstract water [4].

The kinetics of the method were analysed in the second passage (Section 5: lines 1–10):

‘Why not being thirsty, and immersing in a bath, do we become thirsty, and vise versa, if we are thirsty, the feeling seizes because it is due to dryness. In the case that we enter the bath thirsty, the body, because it shares the anima vita, somehow absorbs through the pores on its surface the fluid, consequently its depth becomes wet, where exactly the feeling of thirst is generated. (In the case of) those who enter a bath without being thirsty, the underlying fluid is extracted by perspiration, so as not to oppose the (external) humidity’.

We notice again that they knew empirically that the movement of fluids through a semi-permeable membrane is due to differences of concentration gradient, and also that nature seeks an osmotic equilibrium.

These two passages may be interpreted without a biased hindsight to be quite relevant to the Invited Comment. Although these statements force us to upgrade our opinion of the ancient knowledge on physiology, I was unable to find any previous comment on them by medical historians in general, or nephrologists in particular. The aim now is not to prove that the ancient medical writers had, through perception, described correctly everything relative to renal problems. I have never suggested that [5]. Hence, I disagree with Joseph Glanvill (seventeenth century) who wrote in the Vanity of Dogmatizing:

‘Adam needed no spectacles. The acuteness of his natural opticks (if conjecture may have credit) shews’d him much of the coelestial magnificence and bravery without a Gallilaeo’s tube: and this’ most probable that his naked eyes could reach near as much of the upper world, as we with all the advantages of art […]. Thus the accuracy of his knowledge of natural effects, might probably arise from the sensible perception of their causes’ [6].

I only agree with Blaise Pascal who suggested also in the seventeenth century that:

‘The ancients found them (the principles of Nature) only sketched out by those who had preceded them, and we will leave them to those who come after us in a more finished state than we received them. Since their perfection depends on time and trouble, it is evident (that) […] Those whom we call ancients were really new in everything, and formed the infancy of men properly speaking, and as we have joined to their knowledge and experience of the centuries that have followed, it is in us that one can find the antiquity which we revere in the others. They must be admired for the consequences that they indeed drew from the few principles that they had, and they must be excused for those where they rather lacked the benefit of experience that the force of the reasoning’ [7].

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