DIURETIC THERAPY IN OLD PATIENTS

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The administration of diuretics is indicated in several clinical conditions characterized by more or less severe water and salt retention (congestive heart failure, non-compensated liver cirrhosis, renal syndromes etc.), or in cases in which water and sodium depletion is supposed to improve some pathophysiological aspects of clinical symptoms (e.g. as background treatment in arterial hypertension, or as emergency treatment in left ventricular failure.

The indications and mechanisms of action of diuretics (see Appendix) in aged patients are quite similar and comparable to those known for patients in any other age. The response of an aged organism, however, may be different, and the risk of side effects higher. The biological cost/benefit ratio may therefore not be favourable in all cases.

Several statistical investigations \(^1,^2,^3\) have shown that diuretics are among the most widely used drugs, largely because they are prescribed in the basic treatment of arterial hypertension even in aged patients. It has also been shown, however, that these drugs most frequently cause unwanted side effects in the elderly. \(^1,^2,^3\) Such effects are chiefly due to changes concerning the metabolic fate of drugs (involving changes of drug bioavailability, prolonged drug half-life, changes in biological response and water
and salt homeostasis. A higher frequency of unwanted side effects from diuretics in the elderly is determined also by the presence of latent disorders of glucose and uric acid metabolism, by the peculiar sensitivity of the senile brain, of the myocardium and of the pressure receptors to alterations in cellular water and salt concentration. 4,5

As to water and salt metabolism in the elderly, further aging brings about not only an impairment of renal function involving a decrease in glomerular filtration rate and in maximum reabsorption capacity at the tubular level, but also a variety of anatomical and functional alterations affecting the different mechanisms controlling water and salt regulation, 6,7 such as reduced thirst, reduced response to hypothalamic osmoceptors (associated with a decreased sensitivity of renal peripheral receptors to the antidiuretic hormone 8) as well as reduced plasma renin activity, reduced plasma and urine aldosterone concentration, causing the organism to respond less promptly to acute stimuli.

The response of renal tubules to circulating aldosterone 12 and the ability of renal sodium excretion to adjust to drastic dietary changes are therefore less prompt. Tolerance to large variations of water intake is impaired as far as both excess and reduction of water intake are concerned. 11 Aging involves moreover a progressive reduction of total body water 13 affecting chiefly intracellular water content and changes of the electrolyte pool, without variations of osmolarity. Sodium concentration in tissues – particularly as far as its exchangeable quota is concerned – has been shown to increase, while tissue potassium depletion has been shown to occur. 14,15,16

Water and salt homeostasis becomes even more precarious due to reduced potassium cell pools and to the impairment of the reserve function of bone tissue. 6 Reduction of serum albumin and hence of colloid osmotic pressure, senile changes in capillary and cellular permeability, changes in the arteriolar and capillary circulation, in the cellular energetic systems in the enzymes releasing energy for the potassium and sodium "pump" may also determine further changes in water and electrolyte metabolism. In aged patients water and salt metabolism may easily be affected by disorders developing after any kind of disease, after surgery or after mistaken or incongruous dietary or drug treatment, particularly as far as water and salt intake is concerned. Diuretic treatment, which modifies more less drastically an already precarious water and salt homeostasis, is among the most important of these factors. 17 On the other hand, some of the metabolic disorders which can be ascribed to diuretic treatment are often already present, in a more or less latent form, in aged patients (diabetes mellitus, gout etc).