NEFROLOGÍA. Vol. XXII. Suplemento 2. 2002

Comparative effects of ACE inhibition and angiotensin II receptor blockade in prevention of renal damage

S. Klahr, M.D.
Washington University in St. Louis. Missouri. USA.

Intrarenal angiotensin II has important effects on renal function and urinary sodium excretion and, via these local actions, on blood pressure regulation. Angiotensin-converting enzyme inhibitor (ACE I) treatment has been found to be renoprotective in patients with a variety of chronic renal diseases and also in diabetic patients with nephropathy.

Although both ACE I and angiotensin subtype 1 receptor antagonists (AT_1 RA) are effective in inhibiting renin-angiotensin system (RAS), they differ in their effects on the components of the system. Inhibition of ACE results in decreased conversiion of Ang I to Ang II and a compensatory rise in renin levels due to loss of negative feedback inhibition by juxtaglomerular apparatus cells (JGA). In contrast AT_1 RA produce elevation in both renin and Ang II because normal feedback inhibition of JGA cells through stimulation of angiotensin II type 1 (AT_1) receptors in blocked. These differences in the level of inhibition may have implications for the therapeutic effects of AT_1 RA as compared to ACE I.

ACE I reduces only ACE dependent Ang II production, whereas AT_1 RA blocks the effect of Ang II from any source at the receptor level. In the presence of ACE inhibition Ang II may be produced by other proteases, including chymese and other serine proteases.

It is known that there are at least two subtypes of AT receptors. Blockade of the AT_1 receptors in the presence of Ang II levels may result in stimulation of subtype 2 (AT_2) receptors. AT_1 receptors mediate most of the known effects of Ang II such as vasoconstriction, upregulation of aldosterone synthesis and its release, and renal tubule sodium and water reabsorption.

Most of the studies in models of chronic renal disease indicate that treatment with AT_1 RA affords renal protection that is comparable to that observed with ACE inhibition.