Assessment of experimentally induced acute changes of renal haemodynamics

Sir,

In the study by Fleischmann et al. [1] concerning l-arginine-induced changes of renal haemodynamics, the authors used a constant infusion technique with inulin and para-aminohippuric acid (PAH) as markers for glomerular filtration rate (GFR) and renal plasma flow (RPF), respectively. They followed an experimental protocol to achieve steady state after 2 h before l-arginine application to detect acute changes in renal function in response to two different dosages of l-arginine. For assessment of GFR and RPF, blood samples were drawn after 120 min for baseline clearance, after 150 min for clearance change under 100 mg kg\(^{-1}\) 30 min infusion of l-arginine and after 180 min for clearance change under 500 mg kg\(^{-1}\) 30 min infusion of l-arginine. It was found that hypercholesterolaemia and treatment with statins were not associated with impaired l-arginine-induced renal vascular relaxation.

Not only is the finding in contrast to studies previously performed in the vasculature of the human forearm or the coronary circulation, but the question also arises as to whether the method used for determining renal function was appropriate for this purpose. It has been shown previously that constant infusion techniques are inappropriate for the study of experimentally induced acute changes in renal function [2]. Rather, it is necessary to employ a pharmacokinetic method for the description of time-dependent non-steady-state processes that incorporate distribution effects on time-dependent marker profiles in addition to elimination effects within clinically tolerable time horizons [3,4]. By a newly developed method of dynamic renal function testing [5] applied to patients with essential hypertension we found decreases of GFR by \(\sim 10\%\) upon protein ingestion during the washout phase. Moreover, we observed restoration of renal functional reserve, as determined by the compartmental analysis method, after long-term antihypertensive treatment. Thus, an evaluation of the state of renal vasculature and renal vascular relaxation in response to amino acids, proteins or other agents can be reliably done only by the pharmacokinetic method of dynamic renal function testing.

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