Endogenous Ligands That Bind to Serum Albumin and Renal Failure

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Dear Sir,

One of the furan fatty acids, 3-carboxy-4-methyl-5-propyl-2-furanpropanoic acid (CMPF), is a major endogenous ligand substance that bound to serum albumin in uremic serum [1, 2]. It inhibits in vitro the binding of some anionic drugs to serum albumin in a concentration usually observed in uremic serum; it seems therefore likely that CMPF is one of the 'uremic toxins' [3, 4]. CMPF may be a minor metabolite of an unknown substance [5].

We have recently suggested that the accumulation of CMPF in serum reflects the 'chronicity' of renal failure and the measurement of serum CMPF concentrations is useful in differentiating between acute renal failure (ARF) and chronic renal failure (CRF), which is sometimes difficult [5]. In addition, Vladutiu et al. [6] reported that an albumin-associated fluorescent substance(s) might reflect the chronicity of renal disease and might be of clinical value in distinguishing ARF from CRF. The fluorescent characteristics of CMPF are identical with those of the albumin-associated fluorescence reported earlier [7].

We have hence estimated the value of the measurement of serum concentrations of endogenous ligand substances, CMPF and indoxylsulphate (IS), in differentiating between non-dialyzed CRF, acute on CRF (A on CRF) and ARF, which is clinically sometimes difficult. Serum concentrations of CMPF and IS were determined by high-performance liquid chromatography [8, 9]. Serum concentrations of creatinine and urea were deter-

Table 1. Molar ratios of CMPF/creatinine, CMPF/urea, IS/creatinine and IS/urea (mean $\pm$ SE)

CMPF/creatinine CMPF/urea ($\times 10^{-3}$) ($\times 10^{-3}$)

31.4 $\pm$ 4.5 129.8 $\pm$ 29.8* 160.7 $\pm$ 17.1*

0.71 $\pm$ 0.11

2.10 $\pm$ 0.45* 3.28 $\pm$ 0.30*

ARF (n = 14)

A on CRF (n = 8)

Non-dialyzed CRF (n =

36)

IS/urea ($\times 10^{-3}$)

IS/creatinine ($\times 10^{-3}$)

p < 0.001, compared with ARF by the Student t test.

mined by routine laboratory methods. The results were summarized in table 1. The molar ratios of CMPF to creatinine and CMPF to urea of non-dialyzed CRF and A on CRF were significantly

higher than those of ARF, but the molar ratios of IS to creatinine and IS to urea were not significantly different between non-dialyzed CRF, A on CRF and ARF. These results indicate that the accumulation of endogenous ligands having strong affinity for serum albumin such as CMPF reflects the chronicity of renal failure and the measurement of serum concentrations is of clinical value in differentiating between ARF and CRF. However, the accumulation of ligands having relatively weak affinity for serum albumin such as IS not necessarily reflects the chronicity of renal failure.

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