Sex- and Age-Dependent Reference Values of Alpha-1-Microglobulin in Urine

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Dear Sir,

There are different reference ranges of α -microglobulin (A-I-M) in serum and urine reported in the literature [1-11]. Reasons for these divergent data are: methodical problems caused by the heterogeneity of A-I-M, the calibration material and antisera of different specificity used in the immunochemical methods (radioimmunoassay, enzyme immunoassay, radial immunodiffusion), inappropriate selection of reference individuals and insufficient consideration of guidelines for the statistical treatment of collected reference values [12]. Recently, Itoh and Kawai [1] described sex differences of A-I-M in body fluids in this journal. However, they could not sufficiently take into account the influence of age, because they only investigated two small groups aged up to 15 years. As we were also interested in the diagnostic validity of this low-molecular mass protein in urine, we focused our attention on this problem analyzing the A-I-M data collected in a large group of healthy adults during the last 2 years [13].

304 healthy adults (144 women, 160 men) were studied; they were asymptomatic, had no history of renal diseases and were not receiving medications, showed negative test results with Combur9-dipsticks and serum creatinine concentrations below $106 \mu\text{mol/l}$. A-I-M was determined in untimed 2nd-morning urine samples by single radial immunodiffusion (Behringwerke AG, Marburg, FRG).

Our reference cohort was subdivided into five age groups as shown in table 1. The data were expressed as A-I-M concentration and A-I-M/urine creatinine ratio and were tested on whether they depended on sex and age

(Kruskal-Wallis test; Mann-Whitney U test. A-I-M concentrations were both age- and sex-dependent, whereas A-I-M/creatinine ratios did not differ between women and men and could be combined for further calculations. There were no statistical differences of the A-I-M/creatinine ratios between the three age groups of 18-40 years on one hand and between the two groups above 40 years on the other hand. A clear increase in values was observed in the group of persons older than 40 years (table 1). Since the protein/creatinine ratio allows to use random urine specimens for analysis and to consider the effect on urine flow rates, this ratio has been recommended for the interpretation of results [4, 14]. Thus, considering the age effect on this parameter as described in table 1, 95% reference intervals

were calculated according to the percentile approach [12]. The upper 95% reference limit for men and women in the age group from 18 to 40 years amounted to 1.27 g A-I-M/mol creatinine and that for persons above 40 years to 2.20, respectively.

In summary, the values of A-I-M in urine either given as concentrations or related to urine creatinine are influenced both by age and sex. Our results are close to the data described by authors who also used reagents from Behring [2, 4, 8], but they are essentially higher than the data described by Itoh and Kawai [1, 6, 7]. Our recommendation to use common reference intervals of the parameter A-I-M/creatinine ratio for men and women would facilitate the diagnostic applicability of A-I-M in clinical practice.

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