Marked Variation in Creatinine Clearance Estimation in Patients Receiving Parenteral Nutrition

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Dear Sir,

Analytical and biologic variations in serum and urinary creatinine may account for up to 33% variability in creatinine clearance calculations [1]. We wish to report on the marked variability of creatinine clearance in patients receiving total parenteral nutrition (TPN). 18 of 93 patients receiving TPN at the Vancouver General Hospital had serial estimations of creatinine clearance. Almost all patients had marked variation in creatinine clearance values; in some cases this exceeded 200%. In 11 of the 18 patients, the total urine output was not constant and incomplete urine collections may have accounted for the variation. However, in the remaining 7 patients, the daily urine output was fairly constant and the difference between the highest and lowest urine output during the course of TPN did not exceed 300 ml.

A standard protocol was followed for TPN. The protein source was a crystalline amino acid solution (Travasol). Dextrose, Intralipid (Pharmacia), vitamins and electrolytes were administered according to standard clinical indications. Creatinine clearance values were calculated from standard equations using serum and urine creatinine determined by an automated analyzer (ACA Dupont, Dupont Co., Wilmington, Del.). None of the patients were receiving drugs known to interfere with creatinine estimation.

Table I shows the changes that occurred in creatinine clearance in the 7 patients receiving TPN. In all cases the serum creatinine remained fairly constant as did urine volume (not shown). Thus the marked variation in creatinine clearance is due mainly to the changes in urinary creatinine excretion. A 7–15% variation in urinary excretion of creatinine has been shown to occur in normal individuals [2]. In chronic semistarvation in adults, urinary creatinine excretion is reduced [3]; improved nutritional support leads to increased creatinine excretion [4, 5]. These changes occur in conjunction with an improvement in body

Table I. Serial measurements of urinary creatinine (Ucr), serum creatinine (Scr) and creatinine clearance (Ccl) in the 7 patients receiving TPN

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weight. The changes in our patients occurred fairly early after initiation of TPN. Whatever the reason for the marked variation in urinary creatinine in these patients, it is important to recognize this phenomenon. Often patients receiving TPN require administration of

drugs which are toxic in the presence of renal insufficiency. Recognition of this marked variation in creatinine clearance in patients with TPN may help in avoiding this potential hazard. Reliance should be placed on serial changes in serum creatinine. A baseline value should be obtained prior to start of TPN.

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