Effect of Ascorbic Acid on the Hematopoiesis of Patients with Chronic Renal Failure Receiving CAPD

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Dear Sir,

A good correlation has been reported between ascorbic acid and iron, as well as folic acid metabolism [1–3]. A statistically significant decrease in ascorbic acid levels of patients with chronic renal failure at the beginning of chronic ambulatory peritoneal dialysis (CAPD) has been recently found [4]. Low plasma ascorbic acid levels have been found in patients receiving CAPD for years in a study of our own [to be published]. Having all the above in mind we decided to study the influence of ascorbic acid on the hematopoiesis of such patients measuring the levels of hematocrit and plasma ferritin.

Materials and Methods

Twenty patient (13 males, 7 females) undergoing CAPD were studied. Their mean age was 56 years (range 19–71 years) and the mean time on dialysis 1½ years (range 7 months to 3 years). Plasma ascorbic acid levels, plasma ferritin levels, hematocrit, and hemoglobin were measured at the beginning of the study. Ascorbic acid Cebion, Merck; 2 g/day p.o.) was administered for a period of 15 days. After this period, the above parameters evaluated again. Following this, the patients, received daily 1 g ascorbic acid for a period of 2 months, when the last measurement was made. The period between the last dose of vitamin C and our measurements was 12 h at the end of 15 days, as well as at the end of 2 months. During this 12-hour period the patients had already begun their morning CAPD. All subjects had been receiving orally a vitamin B complex as well as 5 mg folic acid per day from the beginning of their CAPD and during the whole period of our study. None suffered from diabetes mellitus, chronic liver disease, or any other chronic inflammatory disease. None was given blood transfusions during the period of our study. Three patients were excluded from the statistical analysis of the 15-day period and 2 patients from that of the 2-month period because of acute peritonitis.

The plasma ascorbic acid concentrations was measured using the 2,6-dichlorophenolindophenol sodium colorimetry method [5, 6]. The plasma ferritin concentration was measured using radioim-

munoassay. The statistical analysis was carried out using the student t test based on paired samples for quantitative measurements and the 2-test for paired samples for qualitative measurements.

Results and Conclusions

The mean plasma ascorbic acid concentration at the beginning of the study was 0.89 mg% (range 0.25–1.3 mg%). At the end of the 15-day and 2-month periods, the values were 1.42 (range 0.73–

2,3) and 0.96 mg% (range 0.68–1.22 mg%), respectively. The increase of ascorbic acid levels during the 15-day period has been statistically significant ($t = 2.58$; $p < 0.05$), in contrast to the results at the end of the 2-month period ($p < 0.01$). The qualitative comparison of ascorbic acid increase and hematocrit levels during the 15-day period showed a statistically significant relationship ($\chi^2 = 12.25$). The increase of the hematocrit levels at the end of 15 days has been statistically highly significant ($t = 9.33$; $p < 0.001$). The mean change was 2.7 (range 0.3–6.2). The increase at the end of 2 months has been statistically less significant ($t = 2.82$; $p < 0.05$). The mean change was 1.27 less (range 0.2–2.8). Relative changes have been observed as far as hemoglobin values are concerned. The increase of plasma ferritin levels at the end of the 15-day period was statistically significant ($t = 3.16$; $p < 0.01$). Its mean change was 12.3 ng/ml (range 1.3–64.4 ng/ml). After 2 months the values (always being compared to the values at the beginning of the study) showed smaller changes ($t = 2.17$; $p < 0.05$). The mean increase was 10.4 ng/ml (range 1.2–45.6 ng/ml). In summary, this study demonstrated that treatment of chronic renal failure patients undergoing CAPD with ascorbic acid (2 g daily) for 15 days results in statistically significant increases of hematocrit, hemoglobin and ferritin levels. The regular control of plasma ascorbic acid levels of such patients is proposed.

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