Effect of Acetate and Erythropoietin on Fetal Hemoglobin in Hemodialyzed Uremic Patients

To the Editor:

It has been recently reported in Blood by Stamatoyannopoulos et al1 that acetate stimulates synthesis of fetal hemoglobin (HbF) in vivo. It has also been reported that recombinant human erythropoietin (rHu-EPO) is a potent HbF inducer. Patients with end-stage renal disease under hemodialysis (HD) are treated by dialysate containing acetate or bicarbonate for the correction of acidosis and some of these patients receive rHu-EPO for managing anemia of end-stage renal failure.2,4

The present study was performed to determine whether acetate and rHU-EPO increase HbF in uremic patients under regular HD. The study was performed in 72 uremic patients under regular HD three times per week (3 times for 4 hours weekly) with hollow fiber dialyzers. For the better evaluation of the effect of acetate and rHu-EPO on the HbF synthesis, patients were divided in four groups. Group I consisted of 17 patients with a hematocrit (Hct) of 30% ± 3.19% under HD with dialysate containing acetate and treated with rHu-EPO 30 to 50 IU/kg of body weight (BW) at the end of the HD session. Group II consisted of 18 patients with an Hct of 31.4% ± 5.3% under HD with dialysate containing acetate but not treated with rHu-EPO. Group III consisted of 20 patients with an Hct of 31.45% ± 5.00% under HD with dialysate containing bicarbonate and treated with rHu-EPO 30 to 50 IU/kg BW at the end of the HD session. Group IV consisted of 17 patients with an Hct of 31.38% ± 6.55% under HD with dialysate containing bicarbonate but not treated with rHu-EPO. Betke’s method was used to determine the value of HbF in all patients. Normal values for HbF are less than 0.9%.

Our findings showed that the mean values (±SD) of HbF for groups I, II, III, and IV were 0.53% ± 0.14%, 0.50% ± 0.17%, 0.50% ± 0.21%, and 0.64% ± 0.38%, respectively. According to these findings, HbF values in HD uremic patients are within normal limits. The mean values (±SD) of HbF in patients under bicarbonate dialysate (group IV) are the highest but with no significant difference as compared with the values of HbF observed in the patients of the other groups. Therefore, the use of dialysate with acetate and rHu-EPO does not stimulate the synthesis of HbF in HD uremic patients.

According to the findings reported by Stamatoyannopoulos et al,1 administration of sodium acetate in experimental animals by continuous intravenous infusion (in doses of 1.5 to 6 g/kg/day) results in an increase of HbF around day 4.1

In regular HD sessions, patients are hemodialyzed three times weekly and the HD session time is 4 hours. The concentration of acetate in plasma during HD is about 3.5 to 5 mmol/L. It seems that the amount of acetate transferred from dialysate to the patient and the short time of the HD session are not adequate to stimulate HbF synthesis.3,4

With regard to the induction of HbF by the administration of rHu-EPO, most reports suggest that the dosage (30 to 50 IU/kg) used in uremic patients is not adequate to increase HbF. Stimulation of HbF synthesis was observed by a dose of rHu-EPO 10-fold greater than the usual dose administered in uremic patients.3,4

In conclusion, acetate dialysate and rHu-EPO do not stimulate the synthesis of HbF in uremic patients under HD.

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REFERENCES


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