Does Erythropoietin Have a Beneficial Effect on Calcium, Phosphorus and Parathyroid Hormone Levels in Pediatric Hemodialysis Patients?

U.	Umit	Saatci
R.	Rezan	Topaloglu
S.	Seza	Ozen
A.	Aysin	Bakkkaloglu
N.	Nesrin	Besbas

Department of Pediatric Nephrology, Hacettepe University Faculty of Medicine, Ankara, Turkey

Prof. Dr. Umit Saatci, Head, Department of Pediatric Nephrology, Hacettepe University Faculty of Medicine, TR-06100 Sıhhiye, Ankara (Turkey)

Dear Sir,

It has been established that human recombinant erythropoietin (rHuEpo) is a very effective replacement therapy for anemia of chronic renal failure [1]. This drug has also been shown to exert beneficial effects on other organs and on some endocrinological functions in the uremic patient [2]. It has been shown that rHuEpo causes an increase in intracellular calcium (Ca) concentrations [3-5]. The purpose of this retrospective study was to investigate whether rHuEpo had any possible effects on levels of N-terminal fragment of circulating immunoreactive parathyroid hormone (PTH), serum Ca, phosphorus (P) and alkaline phosphatase levels. Fourteen hemodialysis patients, with an age range of 9-16 years, were the subject of this study. They all received Ca and active vitamin D preparations at maintenance doses during the study. Serum Ca and P were measured monthly, and alkaline phosphatase and N-terminal PTH values were measured every 3 months for 6 months before and after the start of rHuEpo treatment. These patients were treated with rHuEpo administered 3 times weekly by subcutaneous injections. The initial dose was 150 U/kg/ week, and the dosage was then adjusted to keep the hematocrit (Hct) value between 27 and 30%. All patients had an increase in the hemoglobin and Hct values with mean values from 6.3 ± 0.8 to 8.1 ± 1.4 g/dl and from 19.1 ± 1.8 to $24.4 \pm 4.2\%$, respectively.

Table 1. Ca and

P levels before and after the start of rHuEpo therapy (n=14)

The mean values for serum Ca and P before the start of rHuEpo therapy were found to be 9.3 ± 0.9 and 5.4 ± 0.8 mg/dl and 9.9 ± 1.3 and 4.8 ± 0.7 mg/dl after the start of therapy, respectively (table 1). The mean values of P decreased significantly and then remained within normal levels. Serum Ca levels increased, however, did not reach hyper-calcemic values (table 1). Although the number of patients with high PTH and alkaline phosphatase levels was 8 (57%) and 6 (42%), respectively, all returned to normal after the initiation of rHuEpo treatment.

Our findings suggest a correction of the N-terminal fragment of PTH, alkaline phosphatase and P levels in patients on maintenance hemodialysis with rHuEpo treatment. Further studies are

required for the verification of our results and to shed light on whether this beneficial effect is through the monitorization of intracellular Ca levels.

References

- Schaefer RM, Horowitz WH, Massry SG: Treatment of renal anemia with recombinant human erythropoietin. *Am J Nephrol* 1989;9:353-362. Baldamus CA, Scigalla P, Koch KM (eds): *Erythropoietin: From Molecular Structure to Clinical Application*. Basel, Karger, 1989. Tepel M, Wischniowski H, Zidek W: Erythropoietin induced transmembrane calcium influx in essential hypertension. *Life Sci* 1992; 51: 161-167.
- Miller BA, Scaduto RC Jr, Tillotson DL, Botti JJ, Cheung JY: Erythropoietin stimulates a rise in intracellular free calcium concentration in single early human erythroid precursors. *J Clin Invest* 1988;82:309-315.
- Miadenovic J, Kay NE: Erythropoietin induces rapid increases in intracellular free calcium in human bone marrow cells. *J Lab Clin Med* 1988; 112:23-27.