Improvement of Anemia and Secondary Hyperparathyroidism with Erythropoietin Treatment in Hemodialysis Patients

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Dear Sir,

Anemia is a severe problem in patients with chronic renal insufficiency. While multiple factors can cause anemia in chronic renal failure, decreased erythropoietin (Epo) production is the most important cause [1]. Another cause may be secondary hyperparathyroidism that has not been clearly explained. It was suggested that parathormone (PTH) may play a role by its direct inhibitory effect on erythropoiesis and/or induction of bone marrow fibrosis [2]. We studied the effect of Epo therapy on secondary hyperparathyroidism in hemodialysis (HD) patients.

Twenty-four HD patients who were treated with Epo, 9 males and 15 females, mean age 45.6 ± 14.5 years (range: 18-75) were included in the study (group I). The control group consisted of 17 age- and sex-matched HD patients who were not prescribed Epo (group II). Patients are dialyzed for 4 h, 2-3 times a week. All patients received calcium carbonate (3-9 g/day), calcitriol (0.25 mg/day), and a low-protein diet consisting of 800 mg phosphorus. Group I patients were treated with Epo 60-70 IU/kg s.c. twice a week. In all patients, serum calcium (Ca), phosphorus (P) and alkaline phosphatase (ALP) values were measured monthly, and N-terminal PTH values were measured every 3 months. The serum values of Ca, P, ALP and PTH at baseline and at the third month were compared in the two groups by the Student’s t test. All the measurements are shown in table 1.

With Epo administration in group I, the mean hematocrit value rose from 18.6 ± 2.6 to 24.8 ± 3.5% (p < 0.001) while the serum value of Ca increased significantly (p <

Table 1. Serum levels of Ca, P, ALP and PTH in groups I and II

<table>
<thead>
<tr>
<th>Group</th>
<th>Epo and (CaCC &gt; 3 + vitamin D)</th>
<th>Baseline</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>(CaCC &gt; 3 + vitamin D)</td>
<td>8.5 ± 1.2</td>
<td>8.6 ± 1.3</td>
</tr>
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<td></td>
<td></td>
<td>8.4 ± 1.0</td>
<td>9.2 ± 0.8</td>
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Ca, mg/dl
Ca, mg/dl
Baseline 489.7 ± 452.3 238.0 ± 437.7
*After treatment 327.4 ± 349.3 230.5 ± 295.8
* p < 0.05; ** p < 0.03; *** p < 0.01; **** p < 0.001.

is excessive PTH secretion in chronic renal failure and that this status may contribute to the anemia seen in uremic patients [3]. Improved anemia in patients with primary hyperparathyroidism has been reported after surgical ablation of parathyroid adenoma [4]. Also, it has been noted that parathyroidectomy may improve the anemia in patients with chronic renal failure. Unfortunately, observations on PTH-related anemia (p < 0.001). The serum values of ALP and PTH decreased significantly (p < 0.001, p < 0.05). The mean serum value of P also decreased, but the difference was not significant (p > 0.05). In group II, the mean serum values of P, ALP and PTH decreased but the difference was not significant with the exception of the serum P values (p < 0.03).

A number of studies have shown that one of the major causes of renal osteodystrophy