Persistent Anemia after Successful Kidney Graft

J.J.	Juan J.	Plaza
A.	Alberto	Ortiz
G.	Guillermina	Blum
M.	Manuel	Moliz
C.	Carlos	Caramelo

Kidney Transplant Unit, Fundación Jiménez Díaz, Universidad Autonoma de Madrid, Spain

J.J. Plaza, MD, Servicio de Nefrología, Fundación Jiménez Díaz, E-20840 Madrid (Spain)

Dear Sir,

Anemia of chronic renal failure is multifactorial but many observations indicate that inadequate production of erythropoietin (EPO) is a major contributory factor [1, 2]. Successful renal transplantation is associated with an improved hemoglobin concentration, which very frequently reaches normal values in a short period of time [3], reflecting the normalization of EPO production by the graft [4,5] and possibly an improvement of the medullary erythropoietic response to the hormone [6]: in both cases, however, good function of the graft is required. A 40-year-old man, grafted with a second kidney from a cadaveric donor in July 1988, has had satisfactory and early recovery of renal function. Blood creatinine has been about 1.6 mg/dl (141.4 $\mu\text{mol/l}$) and CCr 60 ml/min from September 1988 until now. Triple immunosuppressive therapy including azathioprine, prednisone and ciclosporin A at low doses has been well tolerated. However, in spite of good renal function without rejection crisis, blood hemoglobin levels remained below normal values along these two years ($\text{Hb} < 8 \text{ g/dl}$). Other hematological laboratory tests and clinical studies were negative in finding a specific cause of the anemia other than EPO deficiency and an elevated serum parathormone (450 U/ml). Both serum EPO levels measured by RIA and reticulocyte count were low (table 1). We hypothesized that this type of anemia would be responsive to the increase of circulating EPO levels. Treatment was therefore initiated with subcutaneous recombinant human erythropoietin (rHuEPO) 40 IU/kg/body weight three times a week until the target hemoglobin was reached ($\text{Hb} > 12 \text{ g/dl}$) 40 days later.

Thereafter, the dosage was

Table 1. Laboratory characteristics of the patient prior to and after treatment with rHuEPO

adjusted to a maintenance dose of 30 and later 15 IU/kg/dl three times a week. No changes in renal function were detected as judged by the constant CCr in the 5 months following the beginning of rHuEPO.

Correction of the anemia after a successful kidney transplantation is attributed to an increased EPO production by the graft [5,7], to an improvement of the bone marrow erythropoietic response to EPO [6], or both. Removing any other causes to explain the etiology of the anemia, the low immunoreactive serum EPO and the positive response to subcutaneous rHuEPO support, the first mechanism as responsible for the anemia in the present patient. In some way, the

disregulation of the feedback mechanism between hemoglobin levels and EPO secretion in this case is opposite to that proposed for the more common situation of posttransplant erythrocytosis [8].

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The present case raises two significant points: first, that a selective deficit of EPO production in transplant kidneys may exist with otherwise near-normal kidney function; second, that rHuEPO may be a safe and efficacious therapy in the subset of renal transplant patients with persistent anemia and good renal function. Recently, a successful trial with rHuEPO has been carried out in patients with markedly reduced renal transplant function [9].

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