Phlebotomy for Polycythemia Associated with Acquired Cystic Renal Disease in a Patient on Hemodialysis

J.	Juan	Navarro
A.	Abelardo	Aguilera
F.	Fernando	Liaño
J.	Julio	Pascual
J.	Joaquín	Ortuño

Department of Nephrology, Hospital Ramón y Cajal, Madrid, Spain

Fernando Liaño, MD, Department of Nephrology, Hospital Ramón y Cajal, Carr. Colmenar, Km. 9,100, E-28034 Madrid (Spain),

Dear Sir,

Human erythropoietin (EPO) deficiency is considered a decisive factor in the development of anemia of chronic renal failure [1]. The presence of normal hemoglobin (Hb) and hematocrit (Ht) levels is not frequent in patients on hemodialysis [2] and levels above the normal range are exceedingly rare, usually associated with polycythemia vera, lung or liver disease, malignant tumors, nephroan-giosclerosis and acquired cystic kidney disease (ACKD) [1,3-5].

We report a patient on hemodialysis who developed ACKD and polycythemia who needed phlebotomy to maintain Ht levels within an adequate range.

A 61-year-old male nonsmoker presented in June 1980 with hypertension, edema, heavy proteinuria and microscopic hematuria. Renal biopsy showed advanced glomerular sclerosis and interstitial fibrosis with angio-sclerosis at the small vessel level. Renal size and outline were normal on tomography. Several months later, terminal renal failure made periodic hemodialysis necessary. Hb was 10.1 g/dl and Ht 30.3%. Bone marrow aspirate showed alterations compatible with anemia secondary to chronic renal failure. During the next years, the patient did well on our hemodialysis program except for several episodes of supraventricular tachycardia finally diagnosed as Wolff-Parkinson-White syndrome.

In October 1989, he suffered the breaking of his arterio-venous fistula due to local infection. In January 1990, Hb was 16.5 g/dl and Ht 54%, and a therapeutic phlebotomy (400 ml) was indicated. Since August 1990, Hb has been between 15 and 17 g/dl and Ht between 48 and 50%. Liver and pulmonary function tests were normal, as was α -fetoprotein and carcinoembryonic antigen. Abdominal computed tomography showed bilateral renal cysts and he was diagnosed having ACKD. Serum EPO levels were progressively elevated (fig. 1). In an attempt to lower them, oral theophylline (400 mg/day) was started, but intense headache obliged us to withdraw this drug. In December 1990, Hb was 18.5 g/dl and Ht 56.5%, and therapeutic phlebotomy was necessary. The hematologic evolution is depicted in figure 1.

During the first 10 years on periodic hemodialysis, our patient maintained Hb levels below normal values, as it is the rule in these populations [2]. In the last 2 years, slow but progressive Ht elevation was noted and finally, exceedingly high Ht levels required therapeutic phlebotomy. Extrarenal causes of erythrocytosis were excluded, and high EPO levels

were very probably related to ACKD. Inappropriate renal secretion induced by cystic formation may be an adequate explanation for these high EPO levels [6].

Erythrocytosis can be associated with significant morbidity. Thomas et al. [7] demonstrated a significant reduction in cerebral blood flow in patients with polycythemia. Seizures developed in patients on recombinant EPO treatment have also been related to reduction in blood flow [1]. The practice of therapeutic phlebotomies when Ht overpasses 50% is a safe procedure to avoid neurologic complications. Barkis et al. [8] demonstrated that theophylline attenuates the production of EPO in human and it can be an alternative to phlebotomies in these patients.

© 1992 S. Karger AG, Basel

0028-2766/92/

0621-0110\$2.75/0

60-

55-

50

45

M- 40-

E

35-30-25-20-

IX

Year 80

IX

84

IX

89

VIII

90

XII

91

Fig. 1. Hematologic evolution of Ht, Hb and EPO. SR = Spontaneous rupture of FAV; PH = phlebotomy. EPO values, normal range: 0.29-25.9 mU/ml.

Hb
g/dl

EPO mU/ml

References

Eschbach JW: The anemia of chronic renal failure. Pathophysiology and the effects of recombinant erythropoietin. *Kidney Int* 1989;35: 134-148.

Charles G, Lundin AP III, Delano BG, Brown C, Friedman EA: Absence of anemia in maintenance hemodialysis. *Int J Artif Organs* 1981;4: 277-279.

Klassen DK, Spivak JL: Hepatitis-related hepatic erythropoietin production. *Am J Med* 1990;89:684-686.

Radtke H, Claussner A, Erbes P, Scheuermann E: Serum erythropoietin concentration in chronic renal failure: Relationship to degree of anemia and excretory renal function. *Blood* 1979;54:877-884.

Shalhoub R, Rajan D, Kim V, Goldwasser E, Kark J, Antoniou L: Erythrocytosis in patients on long-term hemodialysis. *Ann Intern Med* 1982;97:686-690.

Goldsmith HJ, Ahmad R, Raichura N, Lai SM, McConnell CA, Gould DA, Gyde O, Green J: Association between rising hemoglobin concentration and renal cyst formation in patients on long-term regular hemodialysis treatment. *Proc EDTA* 1983;19:313-318.

Thomas DJ, Marshall J, Ross Russell RW, Wetherley-Mein G, Duboulay GH, Pearson TC, Symon L, Zilkhae: Effect of haematocrit on cerebral blood flow in man. *Lancet* 1977;ii:941-943.

Barkis GL, Sauter ER, Hussey JL, Fisher JW, Gaber AO, Winsett R: Effects of theophylline on erythropoietin production in normal subjects and in patients with erythrocytosis after renal transplantation. *N Engl J Med* 1990;323:86-90.

III