Low Serum TSH Levels and Negative TRH Test in Dialysis Patients

J.		Evers ^a
H.		Scheid ^b

^aDialyseinstitut Bad Neuenahr und ^bRadiologische Abteilung, Krankenhaus Bad Neuenahr, Deutschland

Dr. med. Josef Evers, KfH Dialysezentrum, Dorotheenweg 3, D-53474 Bad Neuenahr (Germany)

Dear Sir,

Various alterations of thyroid hormones, mostly decreased levels of total thyroxine (T₄) and triiodothyroxine (T₃) in serum, and a blunted, delayed rise of thyroid-stimulating hormone (TSH) after administration of thyrotropin-releasing hormone (TRH) have been found in patients with renal failure [1]. However, decreased levels of TSH and no rise in response to exogenous TRH stimulation are unusual. Therefore, we want to report about 4 dialysis patients with subnormal TSH levels and a negative TRH test.

Within 2 years of opening of a new dialysis center in an area with endemic goiter we detected 4 out of 30 patients with extremely low TSH levels which did not rise after intravenous injection of 0.400 µg TRH. Levels of basal and stimulated TSH (after administration of TRH), total and free thyroid hormones are given in table 1.

Patient 1 (R.M.) is a 64-year-old anxious man with end-stage renal failure (ESRF) due to nephrosclerosis and regular hemodialysis treatment since August 1991. After transfer to our center he suffered from gradual loss of dry weight, hypokalemia, ventricular premature beats and repeated congestive failure. After subtotal thyroidectomy in December 1993 because of autonomy of the right thyroid lobe, TSH was normal at 2.09 µU/ml in March 1994, in response to TRH 4.89 µU/ml, T₄ was 7.0 µg/dl and T₃ 110 ng/dl. Histo-logical examination revealed only degenerative changes of the thyroid, no adenoma.

Patient 2 (P.K.) is a 68-year-old man with acromegaly and ESRF with unknown primary disease with hypertension and atrial fibrillation. He started with regular dialysis treatment in August 1992. The left kidney had to be removed in November 1992 because of a hypernephroma. ^{99m}Tc scintillation scanning of the thyroid showed multinodular goiter with autonomy in two nodules. In April 1993, he suffered from a myocardial infarction with severe congestive heart failure, and in 20 months he lost weight from 67 to 58 kg. No antithyroid therapy has been given until now.

Table 1. Dialysis patients with low TSH levels (normal levels in parentheses)

Age/Sex

Basal TSH

(0.1-4.0)

µU/ml

Stimulated TSH

(2.0-30.0)

$\mu\text{U/ml}$
 T_3
 (60-200) ng/dl
 (4.8-12.9) $\mu\text{g/dl}$
 Free T_3
 (2.2-4.7) pg/l
 Free T_4
 (0.8-2.0)
 ng/dl

196
 78
 130
 136
 8.0 4.4 6.8 9.5
 4.4 5.34 2.8 3.95
 1.3
 1.92
 0.3
 1.75

Patient 3 (U.N.) is a 60-year-old man with insulin-dependent diabetes mellitus, accelerated arteriosclerosis, ESRF due to diabetic nephropathy and hypertension. In February 1994, hemodialysis was started because of repeated congestive failure; his weight decreased from 95 to 91 kg. Thyroid $^{99\text{m}}\text{Tc}$ scintillation scanning showed autonomy of the left lobe. After a trial with carbimazole a subtotal thyroidectomy is planned.

Patient 4 (W.A.) is a 67-year-old woman with regular hemodialysis treatment since February 1987 because of cystic kidneys which were removed in 1988 and 1989. She had loss of appetite and of dry weight of about 3 kg in 6 months, erythropoietin-resistant anemia, aluminum overloading, intermittent congestive heart failure and, rarely, tachyarrhythmia at the end of hemodialysis. Scintillation scanning of the thyroid showed diffuse goiter without warm or cold nodules.

Extremely low levels of TSH in serum with no rise in response to exogenous TRH administration in patients with chronic renal failure are unusual. As underlying disease we found multinodular goiter with autonomy in 3 patients and diffuse goiter in 1 patient. All patients were aged about 60 years or older; they had repeated pulmonary congestion and weight loss, but no ophthalmopathy or dermopathy. Conventional laboratory test results were on the borderline or in the normal range.

Although the course of thyroid disease did not appear progressive, and as the signs were difficult to distinguish from the usual complications in hemodialysis patients, nephrologists should be more aware of this problem in dialysis patients. If an association of signs as weight loss, congestive heart failure or atrial fibrillation with thyroid disease is suspected, a TRH test should be performed.

Further investigations are required to see if this is only a local problem in a area with endemic goiter. Treatment with radioactive iodine is difficult because of dialysate contamination. More frequent exchange of experiences is needed to ascertain if a wait-and-see policy, a trial with an antithyroidal drug, treatment with radioactive iodine (¹³¹I), ablative therapy or an individualized approach is best to improve the care of such dialysis patients. In any case, administration of iodide should be avoided to prevent the development of overt thyrotoxicosis.

Reference

1 Ramirez G, Haley JA: Abnormalities in the hypothalamic-hypophyseal axes in patients with chronic renal failure. *Semin Dial* 1994;7: 133-146.

358

Evers/Scheid

Thyroid Abnormalities in Dialysis Patients