OLGU SUNUMU

Sürekli Ayaktan Periton Diyalizi Uygulanan Üç Olguda Tirotoksikoz

Thyrotoxicosis in Three Patients on Continuous Ambulatory Peritoneal Dialysis

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ÖZET

Üremi tiroid fonksiyonlarını etkilemekte ve son dönem böbrek yetmezliği (SDBY) hastalarında hipotiroidizm gelişmektedir. Bununla birlikte tirotoksikoz SDBY hastalarında nadirdir. SDBY hastalarında bildirilen çoğu tirotoksikoz olguları tiroid kanseri olan ve hemodiyalize giren hastalardır. Bu nedenle tiroid kanseri olmayan üç periton diyalizi (PD) hastasındaki tedavi deneyimimizi ve sonuçlarını paylaşmak istedik.

Klinik bulgular üreminin tirotoksikoz semptomlarını maskelemesi nedeniyle nonspesifikti. Hipertiroidizmin nedeni iki hastada Basedow-Graves ve bir hastada toksik nodüler guatr idi. Tüm hastalar her iki anti-tiroid ilaç ile (propiltiyourasil ve propranolol) ve radyoaktif iyot (RAI) ile tedavi edildi. Anti-tiroid ilaçlara bağlı bir yan etki tespit edilmedi, fakat tüm hastalarda radyoaktif iyot tedavisi sonrası hipotiroidi gelişti.

Tirotoksikozun klinik bulguları SDBY hastalarında maskelenebilir. Bu nedenle tirotoksikoz daha fazla araştırılmalıdır. Anti-tiroid ilaçlar PD hastalarında güvenle kullanılabilir. Fakat eğer RAI tedavisi kullanılırsa, hastalar RAI tedavisi sonrası hipotiroidizm için değerlendirilmelidir.

Biz peritoneal klirensi zayıf olan bir toksinin tiroid fonksiyonları üzerine etki edebileceğini ve PD hastalarında tirotoksikoza neden olabileceğini düşünüyoruz.

Anahtar sözcükler: hipotiroidi, periton diyalizi, radyoaktif iyot tedavisi, tirotoksikoz

ABSTRACT

Uremia affects thyroid functions and hypothyroidism occurs in end-stage renal disease (ESRD) patients. However, thyrotoxicosis occurs in ESRD patients rarely. Most of the published reports about thyrotoxicosis in ESRD patients are related with thyroid cancer and maintenance on hemodialysis. Therefore we wanted to share our experience about therapy and outcomes of three thyrotoxic peritoneal dialysis (PD) patients without thyroid cancer.

Clinical manifestations were nonspecific because uremia masked thyrotoxic symptoms. Hyperthyroidism was due to Basedow-Graves disease in two patients and toxic nodular goiter in one patient. All patients were treated with both anti-thyroid drugs (propylthiouracil and propranolol) and radioactive-iodine (RAI) therapy. No side-effects were seen due to anti-thyroid drugs but hypothyroidism developed after radioactive iodine therapy in all patients.

Clinical manifestations of thyrotoxicosis may be masked in ESRD patients. Therefore thyrotoxicosis need to be thoroughly investigated. Anti-thyroid drugs may be used safely in PD patients. But if RAI therapy is used, patients must be evaluated for hypothyroidism after RAI therapy. We speculate that a uremic toxin with poor peritoneal clearance may affect thyroid functions and cause thyrotoxicosis in PD patients.

Keywords : hypothyroidism, continuous ambulatory peritoneal dialysis, radioactive iodine therapy, thyrotoxicosis

2006;15 (1) 52-55

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Introduction

End-stage renal disease (ESRD) is characterized by irreversible loss of renal function and has effect on multiple systems, including endocrine system. Also the kidney has an important role in the metabolism, degradation and excretion of thyroid hormones. ESRD affects thyroid function in multiple

Table I. Clinical and demographic characteristics of the patients

	Patient 1	Patient 2	Patient 3
Age/Gender	37/F	37/F	65/M
Primary renal disease	Chronic glomerulonephritis	Chronic pyelonephritis	Hypertensive nephrosclerosis
Thyrotoxicosis etiology	Toxic nodular goiter	Toxic diffuse goiter	Toxic diffuse goiter
Presence of exophthalmos	Yes	Yes	No
Dialysis time (months)	85	60	28
Treatment	Medical + RAI	Medical + 2 RAI	Medical + RAI

RAI: Radioactive iodine

ways, such as decreasing circulating thyroid hormone concentration, disturbing the binding of the hormone to carrier proteins and increasing iodine storage in thyroid gland (1).

The diagnosis of thyrotoxicosis is more difficult because of the signs and symptoms masked in uremia. Also thyrotoxicosis is seen less frequently than hypothyroidism in ESRD patients. Most of the published reports are about thyrotoxicosis in ESRD patients undergoing hemodialysis (HD) (2,3) and with thyroid cancer (4). Three patients with thyrotoxicosis but without thyroid cancer who were on maintenance peritoneal dialysis (PD) were reported in this paper. We want to share our diagnosis, treatment experience and complications of treatment by antithyroid drugs and radioactive iodine (RAI) in three PD patients with thyrotoxicosis.

Material

Patients

In our clinic, we diagnosed thyrotoxicosis in three (2 female, 1 male) PD patients with palpitation, tiredness, weakness and non-diagnostic symptoms. Clinical and demographic characteristics of the patients are summarized in Table I.

Case 1. Thirty-seven-year-old female patient was on maintenance peritoneal dialysis for 85 months (from August 1998 to date). She presented with nervousness, weight loss, intolerance to heat and tachycardia at September 2003. Primary renal disease was chronic glomerulonephritis. The physical examination revealed blood pressure 180/90 mmHg, pulse 150/minute regular, respiration rate 24/minute. There was exophthalmos, thin skin and weakness in upper arms and thighs. Laboratory parameters were as follows; hemoglobin 10.5 g/dL, htc 31%, BUN 68 mg/dL, serum creatinine 11.8 mg/dL, serum albumin 4.4 g/dL. Thyroid function tests documented thyrotoxicosis; free T_3 11.43 pg/mL, (normal 2.30-4.20 pg/ml), free T_4 4.64 ng/dL (normal 0.89-1.80 ng/dL) and thyroid-stimulating hormone (TSH) < 0.001 µIU/mL (normal 0.35-5.5 µIU/mL). Thyroid ultrasonography demonstrated a pattern of multinodular thyroid gland and thyroid scan, performed with sodium pertechnetate Tc 99m, demonstrated an active nodular thyroid gland. Propylthiouracil and propranolol were used between September 2003 and August 2004. 15 mCi of radioactive iodine (RAI) was used at May 2004 and hypothyroidism developed three months after RAI therapy. She has been treated with L-thyroxine.

Case 2. Thirty-seven-year-old female patient was on maintenance peritoneal dialysis between May 1997 and May 2004 (except 1997 to 1998, renal transplantation period). Primary renal disease was chronic pyelonephritis. She presented with palpitation, inability to fully close the eyelids during sleep and menstrual irregularity at March 2002. Physical examination revealed diffuse goiter, tachycardia, fine and moist skin, tremor and exophthalmos. Laboratory parameters were as follows; hemoglobin 10.1 g/dL, htc 29%, BUN 43 mg/dL, serum creatinine 10 mg/dL, serum albumin 3.6 g/dL. Thyroid function tests documented thyrotoxicosis; free T_3 5.60 pg/mL, (normal 2.30-4.20 pg/mL), free T_4 2.09 ng/dL (normal 0.89-1.80 ng/dL) and thyroid-stimulating hormone (TSH) < 0.001 µIU/mL (normal 0.35-5.5 µIU/mL). Thyroid ultrasonography revealed an enlarged diffuse thyroid gland and thyroid scan performed with sodium pertechnetate Tc 99m demonst-

rated a pattern of diffuse gland hyperplasia. Propylthiouracil and propranolol at different dosages were used. 25 mCi of radioactive iodine (RAI) was used at May 2003 and 20 mCi three months later. Hypothyroidism developed after RAI therapy and L-thyroxine was used as replacement therapy. She died due to cerebrovascular accident at May 2004.

Case 3. Sixty-five-year-old male patient was on maintenance peritoneal dialysis for 28 months (from June 2003 to date). He presented with palpitation, tiredness and malaise at February 2004. Primary renal disease was hypertensive nephrosclerosis. The physical examination revealed blood pressure 180/80 mmHg, pulse 110/minute regular, respiration rate 18/minute. Laboratory parameters were as follows; hemoglobin 11.7 g/dL, htc 35%, BUN 67 mg/dL, serum creatinine 5.0 mg/dL, serum albumin 3.6 g/dL. Thyroid function tests documented thyrotoxicosis; free T_3 12.58 pg/mL, (normal 2.80-7.10 pg/ml), free T_4 47.69 ng/dL (normal 12-22 ng/dL) and TSH = 0.007 µIU/mL (normal 0 .27-4.2 µIU/mL). Thyroid ultrasonography demonstrated an enlarged diffuse thyroid gland and thyroid scan performed with sodium pertechnetate Tc 99m demonstrated a pattern of diffuse gland hyperplasia. Propylthiouracil and propranolol were used between February 2004 and August 2004. 17 mCi of radioactive iodine (RAI) was used at August 2004 and hypothyroidism developed one month after RAI therapy. He has been treated with L-thyroxine.

All patients were treated with propylthiouracil and propranolol as anti-thyroid drugs. RAI therapy was used in all patients (two times for one patient and one time for two patients). All patients well tolerated the oral therapy. No side-effects such as leukopenia, fever, headache and arthralgia were observed. After RAI therapy, hypothyroidism developed in all patients. L-thyroxine was used as replacement therapy. Except one (who died due to cerebrovascular accident), patients have been treated with L-thyroxine.

Discussion

Patients with chronic renal failure exhibit more disturbances in endocrine system and thyroid function (1). The prevalence of hypothyroidism is higher than that of hyperthyroidism in ESRD patients. Lin et al (5) investigated the prevalence of thyroid dysfunction and nodular goiter in ESRD patients and healthy group. They obtained higher prevalence of thyroid dysfunction and nodular goiter in ESRD patients than in healthy group.

The prevalence of Basedow-Graves disease is not established in healthy population. Tunbridge et al (6) reported that in Whickham, an area thought to be representative of United Kingdom, the prevalence of Basedow-Graves disease was 2.7%. Basedow-Graves disease is the most common cause of spontaneous hyperthyroidism in patients younger than 40 years of age. However thyrotoxicosis is rare in ESRD patients. The prevalence of thyrotoxicosis was 3% (2/61) in female and 1.5% (1/61) in male patients in our clinic. In literature, most of thyrotoxic ESRD patients were undergoing maintenance hemodialysis. The experience in terms of the management of the patients with thyrotoxicosis on peritoneal dialysis is limited.

All our patients have been treated with antithyroid drugs (propylthiouracil and propranolol) plus RAI therapy. After RAI therapy hypothyroidism developed in all our patients and L-thyroxine is used for replacement therapy. Oshiro et al (7) reported a 26-year-old hemodialysis patient with erythropoietin (EPO) resistant anemia associated with primary hyperthyroidism. Methimazole is used in this patient to improve hyperthyroidism and anemia. Foley et al (8) reported two patients with thyrotoxic heart disease, who have been treated with beta blocker, while on maintenance hemodialysis. Also we used propylthiouracil and propranolol in our patients and no side-effects were observed.

RAI is an other alternative therapy used for especially thyroid cancer treatment in ESRD patients. Sinsakul et al (3) reported two patients undergoing maintenance hemodialysis with papillary thyroid cancer, treated with RAI. The experience in managing patients with RAI on peritoneal dialysis is limited. Because the excretion of RAI is dependent on the kidney, ESRD patients are at risk of prolonged exposure during RAI therapy. Because serum RAI half-time was 5 times longer in CAPD patients, we consulted with the Department of Nuclear Medicine for RAI dose adjustment. The first patient was treated with 15 millicurie (mCi), the second patient with 25 mCi in the first session and 20 mCi in the second session, and the third patient with 17 mCi of RAI. Hypothyroidism is an important late complication of RAI therapy. All our patients also had hypothyroidism symptoms after RAI therapy and have been treated with L-thyroxine.

In conclusion; the diagnosis of thyrotoxicosis is more difficult because the signs and symptoms are masked in uremia. Therefore ESRD patients need to be thoroughly investigated for thyrotoxicosis. Antithyroid drugs are well tolerated in our PD patients and can be used safely for thyrotoxicosis therapy. RAI therapy can also be used but patients must be investigated for complications such as hypothyroidism. It could be speculated that uremic toxin with poor peritoneal clearance could affect thyroid functions and cause thyrotoxicosis in these patients.

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