LETTER TO THE EDITOR

Thyroid function in patients with proteinuria

Dear Editor,

As demonstrated by Gilles *et al.*[1] thyroid function is usually not overly affected in proteinuric states. This may be different, however, in patients treated with thyroxine (T4) who develop a nephrotic syndrome.

CASE REPORTS

Patient 1

This 65-year-old woman was treated by her family physician with 275 µg of T4 (Thyrax^{R}) because of primary hypothyroidism. She was referred because of the nephrotic syndrome (s-albumin 13 g/l, 24-hour urinary protein excretion 16 g). She was hypothyroid, the thyroid-stimulating hormone (TSH) being 57 mU/l (normal 0.5 to 4), fT4 6.8 pmol/l (11 to 24). The dose of T4 was increased to 400 µg daily, after which the TSH normalised (1.6 mU/l). The kidney biopsy showed focal glomerulosclerosis. With high-dose steroids, the proteinuria dropped to 11 g/day. TSH decreased to 0.17 mU/l and fT4 rose to hyperthyroid levels (37 pmol/l). Currently, the proteinuria is stable at 2 g/day. The patient is more or less euthyroid (TSH 5 mU/l, fT4 21 pmol/l) on 225 µg of T4.

Patient 2

A 55-year-old woman, euthyroid on 175 µg of T4 (Euthyrox^{R}), became nephrotic (s-albumin 26 g/l; proteinuria 11 g/day) due to minimal lesion nephropathy. The TSH rose to 42 mU/l, fT4 dropped to 11.7 pmol/l. The dose of T4 was increased to 200 µg/day, when the nephrotic syndrome went into remission two weeks after the start of high-dose prednisone. The TSH dropped to 0.016 mU/l and fT4 rose to 35.8 pmol/l. Decreasing the dose of T4 to 175 µg/day rendered the patient euthyroid again. The same sequence was seen two years later when the nephrotic syndrome relapsed and was again brought into remission.

There is a linear relationship between urinary protein and urinary total T4 concentrations in patients with proteinuria.[2] Apparently, patients with hypothyroidism taking thyroxin are unable to compensate for urinary losses of T4, which may result in biochemical and clinical hypothyroidism. This is in contrast to nephrotic patients with a normally functioning thyroid, as described by Gilles *et al.* By increasing the synthesis of T4, these patients make up for the urinary losses of this hormone. I refer to the excellent overview by Chandurkar *et al.*[2] To end with a clinical note: when higher doses are suddenly required in a patient with primary hypothyroidism on a stable dose of T4, do not forget to check the urine for protein.

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2. Chandurkar V, Shik J, Randell E. Exacerbation of underlying hypothyroidism caused by proteinuria and induction of urinary thyroxine loss: case report and subsequent investigation. Endocrine Pract. 2008;14:97-103.