

Hyperthyroidism following Hypothyroidism – a case report

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Summary

A 25 year old female presented with hypothyroidism which was followed by the development of hyperthyroidism about 1 1/2 years later. This uncommon phenomenon is postulated to result from changes in the relative amounts of stimulatory and inhibitory TSH receptor antibodies. This case illustrates the possible continuum between Graves' disease and Hashimoto's thyroiditis within the broad spectrum of autoimmune thyroid disease.

Key words: hypothyroidism, hyperthyroidism, TSH receptor antibodies.

Introduction

Graves' disease, Hashimoto's thyroiditis and primary (idiopathic) hypothyroidism are closely related autoimmune disorders. Histopathological coincidence of Grave's disease and Hashimoto's thyroiditis has been reported¹ and antithyroid antibodies such as antithyroglobulin and antimicrosomal antibodies can occur in both.

The development of hypothyroidism in patients with hyperthyroid Graves' disease during or after treatment with antithyroid drugs is well known. On the other hand the occurrence of thyrotoxicosis after hypothyroidism is a rare phenomenon.

This report describes a case of hyperthyroidism following hypothyroidism.

Case report

A 25 year old Malay housewife was seen in January 1989, having been referred for evaluation of her goitre which had been noted 5 years previously. It was painless and there had been no change in size. She had no symptoms of hypothyroidism or thyrotoxicosis, no family history of thyroid disease, neck irradiation or iodine exposure. Her diet was assessed to be adequate.

Physical examination revealed a small soft diffuse goitre, clinically euthyroid. The rest of the examination was normal.

Thyroxine (T4) level was 66 nmol/l (Normal: 64 - 167 nmol/l) free thyroxine index (FTI) of 17 (normal 14 - 56) and TSH was 10.2 micro IU/ml (Normal 0.3 - 5.0 micro-IU/ml). Titres to antimicrosomal antibody and antithyroglobulin antibody were 1:25,600 and 1:<10 respectively.

On subsequent follow-up she complained of cold intolerance and constipation and she was started on L-thyroxine 50 micrograms daily.

Subsequently she defaulted follow-up and was not seen until January 1990. At that time she had not been on L-thyroxine for several months but was asymptomatic and clinically euthyroid. T4 level was 31 nmol/l, FTI 7 and TSH markedly raised at 52 micro IU/ml. L-thyroxine was started at a dose of 100 micrograms daily. In March 1990 she developed tremors, palpitations and heat intolerance. The L-thyroxine dose was reduced to 50 micrograms daily. In May 1990 the T4 level was 232 nmol/l and FTI 97. L-thyroxine was stopped.

Six weeks later (during which time the patient was not on any medications) the T4 level was 298 nmol/l, FTI 86 and TSH <0.3 micro IU/ml. She was clinically toxic with a small soft diffuse goitre but there was no bruit and no eye signs were noted. She was then started on propylthiouracil. Over a two month period she became clinically euthyroid. She continues to be followed-up.

Discussion

Hyperthyroidism after hypothyroidism is rare. Bell et al² found 27 cases. McDermott et al³ found 21 cases. The average interval between the diagnosis of hypothyroidism and the onset of hyperthyroidism was 3.4 years in the McDermott series with a range of 2 months to 11 years.

The pathogenesis of this sequence of events is unknown. Hypotheses centre on the TSH receptor and its antibodies. Some immunoglobulins stimulate thyroid hormone production while others may block the TSH receptor but are themselves not able to stimulate thyroid hormone synthesis. Still other antibodies cause thyroid growth and goitre formation. Presumably the change in relative amounts of stimulating and blocking antibodies produces hyperthyroidism following hypothyroidism^{2,4}. Unfortunately no assays of TSH receptor antibodies were performed in the case presented.

Other authors feel that the initial hypothyroid phase is due to autoimmune damage to the thyroid gland⁵ rather than resulting from inhibitory antibodies. Nevertheless it is difficult to explain why such a gland damaged by autoantibodies could subsequently develop hyperthyroidism.

The cause of the proposed changes in autoantibodies is not known. Thyroxine treatment has been postulated to be the trigger for this change by causing decreased immunological surveillance^{2,4}.

The histological features of the gland during the hypothyroid stage have been poorly documented in most reported cases including ours. Nevertheless Kasagi et al⁵ in their case report documented lymphocytic infiltration on needle biopsy.

This case illustrates a possible continuum between Graves' disease and Hashimoto's thyroiditis⁶. Either disease may present as hyperthyroidism, euthyroid goitre or hypothyroidism³.

Hyperthyroidism after hypothyroidism may not be as rare as has been reported simply because hypothyroidism is easily overlooked especially if the interval between the initial hypothyroid state and the development of hyperthyroidism is short. Finally one should keep in mind the possibility that primary hypothyroidism due to autoimmune thyroiditis may not always be permanent and even hyperthyroidism may develop⁵.

References

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