Development of a thyroid function strategy for general practice

S RAMACHANDRAN

J J MILLES

M B WELLS

R A HALL

SUMMARY

A study was carried out to investigate a thyroid stimulating hormone (TSH) frontline strategy that could potentially result in a more straightforward interpretation of thyroid function tests, a reduction in the number of inappropriate referrals to medical outpatients, an improvement in the 'turnaround time' of results, and a reduction in the number of unnecessary tests carried out, thereby reducing costs.

Keywords: thyroid function tests; thyroid disease; thyroid stimulating hormone; general practice.

Introduction

SINCE 1987 there has been a trend towards the use of TSH as a frontline test with subsequent generation of free T4 and free T3.[1] The Mayo Clinic has published guidelines to this effect.[1] In the event of an elevated TSH, free T4 is generated to confirm hypothyroid status. If TSH is suppressed, then free T4/free T3 are generated to confirm hyperthyroidism. It must be noted that patients with pituitary disease or psychiatric disease may have a TSH that is either within the reference range or below it.[1,2]

Method

The study included 5122 patients, biochemically investigated for thyroid disease over a three-month period. A minimum follow-up of six months was available for all patients. Patient demographic details, TSH, free T4 and free T3 results were downloaded from the laboratory computer onto a database (Microsoft Works for Windows, version 3), and clinical and treatment data were obtained from pathology request forms and general practitioner (GP) patient notes.

The patients were grouped according to the following TSH results:

Below the reference range	<0.3 IU/l
Within the reference range	0.3–5.0 IU/l
Borderline hypothyroid	5.0–10.0 IU/l
Hypothyroid results	>10.0 IU/l

Within these groups the patients were further categorized, depending on their free T4 results (high, low, or normal).

S Ramachandran, BSc, Dip RCPath, senior registrar in chemical pathology, Central Pathology Laboratory, North Staffordshire Hospital; J J Milles, MB, MA, BChir, FRCP, consultant physician, Good Hope Hospital, Sutton Coldfield; and M B Wells, MB, ChB, general practitioner, Streetly Road Surgery, Birmingham.

Submitted: 26 November 1997; accepted: 1 May 1998.

The significant group, which was studied in greater depth, comprised patients with normal TSH and free T4 values outside the normal reference range. It is in this group that information could potentially be lost and clinical management compromised if a frontline TSH strategy was adopted.

Results

Of the 5122 patients, 4423 (86.4%) had a TSH value within the quoted reference range, 4381 of these patients also had a free T4 within the normal reference range. In the remaining 32 patients, 29 had low free T4 values, and the other three patients had elevated free T4 values, with a normal TSH. It was this selected group of 32 patients who were investigated in depth.

In the group of 29 patients with normal TSH and low free T4 values, 17 had no follow-up biochemical or clinical assessment over the following nine months. Of the remaining 12 patients, seven had their results return to normal within the follow-up period while four patients continued to demonstrate similar results, although they were clinically euthyroid. These results did not lead to any documented management changes. The remaining patient was on tri-iodothyronine therapy.

Three patients with normal TSH had elevated free T4 results. One patient was on thyroxine with a free T4 of 35.1 pmol/l. No immediate action was taken to change the dose of thyroxine, and no follow-up took place during the next nine months. In another patient, the free T4 returned to normal, while the remaining patient had no documented follow-up.

Discussion

Our results indicated that only a very small proportion of patients investigated by GPs had a normal TSH with an abnormal free T4 result, suggesting that a frontline TSH policy would be feasible. Of the 32 patients with a normal TSH but an abnormal free T4, the latter result had not led to any change in clinical management.

The data was presented to GPs and hospital physicians and it was agreed that TSH frontline would be adopted, with the caveat that patients being treated for established thyroid disease, suspected pituitary disease, and followed-up with thyroid cancer, would not be bound by the guidelines (Figure 1). These guidelines have been in practice for over a year and have been well accepted by the laboratory staff, GPs, and physicians.

Laminated charts illustrating the guidelines were printed (Figure 1) and these were distributed to GPs practices and hospital outpatients departments. Our guidelines enabled the GPs and physicians to follow the recommendations on clinical practice, published subsequently by the working party of the Royal College of Physicians.[3]

In 1996, the Australian Health Insurance Commission restructured its Medicare rebate rules for thyroid function testing. Payment would only be granted for both TSH and free T4 assays under clearly defined circumstances.[4] Many clinicians did not agree with this protocol; primarily designed for reducing costs and implemented throughout Australia in a way that has greatly limited clinical freedom. The approach outlined in this paper, GPs from the outset were involved by the laboratory in developing and evaluating a protocol that suits their requirements and local circumstances, is an important feature of UK medicine that should be maintained.

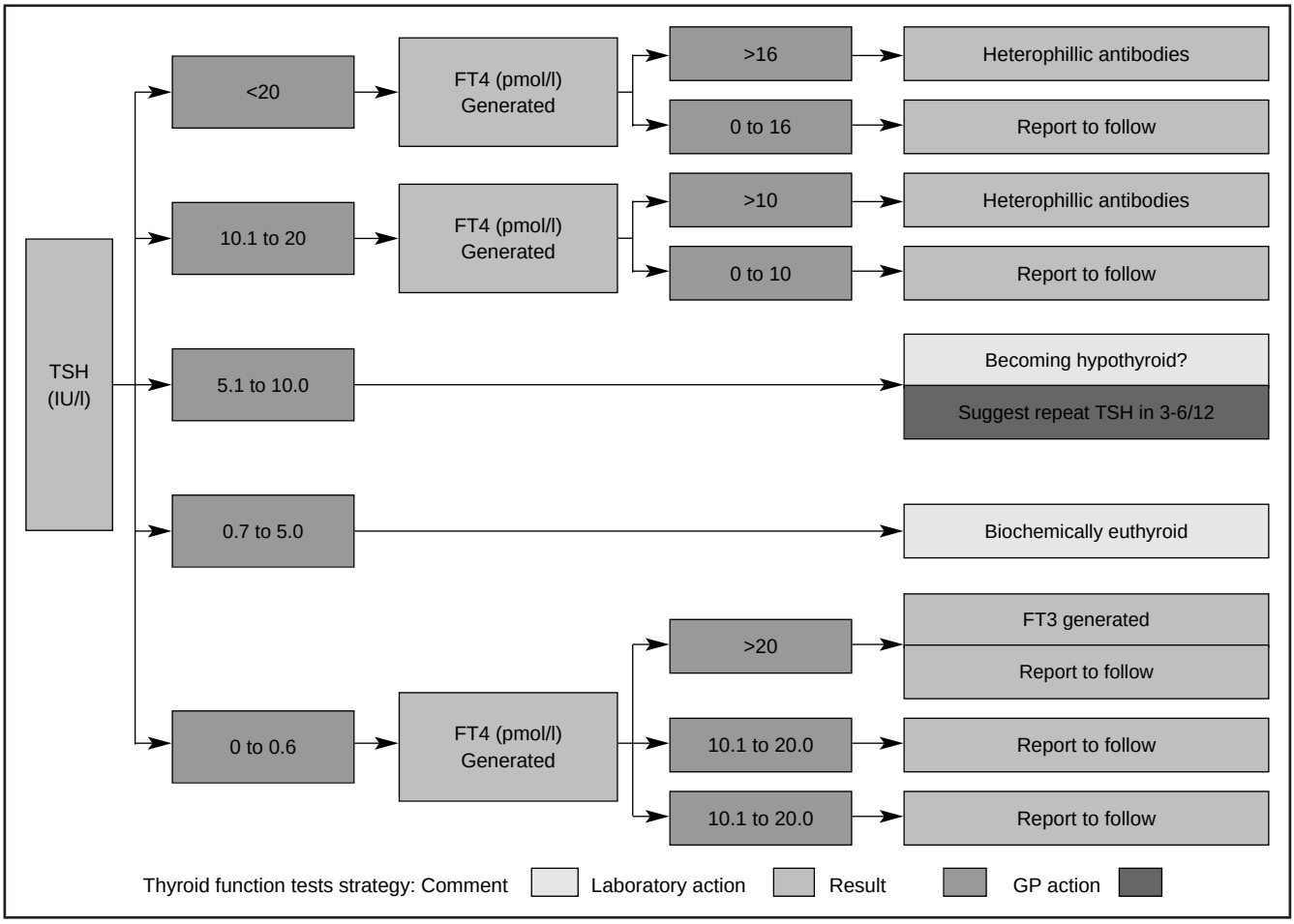

Figure 1. Guidelines regarding actions taken by a laboratory on a cascading scheme depending on frontline TSH and stepwise generated FT4 values.

References

1. Klee G, Hay ID. Role of thyrotropin measurements in the diagnosis and management of thyroid disease. *Clin Lab Med* 1993; **13:** 673-682.
2. Lindsay RS, Toft AD. Hypothyroidism. *Lancet* 1997; **349:** 413-417.
3. Vanderpump MPJ, Ahlquist JAO, Franklyn JA, Clayton RN. Consensus statement for good practice and audit measures in the management of hypothyroidism and hyperthyroidism. *BMJ* 1996; **313:** 539-543.
4. Davey DX, Clarke MI, Webster AR. Thyroid function testing based on assay of thyroid stimulating hormone: assessing an algorithm's reliability. *Med J Aust* 1996; **164:** 329-332.

Address for correspondence

Dr S Ramachadran, Central Pathology Laboratory, North Staffordshire Hospital, Hartshill Road, Hartshill, Stoke-on-Trent, Staffordshire ST4 7PA.