

All Wales Clinical Biochemistry Audit Group

Standards for Thyroid Function Testing Strategies

INTRODUCTION

The results of a questionnaire sent to all laboratories in Wales in September 1999 revealed significant differences in thyroid function testing strategies between laboratories. The majority (9/14) of laboratories used a first line thyrotropin (TSH) and free thyroxine (FT4) strategy, 4 laboratories used TSH alone and 1 laboratory used FT4 alone. Some of the strategies for further testing were unnecessarily complex.

Many guidelines for the detection of thyroid disease recommend a first-line TSH-only strategy.^{1,2} However, a TSH-only strategy may miss cases of secondary and tertiary hypothyroidism^{3,4,5} as the presenting clinical features of pituitary and hypothalamic disease are often non-specific. A TSH-only strategy may also miss cases of primary hyperthyroidism (G.Beckett, personal communication), as immunoassays remain prone to interference, especially from heterophile antibodies.^{6,7}

The survey showed that many laboratories experienced problems with inappropriate testing (11/13) and excessive repetition of testing (10/13). While method-related differences in reference intervals were expected, even those quoted by laboratories using the same methodology were different. It is often impractical for laboratories to validate reference intervals on their own, but a multicentre approach for deriving them for thyroid hormones using identical analysers has been proposed.⁸

The following standards are therefore recommended in the light of the survey findings, discussion at audit meetings in November 1999 and April 2000 and published evidence.

STANDARDS

1. All laboratories offering thyroid function tests should provide TSH and FT4 assays "on site" and should provide or have access to assays for free tri-iodothyronine and thyroid antibodies. TSH should be measured by at least a second generation immunoassay with a functional sensitivity down to 0.02 mU/L.
2. It is recommended that all laboratories should use a TSH and FT4 first-line testing strategy.
3. Laboratories should have a clearly documented strategy for further testing, which should be as simple and explicit as possible. The strategy should be agreed with local physicians and endocrinologists. It is recommended that the strategy should utilise only first-line test results, previous results and clinical information.
4. It is recommended that measurement of thyroid peroxidase (TPO) antibodies⁹ is generally sufficient when antibody testing is required to investigate suspected autoimmune thyroid disease; thyroglobulin antibodies do not need to be routinely measured. It is recommended that TPO antibodies are measured using an immunoassay technique; haemagglutination methods have inadequate sensitivity and specificity.
5. All laboratories should use validated reference intervals. Laboratories using the same method should endeavour to adopt common reference intervals.
6. Laboratories should comment on abnormal results where appropriate, especially for general practitioners and other non-expert clinicians.
7. Laboratories should endeavour to discourage inappropriate and unnecessary repeat testing.
8. Laboratories should be aware of potential analytical interferences (e.g. heterophile antibodies) and either investigate problems "on site" or refer samples to other laboratories for checking.
9. Laboratories should ensure that appropriate internal quality control (IQC) and external quality assessment (EQA) procedures are in place for each assay they perform.

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Appendix: Calendar of Audit Process for Standards for Thyroid Function Testing Strategies

Nov. 1999	Findings of a survey of Welsh laboratories' strategies for thyroid function testing (14/14 laboratories replied) undertaken by Dr.I.Hainsworth (Consultant Biochemist, Morriston Hospital, Swansea) and presented at a joint Wales/South West England Clinical Biochemistry Audit meeting in Weston-super-Mare on 18 th November 1999.
2000-2001	Initial draft standards prepared by Dr.I.Hainsworth and then modified by Mr.I.Hanning (Consultant Biochemist, Hull Royal Infirmary) following Dr.Hainsworth's retirement. Additional advice provided by Dr.R.John (Consultant Biochemist, University Hospital of Wales, Cardiff). Draft standards reviewed at All Wales Clinical Biochemistry Audit Group committee meetings.
2001	Draft standards sent for consultation to consultant biochemists and endocrinologists in Wales to seek their views. Final draft of standards presented at the All Wales Clinical Welsh Biochemistry Audit Group meeting on 18 th October 2001 and at the Welsh Endocrine and Diabetes Society business meeting on 1 st November 2001.
Nov. 2001	Standards finalised and ratified at an All Wales Clinical Biochemistry Audit Group committee meeting (on 22 nd November 2001) by Dr.K.Griffiths (chairman).
2005	Proposed date of re-audit and review of standards.