

## Indications for use of the Thyrotropin Releasing Hormone (TRH) test

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Previously the TRH test has been part of the 'Triple Test' of pituitary function along with GnRH (LHRH) and a stimulant of GH release such as insulin, glucagon or arginine. With the advent of low reading highly sensitive immunoradiometric (IRMA) TSH assays, the need for performing this test has been challenged, especially as it can cause unpleasant side effects in the child such as nausea and flushing, albeit transiently.

TSH secretion has a distinct circadian rhythm with a marked nocturnal surge. Measurement of this nocturnal surge is more sensitive than the TRH test in patients with central hypothyroidism but is more resource dependent (Rose et al) and is difficult to interpret in routine practice (Darzy et al). The TSH response to TRH correlates directly with basal TSH measurements, but not with thyroxine levels. A poor TSH response to TRH was directly correlated with low basal TSH levels (<2.0 mU/l) (Westwood et al). If a low TSH was found in combination with low (free)T4, this was always predictive of central hypothyroidism.

Contrary to currently held views, Mehta et al demonstrated that the timing of the peak TRH response did not categorise the aetiology. Patients with known central hypothyroidism could show normal, blunted or delayed TSH responses to TRH as well as elevated basal values. TRH tests in adult patients following cranial irradiation (Darzy et al) may show subtle alterations to the hypothalamo-pituitary-thyroid axis but do not demonstrate major disruptive changes. Following bone marrow transplantation Ishiguro et al have shown that thyroid function can be assessed and followed up by baseline function tests without the need for dynamic TRH tests.

### Uses of the TRH test:

The TRH test may be useful as an adjunct to genetic screening in suspected TSH resistance due to mutations of the TSH receptor where an exaggerated TSH response occurs (Park et al), or in the differentiation of pituitary secreting tumours. In this latter situation a blunted or absent TSH response may be seen.

### Practice points:

The TRH is unnecessary in the routine evaluation of central hypothyroidism. Low basal TSH levels (<2 mU/l depending on local reference ranges) should arouse suspicion, but TSH levels can be raised in congenital forms of central hypothyroidism eg septo-optic dysplasia.

The (free)T4 levels in combination with TSH form the basis of screening for and following abnormalities of function in suspected secondary (central) hypothyroidism.

If a TRH test is required, baseline free T4 and TSH are measured. TSH levels are then taken at 20 and 60 minutes following an i.v. injection of 7 ug/kg (maximum 100 ug) of TRH. Nausea, vomiting and flushing may occur.

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