TRH-TSH Releasing Hormone Stimulation Test/ GnRH Releasing Hormone Stimulation Test

Clinical Applications:
Clinical consultation with an Endocrinologist must precede the test being performed.
Note: GnRH is expensive and this test is rarely indicated on clinical grounds. An exception is in children with sexual precocity where an increased LH/FSH (of response to GnRH) is seen in central (true) sexual precocity. TRH testing has largely been replaced by sensitive plasma TSH assays for the diagnosis of thyrotoxicosis. TRH test is useful in diagnosis of TSHoma.

Purpose of Test:
Assessment of pituitary and target gland (thyroid and gonadal) function. This procedure is to be followed when both TRH and GnRH responses are needed. Previous work has shown that the response to one hormone is not altered by the addition of the other. It is often not necessary to carry out both these tests. Please specify which hormonal analyses are required.

Patient Preparation
Patient need not be fasting, but should empty bladder before the test.

Procedure:
Make up TRH 400 µg in diluent provided.
Make up GnRH 100 µg in diluent provided.
Inject TRH IV over one minute.
Then - Inject GnRH IV over one minute (set clock at "zero time" after TRH injection).
Note: either hormone may be given alone or can be given as part of an insulin tolerance test. Releasing hormone can be obtained by arrangement with the Christchurch Endocrinology Department.

Blood samples:
Should be taken at 0 (pre stimulation), 20, 60 and 90 min after injection. At each time the following is drawn:
- TSH (TRH test) 5ml plain tube
- LH (GnRH test) 5ml EDTA
- FSH (GnRH test) 5ml EDTA
- Prolactin (TRH test) 5ml EDTA

Separate plasma as soon as possible. Store plasma deep frozen. Label tube with hormone (LH etc) name, date and time of sample. All side effects should be noted. Date of last menstrual period, age, sex of patient, whether on oral contraceptives, thyroxine or other drugs should be noted and recorded. It is often valuable to know "end organ hormone" values at the time of testing (eg Free thyroxine index, plasma testosterone, etc).

Interpretation
Normal response.

TRH Stimulation:
- TSH increment > 2.5 mIU/L (males)
- > 5 mIU/L(females),
- elderly males may have a minimal response.
- Hyperthyroidism due to TSH secreting pituitary adenomas usually have reduced TSH response to TRH
- Prolactin increment > 1050 mIU/L (more marked in females).

GnRH Stimulation
- LH increment > 5 IU/1 (more marked at midcycle or during the luteal phase).
- FSH increment < 5 IU/1 (more marked during puberty). (not always detectable).

Deficient responses are seen in TSHoma, hypopituitarism, thyrotoxicosis or patients receiving excess thyroxine (TSH and prolactin) or oestrogens (LH & FSH).
Exaggerated responses are seen in primary hypothyroidism (TSH and prolactin) and primary hypogonadism (FSH).
A paradoxical GH response to TRH (or GnRH) may be seen in acromegaly.
Patients with prolactinoma may fail to show a prolactin response to TRH.
In setting of raised T4 and normal or raised TSH, a deficient TSH response suggest TSHoma while a normal TSH response suggest syndromes of thyroid hormone resistance.