

Contributing Physician

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October 2019

Introduction

You have been referred to an endocrinologist, a doctor who specializes in the diagnosis and treatment of disorders of the endocrine glands. Endocrine glands release chemicals into the blood in a complex manner, which tell parts of the body to do certain jobs at certain times of the day. These chemicals are referred to as hormones. Endocrine disorders can be in the form of too little or too much hormones being produced. A deficiency exists when there is not enough of a hormone in the body. In order for your doctor to make an accurate diagnosis, testing may be necessary, and some of the testing can be quite complicated. This section was written to help you and your family understand the evaluation process of hormone deficiencies.

Control of Hormones/Hormone Deficiency

The hypothalamus controls the pituitary gland; both are located in the brain. The pituitary gland releases or controls many hormones in the body. The hormones are released in very small amounts into the bloodstream and then travel to parts of the body (referred to as target organs) to perform a specific job. These hormones control many of the body's functions, which are the following: thyroid stimulating hormone (TSH) turns the thyroid gland "on" in order to control your metabolism, adrenocorticotrophic hormone (ACTH) stimulates adrenal cortisol production to assist your body in daily function and stress, vasopressin assists in the salt and water regulation of the body, gonadotropins (FSH, LH) stimulate the ovaries (in women) or testes (in men) to release "sex" hormones (estradiol or testosterone), and growth hormone (GH) that causes growth in children and affects fat metabolism, bone density, lipid metabolism, and muscle in children and adults.

Deficiencies of these hormones may occur alone or in combination with one or more other hormone deficiencies. The hormone(s) deficiency may be congenital, resulting from a defect in the brain. The deficiency may also be acquired, stemming from the damage to the brain after a severe head injury, serious illness (such as meningitis or encephalitis), brain tumor and/or radiation. Sometimes no cause for the hormone deficiency can be identified.

Evaluation and Testing

In order to confirm or determine the possibility of hormone deficiencies your doctor will perform an examination and ask you some questions. Past records may have to be reviewed. Screening blood tests will usually be done. These blood tests will check the secretion of the pituitary hormones and their target organs.

Possible tests that may be done are listed:

- ACTH/cortisol/ACTH stimulation test (to test adrenal function)
- Free T4/TSH (to test thyroid function)
- FSH/LH and estradiol or testosterone (to test stimulation ability of the ovaries or testes)
- IGF-I/GH stimulation test (an indirect measure or screening test for growth hormone production)
- Electrolytes (measures water & salt balance)

You may need to have a picture of the brain; this is done by an MRI scan (a CT is performed for those who have a pacemaker and cannot undergo an MRI scan). These tests are not painful but you will have to hold still for approximately one hour during the test.

Growth Hormone

If there is a possibility that you have GH deficiency, more testing will have to be performed. Growth hormone is secreted by the pituitary gland in quick bursts and does not last long in the blood, so checking a single blood sample for growth hormone will not be helpful. Deep sleep, vigorous exercise, and certain drugs are known to stimulate the secretion of growth hormone. The amount of GH in the blood is measured by taking blood samples over a period of time. This is done by performing a "GH stimulation test." This refers to drawing baseline hormone levels, stimulating GH release by giving a drug, drawing intermittent GH levels for one to four hours. The commonly used medications to stimulate GH secretion include insulin and glucagon. In December 2017, the United States Food and Drug Administration has approved the use of a medication called Macrelin, which can be taken by mouth, as the test that can be used to test for adult GH deficiency. All of these growth hormone stimulation tests requires you to be fasted. On the day of the test, an IV line will be placed in your arm for multiple blood draws to measure your growth hormone levels.

Your doctor will determine the specifics of the tests, such as type of drug, length of test, and amount of the samples.

Once the diagnosis of adult GH deficiency is confirmed, your doctor will need to make sure you are on adequate hormone replacement for other hormone deficiencies prior to stimulation testing. You will be given instructions. You should not have anything to eat or drink, except for water, after midnight the night before the test. You should have minimal activity before the test (no exercise that morning). An indwelling IV will be started and baseline hormone levels will be drawn.

You will be given a medication. Your doctor or nurse will review your medications, the medication to be used and its effects. Growth hormone levels will be drawn intermittently from the IV at specified times for a period of two hours. If the IV stops working during the test, it is important that it be restarted so the samples may be obtained at the specified times.

The purpose of the testing is to determine if you are GH deficient or not and if so, whether you are eligible for GH therapy. In order to start GH treatment, you will have one, sometimes two simulation tests to be performed. Your doctor will decide the number of tests and will interpret the test results for you. It may take several weeks for your doctor to receive and review the test results. You should discuss the results and the possibility of growth hormone treatment with your doctor.

Summary

Your doctor will prescribe GH replacement and other hormone replacement if you are deficient in GH and other pituitary hormones. Remember that each hormone has a specific function in your body. Replacement medication is very important, and so is your compliance with the medications. If you have any questions don't hesitate to call your doctor, nurse, or the MAGIC Foundation for resources.

Evaluation Process of Adults with Growth Hormone Deficiency



Patient Information

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