

Mini Review

Imbalance of Hormones: Women with High Testosterone

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Abstract

Hormones are chemical messengers, secreted by endocrine gland, circulated by the blood in the body and effective in very small quantities. The sex hormones are steroids and are mainly produced by the ovaries or testes. Generally, estrogens and testosterone are sex specific but they are present in both the sexes though quantities differ. In healthy individuals, sex hormone levels changes in phase manner, however, there may be dramatic changes and fluctuations in hormones during puberty, pregnancy and menopause in woman's life. Significant hormone imbalances arises due to many diseases and change in composition of microbiota. Changes in testosterone levels in female subjects is treacherous, spoils her life.

Keywords: Polycystic ovary; Infertility; Hairy growth; Menopause

Introduction

Hormones are body's chemical messenger's act as catalysts in chemical pathway taking place in the body. They are required in very small quantities. So far about 50 hormones have been identified in the human body. They actively participate in many different bodily processes, such as: metabolism, homeostasis (constant internal balance), growth and development, sexual function, reproduction, sleep-wake cycle, mood. For each function certain set of hormones are required [1].

A hormonal imbalance set in when the endocrine glands make either too much or too little of one or more hormones instead of set regulated quantities. For many hormones, having even slight variations in quantity can cause major changes to the body and lead to certain conditions that require treatment [2]. Some hormonal imbalances can be temporary while others are chronic. In addition, some hormonal imbalances require treatment while others may not impact health but can negatively affect quality of life.

Causes hormonal imbalances

Throughout our life hormone levels changes in phase manner, there may be dramatic changes and fluctuations in hormones during puberty, pregnancy and menopause in woman's life [3]. However, there are several other reasons why our hormone levels may be irregular at unexpected at times. Some of the most common causes of fluctuating or imbalanced hormone levels include: stress, depression, certain medications and use of steroid.

Chronic hormone-related conditions can have several different possible causes. In general, the main conditions or situations that cause medically significant hormone imbalances include:

Tumors, adenomas or other growths and

Autoimmune diseases or

Damage or injury to an endocrine gland.

Changes in microbiota

Man and woman will have differences in the composition of the gut microbiota, because gut microbiota can be regulated by the hormonal environment. It is also true that the gut microbiota regulates the levels of sex hormones via interactions among its metabolites, the immune system, chronic inflammation and some nerve-endocrine axes, such as the gut-brain axis [4].

Sex-Steroid hormones

Sex steroids hormones are mainly secreted by ovaries in female and testes in male; they are estrogens, progestogens and androgens. Androgens are generally considered as the male sex hormones because of their masculinizing effects [1]. They include androstenediol, androstenedione, dehydroepiandrosterone, dihydrotestosterone, and testosterone. Though quantities vary, all are present in both the sexes; in males androgens are dominating whereas in females estrogens and progestogens are more. The hormone receptors are special proteins found within and on the surface of target cells throughout the body [5,6].

High levels of Testosterone

It is actually an important hormone for women too, helping to produce new blood cells, maintain bone health and libido, and boost other reproductive hormones. Women typically have naturally lower levels of testosterone, falling in the range of 9 ng/dL-55 ng/dL while men fall in the 300 ng/dL-1000 ng/dL range. Women who produce exceptionally high levels of testosterone may experience signs of virilisation the development of male physical characteristics (i.e., muscle bulk, body hair on the face, chest, or back, deepening of the voice).

If the body produces too much testosterone menstrual periods may become irregular or altogether absent [7] Body hair growth may also increase and such women would have more hair on their body than the average woman. Some women with high testosterone levels develop frontal balding. Other possible effects include acne, an enlarged clitoris, increased muscle mass, and deepening of voice [8].

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High levels of testosterone can also lead to infertility and are commonly seen in Polycystic Ovarian Syndrome (PCOS). PCOS is a hormonal disorder common among women of reproductive age [9]. Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone (androgen) levels. The ovaries may develop numerous small collections of fluid (follicles) and fail to regularly release eggs. PCOS is an endocrine condition that is sometimes seen in women of childbearing age who have difficulty getting pregnant [10]. Women with PCOS have symptoms similar to those produced by high testosterone levels (Human Syndrome). They include:

- Obesity
- An apple-shaped body
- Excessive or thinning hair

Acne

Menstrual irregularity

There are biological causes for increased testosterone in women. One such cause may be polycystic ovary syndrome (PCOS), a condition in which the ovaries or adrenal glands produce more male hormones than normal. Some 10 percent of women have PCOS, which can interfere with a woman's menstrual cycle and create infertility issues [11]. In general PCOS is associated with:

- Higher levels of circulating male hormones

Insulin resistance

Carbohydrate intolerance -- conditions that make you prone to gaining weight

Low levels of HDL

Elevated triglycerides

High LDL

Obesity

High blood pressure

As women with PCOS age, the presence of these risk factors increases their risk for heart disease. At menopause, women experience a decline in testosterone. That decline may be correlated to a reduced libido. Some findings indicate that testosterone replacement therapy may benefit sexual function in certain perimenopausal and postmenopausal women. Testosterone replacement is unadvised in women with breast or uterine cancer. It also may increase the chances of cardiovascular disease or liver disease. So, experts are cautious about recommendations.

Indirectly, the role of the gut microbiota in sex hormone-related diseases, such as ovarian cancer, postmenopausal osteoporosis (PMOP), polycystic ovary syndrome and type I diabetes is also described [4].

Causes of High levels of Testosterone

Too much testosterone can also indicate the presence of tumours on the adrenal gland or ovaries—the main production centre for these hormones in women. For men, the testes and adrenal glands are the main producers. Hormone levels change in both the sexes as they age, however, females experience a more dramatic change. In females levels falling until they reach menopause Testosterone decreases naturally as

a woman ages, especially when a woman reaches menopause. Around that time the ovaries are producing less quantity of sex hormones [12]

In post-menopausal women, testosterone levels may appear higher because estrogen declines and the balance is changed and also because of PCOS. A condition known as intersex is another cause for higher than normal testosterone levels in women. Intersex is when a person possesses both sex organs (e.g., a person may have female genitalia but also possess testicular tissue internally). The two-time Olympic champion Semenya, mentioned earlier, is an intersex athlete.

Testosterone levels fluctuate during day time, levels tend to be lowest around 8 in the evening, and then climb during the night, peaking around 8 a.m. and therefore it is advice to measure testosterone levels in the morning at 8 a.m.

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