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Practical Testosterone Testing for Men

Testosterone is the primary androgenic steroid hormone and is necessary for the normal development of the male sex organs and secondary sex characteristics. Between 2010 and 2013 prescriptions for testosterone increased by 77 percent, taken by 2.3 million patients, despite the fact that replacement therapy poses risks for prostate cancer and heart attack (See CBS News link). The Bronson Laboratories have seen a corresponding surge in testosterone testing. This article will discuss when and how to test for testosterone deficiency in adult men.

The Definition of Hypogonadism

It is well known that testosterone levels in men naturally decline with age. Some people like to use the term andropause, but the decline in men is much more gradual than the female menopause. Regardless of the term used, this process is a normal part of aging. Testosterone production in the testes is regulated by pituitary-gonadal feedback involving luteinizing hormone (LH) and follicle-stimulating hormone (FSH).

- Primary hypogonadism is defined as the serum testosterone concentration and/or the sperm count are below normal and the serum luteinizing hormone and/or follicle-stimulating hormone concentrations are above normal.
- Secondary hypogonadism is defined as serum testosterone concentration and/or the sperm count are below normal and the serum luteinizing hormone and/or follicle-stimulating hormone concentrations are normal or low.

The prevalence of hypogonadism is low, the European Male Aging Study came up with 2.1 percent in men over 40 years old.

When to Test

It's pretty hard not to hear commercials about low testosterone these days. There are numerous supplements with names like TestoJack™, some of which purport to help men lose weight, build muscle and enhance sexual vitality. So it is not unusual that men will present to their doctor and ask to be tested for low testosterone. Practically speaking testing is not indicated in the absence of specific symptoms. See Table 1. Feeling tired and weight gain are not valid reasons for testosterone testing or we would be testing almost every man hitting middle age.

Table 1.
Signs and Symptoms of Testosterone Deficiency

Loss of libido
Erectile dysfunction
Gynecomastia
Infertility (azoospermia)
Osteoporosis
Hot flashes and sweats
Shrinking testes
Reduced need for shaving facial hair

How to test

Testosterone levels are known to be diurnal and peak at about 8 a.m. in the morning and can be 30 percent lower at 8 p.m. in the evening. The diurnal pattern is more prevalent in younger men. The so called normal range is incredibly broad and dependent upon age and the laboratory method. In the Bronson Laboratory, the reference range for males 18 to 49 years old is 249-836 ng/dL and less than 50 years old is 193-740 ng/dL. Because there is no clear cut off at the low end, the American Urological Association White Paper recommends that values of total testosterone be above 350 ng/dL and do not require treatment and those below 230 ng/dl with symptoms qualify for treatment. Patients who are borderline between 230-350 ng/dL should obtain total and free testosterone testing as described below.

Some authorities believe that a single normal morning value for testosterone is sufficient to rule out hypogonadism. A single low value, however, is not sufficient to diagnose hypogonadism. Repeat low morning values in combination with specific signs and symptoms are necessary to make a diagnosis.

In practice, it is best to start with a total testosterone test as most men will be in the normal range. If they are low or borderline low a second line test to include total and free testosterone is useful.

What about serum free and bioavailable testosterone testing?

In healthy men, roughly 44 percent of testosterone is bound to sex hormone-binding globulin (SHBG) and 54 percent to albumin, with only 2 percent circulating free. The free component is the biologically active form. Bioavailable testosterone (BioT) includes free and the albumin bound component. The albumin binding is so weak that it freely dissociates and is considered bioavailable. The BioT can be calculated or directly measured depending upon the laboratory methods.
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