



Hair Cortisol

Accession #: 414043

Healthcare Professional:

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Patient:

Test Test
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 Phone: 000-000-0000

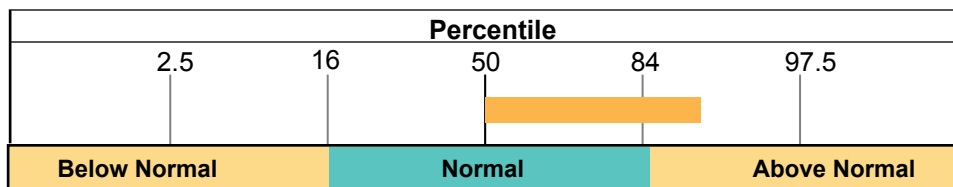
Gender : M

Date of Birth : 01-May-1960

Age: 53

Hair Cortisol

Test	Status	Result	Range	Units
Hair cortisol	Above Normal	28.4	5.9 - 22	pg/mg



HAIR CORTISOL TESTING METHODOLOGY AND REFERENCE RANGES As with any laboratory test, there may be variations in reference ranges between laboratories, depending on the methodology employed.

The method used at Rocky Mountain Analytical to assay cortisol in hair has been painstakingly validated with extensive spike recovery experiments (much more extensive than those previously published in the literature) and also by split sample testing via LCMSMS with deuterated internal standard. It has been reviewed and accredited by the College of Physicians and Surgeons of Alberta.

Note that if the hair sampled for this result was from the first 1/2 inch of fresh growth, closest to the scalp then this result reflects the average day-to-day cortisol output over the past month or so, since hair grows 1/2 inch or 1 cm per month.

GENERAL COMMENTS FOR ELEVATED HAIR CORTISOL

The result for hair cortisol falls in the upper 1/3 of results for normal individuals. The bar may still be green but the interpretation in that case would be that the result is toward the high end of normal. Specific commentary is provided depending on how elevated the result is, and whether the symptom inventory has been filled out.

In general, conditions which may be associated with elevated hair cortisol include chronic stress (e.g. unemployed for 12 months, other financial hardship, caregiver for parent/individual who is chronically ill), acute alcohol withdrawal, increased waist circumference, chronic pain, elite/endurance athlete, elevated Body Mass Index, Metabolic Syndrome, shift work, congestive heart failure.

Although elevated hair cortisol has been seen in the setting of acute myocardial infarction (heart attack), and is associated with Metabolic Syndrome, there have not been any prospective studies (as of November 2013) examining whether elevated hair cortisol is an independent risk factor for future risk of development of Metabolic Syndrome and/or attendant medical problems such as heart attack, stroke and diabetes.

Note that hair cortisol may be elevated in individuals applying a cortisol (hydrocortisone) -containing lotion or solution to the scalp. Sampling hair immediately after exercise which involves profuse sweating from the scalp may also elevate cortisol resulting in a false positive.

WAIST CIRCUMFERENCE/BODY MASS INDEX(BMI) AND HAIR CORTISOL

The hair cortisol result lies in the upper 16% of a normal population and the patients waist circumference and/or Body Mass Index may be higher than optimal.

Increased waist circumference has long been associated with an increased risk of Metabolic Syndrome, as waist circumference is reflective of the amount of visceral fat. Several studies have looked at the association between hair cortisol and waist circumference.

Feller et al (citation below) examined the relationship between hair cortisol and a number of variables such as age, smoking, presence of Type II Diabetes as well as waist circumference, in a group of adults ranging in age from 47 to 82 years. The study population was almost uniformly split between males and females. There was a positive correlation between waist circumference and hair cortisol (hair cortisol tended to increase with waist circumference) which did not stand up after adjustment for the mutual influences of all variables.

Nevertheless, a 2013 paper authored by Stalder (citation below) looking at 1258 individuals (85% males) ranging in age from 16 to 64 years found that those with the highest levels of hair cortisol were more likely to have Metabolic Syndrome, and waist circumference was positively correlated with hair cortisol in that study, as was BMI. A 2012 paper by Stalder (citation below) also reported fairly robust correlation between hair cortisol and BMI.

Many factors are found in association with Metabolic Syndrome, including elevated fasting triglycerides, modest elevation in blood pressure, fasting blood glucose and hemoglobin A1c, as well as increased waist circumference and increased BMI. One has to consider all available clinical information in the interpretation of any laboratory finding.

CARDIOVASCULAR DISEASE AND HAIR CORTISOL

The patient indicated that he or she has had a heart attack (MI) and/or stroke. The hair cortisol result lies in the top 16% of results for a normal reference population. There may be an association between elevated hair cortisol and cardiovascular disease, as outlined below:

A 2011 paper authored by Pereg (citation below) measured hair cortisol in a group of men (60 years old, on average) diagnosed with myocardial infarction in the Emergency Department. The hair cortisol in this group was found to be significantly higher than that in a similar group of men with noncardiac chest pain. The length of hair selected allowed "look back" up to three months prior to admission. The implication from this finding is that elevated hair cortisol (reflective of chronic stress) may actually predict the future risk of cardiovascular disease in previously undiagnosed males; however, as of November 2013, this hypothesis has not been tested in a clinical trial. It is also currently not known whether this extrapolation is valid for females.

Additionally, for those patients who already have a diagnosis of cardiovascular disease (such as this patient) an elevated level of hair cortisol maintained after diagnosis may be predictive of the future risk of additional adverse events. Again, this has not been tested in a prospective trial, as of November 2013.

Pereg also looked at the association between hair cortisol and congestive heart failure in a 2013 paper (citation listed below). In a group of 44 males, hair cortisol correlated to the severity of heart failure, with more severe heart failure being associated with higher hair cortisol. Similarly, the men with the highest hair cortisol also performed the worst on treadmill exercise testing. Note that a finding of elevated hair cortisol in a disease-free patient has not shown to be predictive of future risk of congestive heart failure.

REFERENCES

Complete hair cortisol references are available online at www.rmalab.com/haircortisolref or by calling Client Services at 403-241-4500.



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