

CORRELATION OF TESTOSTERONE AND CORONARY ARTERY DISEASE IN YOUNG AGED MALES

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Abstract

Introduction: Higher serum testosterone levels were thought to be harmful to the cardiovascular system. While few research have concluded low testosterone levels as risk factors for cardiovascular disease (CVD). We conducted a cross-sectional research study to see if there was a link between blood testosterone levels and the severity of coronary artery disease on angiography (CAD). Cardiovascular disease (CVD) is the largest cause of death worldwide, with coronary artery disease (CAD) being the main cause of death. Furthermore, CVD causes considerable morbidity and disability-adjusted life years lost (DALYS).

Aim: Correlation of testosterone and coronary artery disease in young aged males.

Material and Method: The study was conducted in the Department of General Medicine. It included 50 healthy male subjects and 50 CAD subjects of age 18 -45 years who visited the OPD of Dept. of Medicine.

Result: In the study group as showed in Table 1, both groups were compared for Total cholesterol, triglycerides, HDL, VLDL and Testosterone levels. Low testosterone levels were statistically related with severity of CAD ($P < 0.0001$). while LDL and SHBG were not statistically related with severity of CAD ($P > 0.05$).

Conclusion: Low testosterone levels, according to our findings, are an independent risk factor for coronary artery disease and endothelial dysfunction. To determine the role of testosterone as a modifiable risk factor, a randomised controlled trial of testosterone replacement in hypogonadal males and study of its impact on endothelial function, risk factors for cardiovascular disease, CAD development, and outcomes, is required. The current study is the first of its kind in Indian community, and it supports previous research on other populations. Pathogenetic and long-term clinical investigations are needed to elucidate the specific mechanism behind our findings and their therapeutic significance.

Keywords: CAD, CVD, Testosterone, SHBG, HDL, LDL

Introduction:

Cardiovascular disease (CVD) is the largest cause of death worldwide, with coronary artery disease (CAD) being the main cause of death. Furthermore, CVD causes considerable morbidity and disability-adjusted life years lost (DALYS).¹

There is a plethora of evidence on the relationship between conventional coronary risk factors and CAD. Several non-traditional risk variables have emerged in the recent two decades, all of which are linked to inflammatory and pro-coagulant states in patients with CAD. Traditional coronary risk factors and CAD have been found to be more prevalent in hypogonadal males in studies. Furthermore, testosterone replacement treatment has been proven to enhance hypogonadal guys' risk factor profile and ischemic symptoms. After adjusting for obesity and age.² Yeap et al. were the first to demonstrate an inverse relationship between angiographically confirmed CAD and testosterone levels.³

The highest quartile of serum testosterone was linked to the lowest mortality, while the lowest two quartiles were linked to the greatest mortality. Additional research has found a

link between testosterone levels and the occurrence of coronary artery disease. However, a recent study found no link between blood testosterone levels and the severity of coronary artery disease. Despite this, testosterone levels in CAD patients were lower in this research than in individuals with normal coronaries. The data presented above suggests that testosterone has a role in the pathogenesis of CAD, as well as a potential preventive function against the formation and progression of CAD. Patients with low testosterone levels have also been reported to have poor endothelial function, which might contribute to their higher cardiovascular risk.⁴

The unfavourable effect of testosterone on lipid metabolism and fibrinolysis has long been blamed for the relationship between elevated plasma testosterone levels and an increased risk of coronary artery disease (CAD).⁵

Evidence that men have a higher rate of coronary artery disease and myocardial infarction than women of similar age, as well as evidence that android fat distribution is linked to a higher rate of CAD than gynoid distribution, all

contributed to the belief that high plasma testosterone levels are linked to an increased risk of CAD.⁶

Aim

To find out the correlation of testosterone and coronary artery disease in young aged males

Material and Method

The study was conducted in the Department of General Medicine. It included 50 healthy male subjects and 50 CAD subjects of age 18 -45 years who visited the OPD of Dept. of Medicine

Sample collection

5ml of each patient's blood sample was taken and separated in plain tube. The sample was used to estimate the levels of Lipid profile and Testosterone.

Biochemical analysis

Lipid profile was estimated on AU480 Analyser and Testosterone, Free Testosterone and SHBG were estimated in Chemiluminescence immunoassay analyser.

Result

Table 1: Shows comparison between CAD and Normal subjects parameters

Parameters	CAD(n-50)	Normal(n-50)	P-value
Cholesterol (mg/dl)	164.2±20.9	153.12 ± 34.374	P = 0.0146
Triglyceride (mg/dl)	173.48 ± 95.162	110.8±23.6	P < 0.0001
HDL (mg/dl)	44.21 ± 6.451	48.7±5.89	P = 0.0004
LDL (mg/dl)	103.1 ± 31.481	98.4±21.3	P = 0.3841
VLDL (mg/dl)	34.8±9.87	21.4±6.11	P < 0.0001
Testosterone (ng/dl)	358.9 ± 156.210	510.09 ± 181.110	P < 0.0001
Free Testosterone(ng/dl)	6.3241 ± 4.023	09.2190 ± 3.00	P = 0.0001
SHBG (nmol/l)	39.0 ±08.2301	36.314±11.012	P = 0.1130

In the study group as showed in Table 1, Low testosterone levels were statistically related with severity of CAD (P < 0.0001). while LDL and SHBG were not statistically related with severity of CAD (P > 0.05).

Discussion

The findings are similar to those of Hu et al.⁷ and Li et al.⁸, who found an inverse relationship between serum testosterone and Gensini score in earlier research. However, several previous researches have failed to find a definitive link between blood testosterone levels and coronary artery disease (CAD). Another study found a nonlinear relationship between testosterone levels and coronary artery disease (CAD): lower levels reduce the risk of CAD, while greater levels raise the risk.⁹

Few studies have found a link between testosterone and diabetes or metabolic syndrome components. ¹⁰⁻¹³ In addition, total, free, and bioavailable testosterone levels were found to have a negative relationship with BMI, total cholesterol, low density lipoprotein (LDL) cholesterol, and triglyceride levels in our research (statistically insignificant). Previous research has revealed that testosterone levels are inversely related to obesity and cholesterol levels. In our investigation, testosterone levels were favorably associated with HDL levels, although the correlation was not statistically significant.¹⁴

Although the impact appeared to be stronger in people with lower testosterone levels in their blood, testosterone had an anti-ischemic effect in patients with normal testosterone levels. Pugh et al.¹⁵ studied the effects of acute testosterone treatment and discovered that testosterone enhances cardiac

output initially, presumably through lowering left ventricular after-load.

The negative association between testosterone levels and coronary atherosclerosis discovered in our investigation implies that testosterone may play a preventive function in atherosclerosis development. When compared to the control group, the findings presented here do not explain any testicular deregulation, but rather a connection with lower testosterone levels. Previous research has looked at how androgens affect the development and progression of experimentally generated atherosclerosis in a variety of animal models with diet- or injury-induced atherosclerosis. Larsen and colleagues¹⁶

In conclusion, our findings show a link between testosterone plasma levels and the severity of coronary artery disease, indicating that low testosterone levels may be one of the risk factors for cardiovascular disease in males. These findings are in addition to other published research.¹⁹

Previous observational studies have failed to find a positive association between testosterone and CAD, indicating that high levels of this androgen may be a risk factor, but they do appear to imply that individuals with CAD had lower testosterone levels. ¹⁰ Clinical researches looking into the effects of testosterone administration, on the other hand, rule out a possible causative link between testosterone exposure and the development of CAD and show that testosterone may have positive effects on myocardial ischemia. In individuals with established CAD, acute

intravenous testosterone treatment reduces exercise-induced myocardial ischemia, according to our findings.¹⁸

Conclusion

Low testosterone level, according to our findings, may be a risk factor for coronary artery disease and endothelial dysfunction. Determining the role of testosterone as a constant risk factor, a randomized controlled trial of testosterone replacement in hypogonadal men and learning about its effect on endothelial function, risk factors for heart disease, CAD development, and side effects are needed. The current study is the first of its kind in Indian society, and supports previous research on other people. Further researches are needed to establish the correlation of testosterone and coronary artery disease in different age groups.

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