

Is Serum Uric Acid Level Correlated with Erectile Dysfunction in Coronary Artery Disease Patients?

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Abstract- Coronary artery disease (CAD) and vascular insufficiency are consequences of modern lifestyle, and vasogenic erectile dysfunction (ED) is one of the leading causes of sexual dysfunction which could be prevented like ischemic heart disease if the risk factors are discovered and managed. Seventy-five men scheduled for coronary angiography were asked to fill out the IIEF5 questionnaire and underwent serum lipoprotein-a, uric acid, lipid profile, testosterone, Sex Hormone Binding Globulin (SHBG), dehydroepiandrosterone sulfate (DHEAS) tests; and the results were compared with those of erectile dysfunction patients with and without coronary artery disease. Ten out of 32 CAD patients (30%) and 6 of 43 normal coronary men had ED Prevalence ($P=0.04$). The average serum uric acid in ED patients with normal coronary was $5.6 (\pm 0.68)$ 6.5 ± 0.78 mg/dl in ED patients of CAD group $P=0.034$. Men with both ED and CAD had significantly higher levels of lipoprotein-a compared to those CAD patients with normal sexual function. Higher uric acid and lipoprotein-a levels are correlated with the presence of ED in patients with CAD.

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Keywords: Coronary artery disease; Erectile dysfunction; Uric acid

Introduction

As proposed by current evidence, vascular insufficiency is a prevalent etiology of erectile dysfunction (1) and has a well-established correlation with systemic atherosclerosis, leading mainly to coronary artery disease as the major health issue of the modern world (2,3,4).

As postulated by previous studies, (3,5) elevated uric acid levels may exacerbate the atherosclerosis process and is known as a vascular disease risk factor (8,9); therefore, the medical manipulation of serum uric acid level is supported by clinical practice guidelines (6,7). It may be of interest to know that uric acid is actually related to the emergence of erectile dysfunction in middle-aged men with coronary artery disease (CAD) and should be used as a predictive factor to identify CAD patients at risk of ED aiming at trying to justify medical hypouricemic agents in this subgroup. Consequently, the erectile function of the newly diagnosed CAD patients was assessed, and their serum uric acid level was checked and compared to patients who had normal coronary angiography.

Materials and Methods

To answer such questions, after acquiring local university ethical committee approval for the study design, patients referred to Tehran Heart Center for coronary angiography for the first time were enrolled after obtaining an informed consent and based on their angiography results. Two matched groups of men—according to age, smoking, lipid profile— with and without CAD were investigated by means of IIEF 5 questions for ED. Patients with diabetes mellitus, previous urologic or pelvic or spinal cord disease or surgery or trauma were excluded.

Seventy-five men with the mean age of 54 ± 10.9 years scheduled for coronary angiography who consented to participate in this study were enrolled to fill out IIEF-5 questionnaire and underwent blood uric acid, LDL, Triglyceride, HDL, Testosterone, Sex hormone binding globulin (SHBG), dehydroepiandrosterone sulfate (DHEAS) and lipoprotein-a prior to their admission to the catheterization lab.

A patient was considered CAD negative if the angiography was normal or only a single vessel disease less than 75% occlusion was present, and an occlusion of more than 75% of one or more arteries was defined as

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Serum uric acid level and erectile dysfunction

CAD. The prevalence of erectile dysfunction, according to IIEF score was compared in patients with and without CAD. Serum Uric acid, LDL, Triglyceride, HDL,

testosterone, SHBG, DHEAS were also compared.

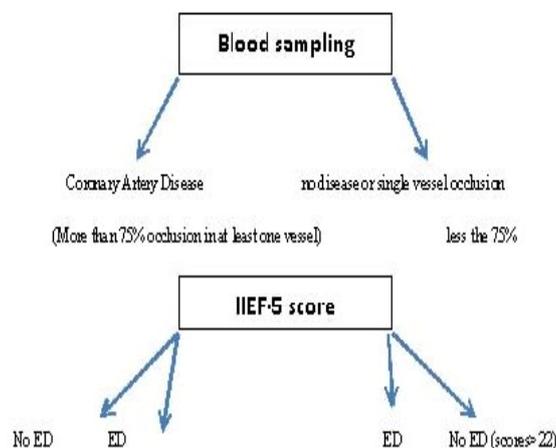


Figure 1. Flow chart of study Candidates of coronary angiography consented to participate in the study (n=75)

Results

A total of 75 men undergoing coronary angiography consented to participate in our survey, filled out the standardized Persian translated version of the IIEF-5 questionnaire and their blood samples were taken.

Thirty-two patients had significant CAD, and 43 had normal coronary angiography. Five out of 32 CAD patients (15%) had severe and the other 5 (15%) had moderate ED [score <7 & <12, respectively]. The prevalence of ED in the normal angiography group was

13% for moderate (n=4) & severe (n=2) disease (P=0.04).

Regardless of erectile dysfunction, the mean uric acid level was $6.58 (\pm 1.22)$ ng/dl in the normal group & 6.60 ± 1.20 in CAD patients (P= 0.9) (ANOVA).

The average serum uric acid in ED patients with normal coronary was 5.6 ± 0.68 and 6.5 ± 0.78 mg/dl in ED patients of the CAD group P=0.034 (ANOVA). Dehydroepiandrosterone sulfate levels were higher among ED patients regardless of CAD compared to the ones without ED.

Table 1. Serum biochemistry results

	NO CAD			ANOVA P-value(crosstab of two ED groups)	CAD		
	NO ED	P-values inside no CAD	ED		ED	P-values inside CAD	No ED
SHBG	25.6±23.4	(P=0.6)	39.2 ± 18.9	(0.5)	55.6±13.7	P=0.5	50±25
DHEASO4	181.7±92.8	(P=0.16)	233.3±72.4	(0.03)	145±75	P=0.4	121±52
TESTOSTERONE	3.79±1.85	(P=0.7)	3.78±1.38	(0.13)	5.72±1.5	P=0.15	4.2±1.8
LPA	34.0±38.9	(P=0.8)	31± 31.7	(0.7)	89.2±68	P=0.06	40.9±43.1

Discussion

Current results revealed that serum uric acid levels are significantly lower among ED patients with normal coronary compared to the ones with both CAD and ED (P=0.034); however, the overall serum uric acid levels

were not different among normal coronary and CAD patients (P=0.9) which are contradictory to recent publications (10, 11).

It could be conferred that high uric acid levels are more prevalent among those with concomitant CAD and ED, $6.5 (\pm 0.78)$ mg/dl vs. $5.6 (\pm 0.68)$ P=0.034.

Surprisingly, the prevalence of ED in the normal

coronary group was 13% compared to 30% in the CAD group who had significant ED (P=0.04) (10).

Another interesting finding was higher levels of DHEAS among CAD Positive ED patients compared to ED patients without CAD (P=0.03) which was not mentioned in the literature yet (13).

Present findings support that higher Lp(a) Levels are associated with the higher probability of ED among CAD patients (P=0.03). However, such a correlation was not observed among patients with normal coronary angiography (14). Previous studies on the correlation between ED and CAD (15, 16) found that presence of erectile dysfunction in young men may be a predictor of future CAD, but such correlation was not observed in older patients even with multiple risk factors present; unfortunately, most researches conducted in this domain are performed by cardiologists and from a different point of view which tries to identify the risk factor for cardiovascular accidents but data on the new incidence of ED in CAD patients.

Regarding present results, it can be postulated that higher uric acid and lipoprotein-a levels are correlated with the presence of ED among CAD patients where such an association was not observed in the normal coronary population and further cohort studies are needed to investigate the effects of high uric acid and Lp(a) on CAD patients, not in molecular, but more clinical settings.

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References

- Shabsigh R, Kaufman J, Magee M, et al. Lack of awareness of erectile dysfunction in many men with risk factors for erectile dysfunction. *BMC Urol* 2010;10(1):18.
- Kawanishi Y, Lee KS, Kimura K, et al. Screening for ischemic heart disease with cavernous artery blood flow in erectile dysfunctional patients. *Int J Impot Res* 2001;13(2):100-3.
- Feldman HA, Johannes CB, Derby CA, et al. Erectile dysfunction and coronary risk factors: prospective results from the Massachusetts male aging study. *Prev Med* 2000;30(4):328-38.
- Corona G, Maggi M. Conventional and unconventional cardiovascular risk factors in men with erectile dysfunction. *J Sex Med* 2013;10(2):305-8.
- Brodov Y, Chouraqui P, Goldenberg I, et al. Serum uric acid for risk stratification of patients with coronary artery disease. *Cardiology* 2009;114(4):300-5.
- Jelić-Ivanović Z, Memon L, Spasojević-Kalimanovska V, et al. Independent association of high serum uric acid concentration with angiographically defined coronary artery disease. *Tohoku J Exp Med* 2007;211(4):369-77.
- Nehra A. Erectile dysfunction and cardiovascular disease: efficacy and safety of phosphodiesterase type 5 inhibitors in men with both conditions. *Mayo Clin Proc* 2009;84(2):139-48.
- Kaya EB, Yorgun H, Canpolat U, et al. Serum uric acid levels predict the severity and morphology of coronary atherosclerosis detected by multidetector computed tomography. *Atherosclerosis* 2010;213(1):178-83.
- Kanbay M, Sanchez-Lozada LG, Franco M, et al. Microvascular disease and its role in the brain and cardiovascular system: A potential role for uric acid as a cardiorenal toxin. *Nephrol Dial Transplant* 2011;26(2):430-7.
- Lin CS, Hung YJ, Chen GY, et al. A multicenter study of the association of serum uric acid, serum creatinine, and diuretic use in hypertensive patients. *Int J Cardiol* 2011;148(3):325-30.
- Rodrigues TC, Maahs DM, Johnson RJ, et al. Serum uric acid predicts progression of subclinical coronary atherosclerosis in individuals without renal disease. *Diabetes Care* 2010;33(11):2471-3.
- Justo D, Arbel Y, Mulat B, et al. Sexual activity and erectile dysfunction in elderly men with angiographically documented coronary artery disease. *Int J Impot Res* 2009;22(1):40-4.
- Sinan Deveci O, Kabakci G, Okutucu S, et al. The association between serum uric acid level and coronary artery disease. *Int J Clin Pract* 2010;64(7):900-7.
- Jackson G, Boon N, Eardley I, et al. Erectile dysfunction and coronary artery disease prediction: evidence-based guidance and consensus. *Int J Clin Pract* 2010;64(7):848-57.
- Meluzin J, Vasků A, Kincl V, et al. Association of coronary artery disease, erectile dysfunction, and endothelial nitric oxide synthase polymorphisms. *Heart Vessels* 2009;24(3):157-63.
- Kincl V, Panovsky R, Meluzin J, et al. Association between laboratory markers and presence of coronary artery disease. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.* 2010;154(3):227-33.