

The Predictive Value of Arteriogenic Erectile Dysfunction for Coronary Artery Disease in Men

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ABSTRACT

Background: Erectile dysfunction (ED) is assumed to be connected with vascular disease caused by endothelial dysfunction, and characterized by the incapability of the smooth muscle cells lining the arterioles to relax, therefore, inhibit vasodilatation.

Aim: To assess the predictive value of arteriogenic ED for coronary artery disease in men above the age of 40 years.

Methods: 75 Patients reporting arteriogenic ED and 25 men with normal erectile function were enrolled in the study. Both patients and controls were subjected to the following investigations: lipid profile, fasting blood sugar, body mass index (BMI), waist circumference, penile duplex study, stress electrocardiography (ECG) test, International Index of Erectile Function (IIEF) Type 5 (Arabic version), and cardiovascular (CV) 10-year risk assessment using Framingham and Prospective Cardiovascular Münster (PROCAM) scoring systems.

Outcomes: We compare between the study groups regarding the interpretation of exercise testing.

Results: We observed significant increase in the mean value of age, systolic blood pressure, BMI, weight, height, and waist circumference in the cases; significant prevalence of obesity and overweight in the cases ($P < .001$); significant increase in the mean value of total cholesterol, triglycerides (TG), and low-density lipoprotein; and decrease in mean value of high-density lipoprotein in the cases ($P < .001$). Additionally, there was high incidence of positive stress ECG in the cases (25.3%) vs that in controls (12%), and significant difference between patients with positive stress ECG test and those with negative stress ECG test regarding their lipid profile, age, BMI, and waist circumference with higher values in positive stress ECG for total cholesterol, TG, and low-density lipoprotein, and lower value for high-density lipoprotein ($P < .001$). According to PROCAM and Framingham scoring systems 10-year risk assessment, there was a high significant difference between the cases and control groups with a higher score in cases than the control group with 30.7% of cases having $\geq 30\%$ risk of developing coronary heart disease, and significant positive correlations between CV risk and BMI, and negative correlations with IIEF-5 cases ($P < .001$).

Clinical Translation: Ischemic heart disease events were higher in men with documented arteriogenic ED than those without ED.

Conclusions: All items of metabolic syndrome were investigated and analyzed and we evaluated our groups using both PROCAM and Framingham scoring system. An exercise ECG is suggested before starting treatment of vasculogenic ED at least in patients with CV risk factors. **Azab SS, Hosni HED, El Far TA, et al. The Predictive Value of Arteriogenic Erectile Dysfunction for Coronary Artery Disease in Men. J Sex Med 2018;XX:XXX–XXX.**

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Key Words: Erectile Dysfunction; Ischemic Heart Disease; Stress Electrocardiography; Metabolic Syndrome

Received March 24, 2018. Accepted April 19, 2018.

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<https://doi.org/10.1016/j.jsxm.2018.04.639>

INTRODUCTION

Erectile dysfunction (ED) is defined as the persistent incapability to achieve and sustain powerful erection to support adequate sexual intercourse.¹ The degree of ED is categorized as mild to severe, according to the International Index of Erectile Function (IIEF).² ED is a widespread disorder that distresses more than 150 million men worldwide, and is expected to double through the next 20 years.³ The prevalence of ED mainly increases with age. ED is a widespread health disease and influences significantly on the quality of life of middle-aged men.⁴ Multiple studies disclosed that 10% of men older than 35 years observed ED and 25%, occasional ED. Nevertheless, after the age of 70 years, this percentage increases to 75%.⁵

A vascular element is confirmed to have the most significant role in the pathogenesis of ED.⁶ This paradigm confirms that ED shares nearly all risk factors, such as hypertension, hyperlipidemia, diabetes mellitus (DM), smoking, and arteriosclerosis.⁷ The prevalence of ED looks to be higher in patients with multiple coronary artery disease (CAD) risk factors or significant CAD as compared with healthy controls.^{8,9} The correlation of ED with these risk factors is confirmed, and in some occasions almost pathognomonic. Shabsigh and associates¹⁰ observed that abnormal penile vascular findings increased significantly, as the number of risk factors for ED increased. The Second Princeton Consensus Conference reported that ED is a predictor sign of silent vascular disease and therefore a man with ED and no obvious cardiac symptoms should be carefully investigated for cardiac or vascular diseases.¹⁰ ED is common in patients with CAD. Studies have shown that a significant proportion (42–75%) of patients with CAD have ED.¹¹ Furthermore, it has been shown that the degree of ED is related to the extent of CAD¹² and ED is more frequent in diabetic patients with silent CAD than in those without CAD.¹³ ED is related to CAD in addition to its cardio-vascular (CV) risk factors.¹⁴ This is possibly because atherosclerosis and endothelial dysfunction are systemic disorders affecting both the coronary and penile arteries. Endothelial dysfunction is assumed to have an essential role in the pathogenesis of CAD, prior to the development of atherosclerotic plaque, and may consequently represent an important marker of risk in patients without clinically obvious vascular disease.¹⁵ Therefore, ED could be considered as a warning symptom for potentially life-threatening CAD or stroke.^{16,17}

METHODS

This study was carried out on 75 patients reporting arteriogenic ED (for at least 6 months) as proved by penile duplex, and 25 healthy potent men, all above the age of 40 years and without any history of cardiac problems attending the Outpatient Clinic of Andrology and Sexually Transmitted Diseases, Kasr El Aini Hospital, Cairo University, through a period of 1 year from May 2010 to May 2011.

Inclusion criteria were: being involved in a stable relationship and reporting ED for at least 6 months. All study groups were above the age of 40 years and without any history of cardiac problems.

Restrictions and exclusion criteria were: single, widowed, and divorced subjects or subjects with unstable relationship; a case of ED due to neurogenic, vascular accident, Peyronie's disease, etc; limb diseases that interfere with performance of stress electrocardiography (ECG); cardiac patients with history of symptomatic CHD; patients receiving coronary dilator drugs; and history of cardiac operations.

Patients were subjected to full history taking including age, duration of marriage, duration of ED, special habits of medical importance, DM, hypertension, hyperlipidemia, chronic diseases, drug intake, pelvic trauma and history of surgical operations especially pelvic surgery, in addition to general disease such as liver, cardiac, or renal diseases. Moreover, sexual history taking took place (onset, course and duration of ED, the presence of morning erections, their frequency and quality, any erectile episodes occurring with visual or manual stimulation or extramarital relations, severity of erectile failure) by asking the patients about ability of vaginal penetration. Patients were also subjected to clinical examination: weight, height, waist circumference, blood pressure, body mass index (BMI), and local examination (including scrotum penis for fibrosis, chordee, etc). Patients answered the questions of IIEF Type 5 (IIEF-5) Arabic version. The following investigations took place: penile duplex study using a color ultrasound machine for patients group to demonstrate arteriogenic ED; measurement of serum level of total cholesterol, triglycerides (TG), low-density lipoprotein (LDL), high-density lipoprotein (HDL), and fasting blood sugar after a minimum of 12 hours fasting; and stress ECG test was carried out according to the multi-stage Bruce protocol.

Interpreting the Test

Principles for a positive test: an atypical (ischemic) test is detected if there is ≥ 1 mm of horizontal or down-sloping S-T segment depression ≥ 80 milliseconds after the J-point (as matched to the level of the PQ interval).

Importance of exercise provoked S-T segment elevation: early repolarization on the baseline ECG is a mutual and non-threatening etiology of S-T segment elevation so S-T variations with exercise are described from the patient's baseline. Exercise-prompted S-T segment elevation shows transmural ischemia induced by spasm of the artery serving the region indicated by the site of the S-T segment elevation. It takes place rarely ($\pm 0.1\%$). It points to immediate termination off the test. The ordinary sensitivity and specificity of the EST for CAD is 68% and 77%, respectively. The probability that an individual patient will have CAD is a product of the test's sensitivity and specificity and the pre-test probability of CAD. While there are numerous risk factors for CAD, the documented predictors are age, the

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