Cardiovascular Risk Factors in Men With Ischemic Heart Disease and Erectile Dysfunction

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OBJECTIVE To study the prevalence of cardiovascular risk factors in men with ischemic heart disease (IHD) and erectile dysfunction (ED).

METHODS We studied cardiovascular risk factors in men with IHD and ED, who undergo coronary angiography. All men filled the Sexual Health Inventory for Males questionnaire (SHIM). SHIM questionnaire scores between 17 and 21 represented mild ED. SHIM questionnaire scores of 16 or lower represented significant ED. Cardiovascular risk factors included the following: age, diabetes mellitus, hypertension, smoking, hyperlipidemia, left ventricular ejection fraction $\leq$30%, and 3-vessel disease. Binary regression analysis was used to study which cardiovascular risk factors were independently associated with ED.

RESULTS The study included 171 men. Mean age was 64.2 $\pm$ 12.6 years. Overall, 61 men (35.7%) had mild ED and 80 men (46.8%) had significant ED. More than half of men (n = 101; 59.1%) had 3 or more cardiovascular risk factors. Age was the only cardiovascular risk factor independently associated with significant ED (odds ratio 1.154; 95% confidence interval 1.081-1.232; P <.0001). No cardiovascular risk factors were independently associated with mild ED.

CONCLUSION ED and its cardiovascular risk factors are highly prevalent in men with IHD. However, only age is independently associated with significant ED in this population. UROLOGY 82: 377–381, 2013. © 2013 Elsevier Inc.

Erectile dysfunction (ED) is the inability to attain and maintain penile erection sufficient for satisfactory sexual performance.[1] According to several studies, cardiovascular risk factors such as age, diabetes mellitus (DM), hypertension, smoking, and hyperlipidemia are associated with ED[2-6] — probably because they are related to enhanced atherosclerosis which involves the penile arteries.[7] Left ventricular heart failure is another ED risk factor — probably because it is associated with reduced cardiac output to the penile arteries among other peripheral arteries.[8]

Ischemic heart disease (IHD) is prevalent in men with ED[9-11] and ED is highly prevalent in men with IHD; approximately 50% of men with IHD have ED,[12,13] but many of these men have additional cardiovascular risk factors to begin with including age, DM, hypertension, smoking, hyperlipidemia, and left ventricular heart failure. In other words, ED is somewhat expected in men with IHD owing to the high prevalence of cardiovascular risk factors in this population. Surprisingly, the prevalence of cardiovascular risk factors has never been studied in men with IHD and ED, to the best of our knowledge.

In this cohort of men with documented IHD, we sought to study the prevalence of cardiovascular risk factors. Assuming men with IHD have several concomitant cardiovascular risk factors, regression analysis has been used to study which of these risk factors is independently associated with ED.

METHODS

Tel-Aviv Prospective Angio Survey

This was a retrospective analysis of data obtained prospectively between February 2007 and January 2010 as part of Tel-Aviv Prospective Angio Survey — a registry of patients who undergo coronary angiography at Tel-Aviv Sourasky Medical Center in Israel. Patients signed an informed consent for participation in the study, which had been approved by the local ethics committee. Each patient completed a detailed questionnaire concerning his medical history before coronary angiography. Angiography findings were documented for all patients.

Patients

The Sexual Health Inventory for Males questionnaire (SHIM) was introduced to men with IHD after coronary angiography.

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Except for 1 man who refused to fill the SHIM questionnaire, compliance was maximal. IHD was defined as ≥50% stenosis in 1 or more coronary arteries documented by coronary angiography or history of myocardial infarction (MI), or a combination of both. All men also underwent echocardiography or ventriculography, or both, to asses left ventricular ejection fraction (LVEF).

SHIM Questionnaire

The SHIM questionnaire is a widely used tool for detecting ED and assessing its severity. It consists of 5 items, each rated on a 6-point scale between 0 and 5, except for 1 5-point scale item rated between 1 and 5. The final score ranges between 1 and 25. ED is defined as SHIM questionnaire score lower than 22. Mild ED is defined as SHIM questionnaire score between 17 and 21, and significant ED is defined as SHIM questionnaire score of 16 or lower.[14]

Cardiovascular ED Risk Factors

Cardiovascular risk factors included the following: age, DM, hypertension, current smoking, hyperlipidemia, and LVEF ≤30%.[2-6,8] Three-vessel disease was also considered a cardiovascular risk factor, being a marker of severe systemic atherosclerosis.[7] The definitions of DM, hypertension, and hyperlipidemia were consistent with those of the ADA, JNC7, and NCEP, respectively.[15-17] Men who take antiglycemic agents, antihypertensive agents, and statins, were also considered to have DM, hypertension, and hyperlipidemia, respectively.

Statistical Analysis

Continuous variables were expressed as mean ± standard deviation, median, and interquartile range (IQR). Chi-square test was used to compare between the prevalence of categorical variables. Analysis of variance and the Student *t* test were used to compare between the mean values of continuous variables with parametric distributions. Kruskal-Wallis test and Mann-Whitney test were used to compare between the mean values of continuous variables with nonparametric distributions. Binary regression analysis was used to study which of the cardiovascular risk factors were independently associated with mild and significant ED. Two-tailed $P < .05$ was considered statistically significant. All statistical analyses were performed by using the SPSS statistical package (SPSS Inc., Chicago, IL).

RESULTS

The cohort included 171 men with documented IHD. Mean age was 64.2 ± 12.6 years (median: 63 years; IQR: 55-74 years). Although more than half of men (n = 92; 53.8%) had history of previous MI, the mean LVEF for the whole cohort was >50%. Mean number of stenotic coronaries was 2.1 ± 0.9 (median: 2; IQR: 1-3). Five men (2.9%) had history of MI without documentation of coronary stenosis (Table 1).

Mean SHIM questionnaire score was 14.5 ± 7.9 (median: 17; IQR: 7-21) and 141 men (82.5%) had ED, of which 61 (35.7%) had mild ED and 80 (46.8%) had significant ED. Hypertension and hyperlipidemia were the most prevalent cardiovascular risk factors (Table 1). Mean number of cardiovascular risk factors was 2.9 ± 1.4

Table 1. Clinical characteristics of men with ischemic heart disease and no erectile dysfunction, mild erectile dysfunction, and significant erectile dysfunction

	Units	Total (n = 171)	No ED (n = 30)	ED (n = 141)	Mild ED (n = 61)	Significant ED (n = 80)	*P* Value*	*P* Value†
Age	Mean ± SD	64.2 ± 12.6	55.7 ± 11.5	65.9 ± 12.2	58.7 ± 11.2	71.5 ± 9.7	<.0001	<.0001
Married	n (%)	128 (74.9%)	23 (76.7%)	105 (74.5%)	43 (70.5%)	62 (77.5%)	.999	.617
Divorced	n (%)	28 (16.4%)	5 (16.7%)	23 (16.3%)	14 (22.9%)	9 (11.3%)	.999	.177
Widow	n (%)	8 (4.7%)	0 (0.0%)	8 (5.7%)	1 (1.6%)	7 (8.8%)	.353	.058
Single	n (%)	6 (3.5%)	2 (6.7%)	4 (2.8%)	3 (4.9%)	1 (1.3%)	.284	.294
Coronary angiography findings								
Occluded coronaries	Mean ± SD	2.1 ± 0.9	1.8 ± 0.8	2.1 ± 0.9	1.9 ± 0.9	2.2 ± 0.8	.049	.031
One-vessel disease	n (%)	46 (26.9%)	11 (36.7%)	35 (24.8%)	19 (31.1%)	16 (20.0%)	.256	.139
Two-vessel disease	n (%)	55 (32.2%)	12 (40.0%)	43 (30.5%)	16 (26.2%)	27 (33.8%)	.389	.383
Three-vessel disease	n (%)	65 (38.0%)	6 (20.0%)	59 (41.8%)	23 (37.7%)	36 (45.0%)	.037	.055
Left ventricular function								
Ejection fraction	Mean ± SD	52.5 ± 10.7	55.1 ± 7.7	51.9 ± 11.2	52.0 ± 10.8	51.9 ± 11.6	.068	.349
Ejection fraction ⩽50%	n (%)	75 (43.9%)	11 (36.7%)	64 (45.4%)	30 (49.2%)	34 (42.5%)	.423	.499
Ejection fraction ⩽40%	n (%)	31 (18.1%)	2 (6.7%)	29 (20.6%)	13 (21.3%)	16 (20.0%)	.114	.196
Ejection fraction ⩽30%	n (%)	8 (4.7%)	0 (0.0%)	8 (5.7%)	2 (3.3%)	6 (7.5%)	.353	.205
Comorbidities								
Myocardial infarction	n (%)	92 (53.8%)	12 (40.0%)	80 (56.7%)	32 (52.5%)	48 (60.0%)	.109	.167
Hypertension	n (%)	106 (62.0%)	13 (43.3%)	93 (65.9%)	38 (62.3%)	55 (68.8%)	.024	.050
Diabetes mellitus	n (%)	62 (36.3%)	6 (20.0%)	56 (39.7%)	17 (27.9%)	39 (48.8%)	.059	.005
Hyperlipidemia	n (%)	112 (65.5%)	17 (56.7%)	95 (67.4%)	43 (70.5%)	52 (65.0%)	.293	.424
Smoking	n (%)	61 (35.7%)	12 (40.0%)	49 (34.8%)	27 (44.3%)	22 (27.5%)	.675	.104

ED, erectile dysfunction; SD, standard deviation.
* No ED vs ED.
† No ED vs mild ED vs significant ED.