ORIGINAL RESEARCH—ERECTILE DYSFUNCTION

Erectile Dysfunction Is Not Independently Associated with Cardiovascular Death: Data from the Vitamins and Lifestyle (VITAL) Study

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ABSTRACT

Introduction. Erectile dysfunction (ED) is a significant problem among aging men. ED is independently associated with cardiovascular (CV) events (angina, myocardial infarction, and stroke).
Aim. We sought to determine if ED was associated with CV death.
Main Outcome Measures. Risk of CV death in men with ED.
Methods. Exactly 31,296 men in Washington aged 50–76 completed a questionnaire in 2000–2002 on supplements, diet, exercise, personal health, and ED. ED was determined by one question: "Have you experienced impotence in the last year?" We excluded patients with a history of coronary artery disease or stroke. Participants linked yearly through 2008 to the Washington State Death Certificate System. CV death was defined by death certificates listing CV-related deaths (International Classification of Diseases 10th Revision [ICD-10] codes: I00-I15, I20-I52, and I60-I99). We performed multivariate Cox proportional hazard regression adjusting for age, marital status, race, education, self-rating of health, body mass index (BMI), antihypertensive/lipid-lowering drug use, diabetes, family history of CV disease, smoking, and exercise.
Results. About 7,762 men had ED and there were 486 CV deaths over 7.8-year average follow-up. The typical man who suffered CV death was older, single, reporting poor health, taking antihypertensives, higher BMI, a smoker, a diabetic, and had a family history of CV disease. When adjusting for age, marital status, and education only, men with ED had a 23% increased risk of CV death (hazard ratio [HR] 1.23, 95% confidence interval [CI] 1.01, 1.49). With further adjustment for known risk factors for CV disease (diabetes, treatment for hypertension or hyperlipidemia, family history of myocardial infarction/stroke, BMI, and exercise), ED no longer predicted CV death (HR 0.93, 95% CI 0.76, 1.15).
Conclusions. In this community-based cohort, ED was not independently associated with an elevated risk of CV death. These data do not contradict prior data associating ED and CV events but rather suggest that ED may be a manifestation of other known risk factors for CV disease. **Hotaling JM, Walsh TJ, Macleod LC, Heckbert S, Pocobelli G, Wessells H, and White E. Erectile dysfunction is not independently associated with cardiovascular death: Data from the Vitamins and Lifestyle (VITAL) study. J Sex Med 2012;9:2104–2110.**

Key Words. Erectile Dysfunction; Cardiovascular Death; Risk Factors; Aging; Impotence; Cardiovascular Events

Aim

Erectile dysfunction (ED) is the inability to sustain an erection firm enough for sexual intercourse [1]. Although cardiovascular disease (CVD) declined since the middle of the 20th century, it remains the number one cause of death in the United States [2]. ED, which is highly prevalent, has come to light as a potential predictor for CV events and CVD [3].

ED is a common problem and often prompts men to seek care. ED may affect more than half of men in the United States, although reported prevalence varies by definition of ED; furthermore, prevalence and incidence increase markedly after the age of 40 [4]. ED in both the United States and elsewhere has a crude incidence of about 25–30 cases per 1,000 men annually [5,6]. The two most potent risk factors for ED are diabetes and age; for example, in one study over 49% of diabetics and over 77% of men over age 75 reported ED [7,8].

A number of studies elucidate the relationship between ED and CVD or events. Most of these, including a meta-analysis with eight studies and over 45,000 men [9], do find association between ED and incident or prevalent CV events [3,10–15] and, in one study, all cause mortality [9]. The association between ED and CV events is robust, despite different instruments for measuring ED, different definitions of CVD/events, and adjustment for different sets of covariates among studies. The only negative study was performed in Vienna, where ED did not predict CV events, but diabetes, age, and hypertension did [16]. These studies do adjust for known CV risk factors such as diabetes, family history, age, and serum lipids; however, the completeness and consistency of adjustment varies from study to study. What remains unclear, though, is the relationship between CV *deaths* and ED. In the Massachusetts Male Aging Study, a prospective population-based cohort of 1,709 men, Araujo et al. found that ED was associated with all cause mortality after adjustment with a hazard ratio (HR) of 1.26 (95% confidence interval [CI] 1.01–1.57). Although suggestive, this trend did not achieve formal significance for CV mortality (HR 1.43, 95% CI 1.00–2.05) [17].

In a cohort of 1,549 men from the ONTARGET and TRANSCEND studies, Bohm et al. found that those with ED had a HR of 1.42 (95% CI 1.04–1.94) for a composite outcome that included CV death myocardial infarction (MI), stroke, and hospitalization for heart failure [18]. When subgroup analysis was performed for CV death separately, the association remained significant (HR 1.93, 95% CI 1.13–3.29). Though Araujo et al.'s study was suggestive, Bohm et al.'s is the only study to date demonstrating independent association between ED and CV death. It is important to note that this study was performed in a high-risk population and was not designed with CV death as a primary outcome.

Given the lack of conclusive data regarding the relationship between ED and CV death we conducted a community-based cohort study that included a single question on ED ("Have you experienced impotence in the last year?") and was linked yearly to the Washington State Death Certificate System. Our goal was to determine if prevalent ED was associated with incident CV death after adjustment for known CV disease risk factors.

Methods

Selection of Study Participants

Eligible study participants were male members of the Vitamins and Lifestyle (VITAL) cohort study of 77,719 people ages 50-76 years living in a 13-county area of western Washington state who were part of a purchased commercial mailing list. Between October 2000 and December 2002, 364,418 individuals were identified and 79,300 returned questionnaires of which 77,719 met control checks for internal validity. This resulted in 31,296 eligible male participants after exclusion of those with preexisting coronary artery disease (CAD) or stroke. For the question regarding ED, there were only 11 nonresponders. The study proposal was approved by the institutional review board of the Fred Hutchinson Cancer Research Center. Methods of cohort recruitment, data collection, and follow-up of outcomes are described in further detail elsewhere [19].

Baseline Data Collection

Baseline data were obtained from a 24-page self-administered questionnaire that included supplement use, diet, medical history, personal characteristics, and CVD risk factors. Educational status, race, age, and marital status were recorded in the survey. The following variables were treated as categorical: educational status, race, metabolic equivalent of task in hours per week for exercise (leisure exercise activities in days per year, hours per week, and minutes per day), self-reporting of health (excellent, very good, good, fair, and poor), and pack year history for current smokers. Body mass index (BMI) (kilogram per square meter) was treated as a continuous variable. All other variables were analyzed as binary. Exactly 7,762 men were identified as having ED by answering yes to the question, "Have you experienced impotence in the last year?" Single-item definitions of ED have been shown to be highly correlated with overall International Index of Erectile Function score [7].

Follow-Up of Subjects for CV Deaths

Deaths were ascertained by linkage to the Washington state death files and moves out of the area