BRIEF COMMUNICATION

Erectile Dysfunction and Mortality in a National Prospective Cohort Study

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ABSTRACT

Introduction. Emerging work has shown erectile dysfunction (ED) to be an important indicator of cardiovascular risk via its shared pathophysiology. Yet limited research has examined if a direct relationship between ED and mortality risk exists.

Aim. The purpose of this brief report was to better define the relationship between ED and mortality risk.

Methods. Prevalent ED was assessed with the question: "How would you describe your ability to get and keep an erection adequate for satisfactory intercourse?" Participant data from the population-based 2003–2004 National Health and Nutrition Examination Survey (NHANES) was linked to death certificates from the National Death Index for mortality assessment.

Main Outcome Measures. Increased risk of premature all-cause mortality among those with ED (vs. those without).

Results. Of 1,790 adult men providing complete data (age range: 20–85 years; mean = 45.4 year), with 557 having ED, over a 93-month follow-up, 244 deceased over this time. After adjustments, those with ED (vs. those without) had a 70% increased risk of premature all-cause mortality (hazards ratio = 1.70; 95% confidence interval; 1.01–2.85; $P = 0.04$).

Conclusions. ED is associated with increased premature mortality risk. The present findings have major public health and clinical implications in that ED is a strong indicator of premature mortality. Therefore, patients with ED should be screened and possibly treated for complications that may increase the risk of premature death. **Loprinzi PD and Nooe A. Erectile dysfunction and mortality in a national prospective cohort study. J Sex Med 2015;12:2130–2133.**

Key Words. Erectile Dysfunction; Mortality; Men; Cardiovascular Disease

Introduction

Erectile dysfunction (ED) affects over 18 million men in the United States. Emerging work demonstrates that ED may be an important marker of cardiovascular risk, via its shared pathophysiology [1–6]. For example, Corona et al. [7,8] demonstrated that penile impairment, assessed via Doppler ultrasound, is an independent risk factor for forthcoming cardiovascular disease. The conditions of ED and cardiovascular disease are linked by similar risk factors including hyperlipidemia, hypertension, obesity, diabetes, and smoking [3]. ED has been specifically recognized as an independent risk factor for stroke and coronary heart disease as well as linked to angina myocardial infarction [3]. Although it is considered to be a disease related to older men, it may affect over 20% of men under the age of 40 years old [1]. The

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prominent underlying pathophysiological link between ED and CVD exists specifically within endothelial cell dysfunction and impaired production of nitrous oxide [1]. Parallel to the improved developments in cardiovascular physiology, the highest area of investigation into the physiology of penile erection has been narrowed to its mechanisms that control the functions of the endothelium and vascular smooth muscle of the corpus cavernosum [3]. What remains ill defined, however, is the relationship between ED and mortality risk [9–11], which was the purpose of this brief report.

Methods

Study Design

Data from the population-based 2003–2004 National Health and Nutrition Examination Survey (NHANES) were used. NHANES uses a representative sample of noninstitutionalized U.S. civilians who are selected by a composite, multistage probability clustered design. Briefly, participants are interviewed in their homes and then subsequently examined in a mobile examination center across numerous U.S. geographic regions. The study was approved by the National Center for Health Statistics Ethics Review Board, with informed consent obtained from all participants prior to data collection.

Mortality Assessment

NHANES participant data were linked to death certificates from the National Death Index; person-months of follow-up were calculated from the date of the interview until death or censoring on December 31, 2011, whichever came first.

Measurement of ED

Identical to other studies [12], prevalent ED was assessed with the question: "How would you describe your ability to get and keep an erection adequate for satisfactory intercourse?" (options: *always or almost always able*; *usually able*; *sometimes able*; and *never able*). Those reporting *sometimes able* or *never able* were classified as having ED. Defining ED in this manner results in high clinical specificity (>90%) [13].

Statistical Analysis

Using survey-based procedures in Stata, a Cox Proportional Hazards model was used to examine the association between ED (independent variable) and premature all-cause mortality risk. Similar to our other work [12], covariates in this model included age, physical activity, race-ethnicity, waist circumference, poverty-to-income ratio, cotinine, and comorbid illness (0, 1, or 2+ of the following physician-diagnosed conditions: arthritis, coronary artery disease, congestive heart failure, heart attack, stroke, cancer, chronic obstructive pulmonary disease and hypertension). Notably, when additional covariates, such as total cholesterol and C-reactive protein were added to the model, results were unchanged. Statistical significance was established as $P < 0.05$.

Results

One thousand seven hundred ninety adults (20–85 years; mean age: 45.4 years) provided complete data (i.e., data for the study variables), with 557 having ED; notably, 1,792 adults provided data on the study variables with the exception of two individuals having a missing status for mortality, so the removal of these two participants resulted in the final analytic sample of 1,790 participants. The median follow-up was 93 months (7.75 years), with 244 deceased over this time period. Among these 244 deaths, 61 were from CVD, 64 from malignant neoplasms, 12 from chronic lower respiratory diseases, 6 from unintentional injuries, 14 from cerebrovascular diseases, 3 from Alzheimer's disease, 8 from diabetes, 4 from influenza and pneumonia, 7 from nephritis, and 65 from other causes. In the sample, 159,140 person-months occurred with an incidence rate of 1.52 deaths per 1,000 person-months. As shown in Table 1, those alive at follow-up, compared with those deceased, were younger at baseline, had a high cotinine level, higher poverty-to-income ratio (higher socioeconomic status), lower waist circumference, had fewer comorbidities and were more likely to engage in moderate-to-vigorous physical activity in the past month.

In a Cox proportional hazards model, and after adjusting for age, physical activity, race-ethnicity, waist circumference, poverty-to-income ratio, cotinine, and comorbid illness, those with ED (vs. those without) at baseline had a 70% increased risk of premature all-cause mortality (hazards ratio [HR] = 1.70; 95% confidence interval [CI]: 1.01–2.85; $P = 0.04$); Harrell's C concordance statistic was 0.86 and the proportional hazards assumption was not violated ($P = 0.10$). Those with ED, compared with those without,