Increased Risk for Cancer Following Erectile Dysfunction: A Nationwide Population-Based Follow-Up Study

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ABSTRACT

Introduction. Previous studies have suggested that erectile dysfunction (ED) is associated with chronic inflammation, which is also a principle mechanism of carcinogensis. However, very few studies have attempted to examine the association between ED and subsequent cancer.

Aim. Using a nationwide population-based data set, the aim of this study is to investigate the risk for cancer during a 5-year follow-up period after a diagnosis of ED, compared to patients without ED during the same period, while adjusting for socio-demographic characteristics.

Main Outcome Measure. Stratified Cox proportional hazard regression was performed to compare the 5-year cancer-free survival rate for the two cohorts.

Methods. This study used data sourced from the Taiwan "Longitudinal Health Insurance Database." The study cohort comprised 1,882 patients with ED and 9,410 randomly selected subjects as the comparison cohort. Each patient was then individually tracked for 5 years from their index ambulatory care visit to identify those who had diagnosed episodes of cancer.

Results. Of the sampled patients, 183 (1.6%) had cancer within the 5-year follow-up period, that is, 43 individuals (2.3% of the patients with ED) from the study cohort and 140 individuals (1.6% of patients in the comparison cohort) from the comparison cohort. After adjusting for the patients' monthly income, the geographic location and urbanization level of the community in which the patient resided, hypertension, diabetes, coronary heart disease, and hyperlipidemia, regression analysis reveals that the hazard of having cancer during the 5-year follow-up period was 1.42 (95% CI = 1.03–2.09, $P = 0.039$) times greater for patients with ED than comparison patients. However, data on smoking, which is an important factor in ED and cancer, is not available and remains a potential confounder.

Conclusions. We conclude that the incidence of cancer in the 5 years after an ED diagnosis is significantly higher than in the general population. **Chung S-D, Kang J-H, Liao C-H, Chiu K-M, and Lin H-C. Increased risk for cancer following erectile dysfunction: A nationwide population-based follow-up study. J Sex Med 2011;8: 1513–1520.**

Key Words. Erectile Dysfunction; Cancer; Epidemiology; Erectile Dsyfunction and Chronic Inflammation

Introduction

Erectile dysfunction (ED), which is defined as the inability to achieve or maintain an erection sufficient for satisfactory sexual intercourse, is the most common sexual problem in ageing men [1,2]. ED affects up to one-third of men throughout their lives and can have a negative impact on intimate relationships, quality of life, and self-esteem [3].

A normal erection is based on complex interaction between neurotransmitter and vascular

smooth muscle responses initiated by the autonomic system after penile stimulation by sexual perception [4]. Plenty of studies have demonstrated that ED shares almost all risk factors, such as hypertension, diabetes mellitus, hyperlipidemia, periodontal disease, and smoking, with vascular disorders, such as coronary heart disease (CHD), peripheral vascular, and cerebrovascular disease [1,5–9].

Recently, systemic low grade inflammation status has also been proposed as a factor potentially contributing to development of ED [10]. Inflammation may promote endothelial dysfunction, and is cardiovascular risk factor common to CHD and ED [11–13]. In addition, increased evidence from preclinical and clinical studies suggests that chronic inflammation status predisposes susceptible cells to neoplastic transformation [14]. However, to our knowledge, to date, there has been no previous study evaluating the risk of cancer after ED diagnosis.

In light of this, using a nationwide population-based data set, the aim of this study is to investigate the risk for cancer during a 5-year follow-up period after a diagnosis of ED, compared to patients without ED during the same period, after adjusting for socio-demographic characteristics. We hypothesize that the pathomechanisms contributing to ED may also be associated with development of malignant neoplasms because they may share common pathways of pathogenesis.

Methods

Database

This study used data sourced from the Longitudinal Health Insurance Database 2000 (LHID2000), which is a subset of records from the Bureau of National Health Insurance and is provided to scientists by the Taiwan National Health Research Institute for research purposes. The Taiwan National Health Insurance (NHI) Program was initiated in 1995, and almost 99% of Taiwan's population was enrolled in this program in 2009. The LHID2000 contains all the original claims data for 1,000,000 beneficiaries, randomly sampled from the year 2000 Registry of Beneficiaries (N = 23.72 million) under the NHI program. There is no significant difference in the gender distribution between the beneficiaries in the LHID2000 and the all beneficiaries under the NHI. The LHID2000 allows the researchers to trace all medical utilization for these 1,000,000 beneficiaries between 1996 and 2008.

The LHID2000 consists of de-identified secondary data released to the public for research purposes, so this study was exempt from full review by the Institutional Review Board (IRB) after consulting the director of IRB of Taipei Medical University.

Study Sample

This study was designed as a retrospective case–cohort study. From the LHID2000, we identified 2,910 patients who visited ambulatory care centers (including outpatient departments of hospitals or clinics) for the treatment of ED (with a principal diagnosis of impotence, organic (ICD-9-CM code 607.84) or impotence, psychogenic (ICD-9-CM code 302.72) between January 1, 2001 and December 31, 2003. We assigned their first ambulatory care visits for the treatment of ED during this period (2001–03) as the index ambulatory care visits. We first excluded patients less than 40 years old (N = 520). In order to increase the likelihood of including only newly onset cases, and we also excluded patients who had visited ambulatory care centers for the treatment of ED prior to their index ambulatory care visit (N = 392). Furthermore, we excluded patients with a history of any type of cancer (ICD-9-CM codes 140–208 and 230–239) prior to their index ambulatory care visit (N = 116). As a result, 1,882 patients with ED (including 1,658 patients with organic impotence and 224 patients with psychogenic impotence) were included as the study cohort.

The comparison cohort of this study was likewise selected from the LHID2000. First, we excluded patients who had been diagnosed with ED during the period from 1996 to 2008. We then limited selected patients to males aged ≥40 years. Thereafter, we randomly selected 9,410 patients (5 for every patient with ED) matched with the study cohort in terms of age group (40–49, 50–59, 60–69, and >69) and the year of index ambulatory care visit using the SAS program proc surveyselecte (SAS System for Windows, Version 8.2, SAS Institute, Cary, NC, USA). We assigned their first ambulatory care visits occurring in the index year (2001–03) as their index ambulatory care visit. Similarly, we assured that all included patients in the comparison cohort had no history of cancer prior to their index ambulatory care visit.

We tracked each patient (N = 11,292) individually for 5 years from their index ambulatory care visit to discriminate those who had diagnosed with any type of cancer. In addition, cases were cen-