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Long-term survival of patients aged 80 years or older treated with radical prostatectomy for prostate cancer☆

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Abstract

Background: Radical prostatectomy (RP) is the gold standard for clinically localized prostate cancer (PCa) patients with life expectancy (LE) of at least 10 years. We examined long-term survival of men aged 80 years or older treated with RP and we attempted to identify criteria based on age and comorbidities that could predict survival of at least 10 years after RP, to identify those that might be considered for RP.

Patients and methods: In Surveillance Epidemiology and End Results (SEER)-Medicare-linked database, we identified 234 octo- and nonagenarians with clinical T1, T2 or T3 PCa treated with RP between 1991 and 2009. Kaplan–Meier analyses examined 10-year survival patterns. Multivariable Cox regression analyses focused on the combined effect of age and/or Charlson Comorbidity Index (CCI) after adjusting for different confounders.

Results: The 10-year overall survival (OS) and cancer specific mortality (CSM) rates in the overall population were 51 and 9.9%. In individuals aged 80–81 years old, the 10-year OS was 62.4 vs. 39.6% in older patients ($p = 0.001$). Moreover, combination of age 80–81 with CCI = 0 yielded 10-year OS of 67.9 vs. 28.5% in older and sicker patients ($p < 0.001$). Age 80–81, absence of comorbidities and the combination of age 80–81 with CCI = 0, represented independent predictors of lower overall mortality (all $p \leq 0.01$).

Conclusions: Two out of three individuals selected for RP aged 80–81 years and without comorbidities, fulfill the criterion of LE of 10 years or more. Therefore, elderly PCa individuals can be suitable for surgical management, if appropriately selected, based on LE criterion.

Keywords: Elderly patients; Long-term survival; Prostate cancer; Radical prostatectomy

Introduction

Radical prostatectomy (RP) represents the gold standard in the management of clinically localized prostate cancer (PCa).[1] However, life expectancy (LE) of at least 10 years is considered as the most important criteria to consider before commitment for such form of treatment.[1] This might represent a concern when elderly individuals, such as octogenarians or nonagenarians are considered. Specifically, a

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LE of 8.1 years in 80 years old patients has been described in the literature.[2] Additionally, the LE decreases to approximately 6 years by the age of 85.[2] That being said, according to National Comprehensive Cancer Network (NCCN) guidelines, the LE of octogenarians within the best quartile of age, within the Social Security Administration tables, is 12.15 years.[2] In consequence, it could be postulated that some individuals, despite the extreme age, might represent a suitable group for RP, based on LE considerations. Unfortunately, the definition of best quartile is based on the clinician's subjective and unguided assessment.[2,3] It is noteworthy to observe an increasing proportion of individuals aged 80 years or older, as well as an increasing LE worldwide.[4−6] In consequence, identification of such PCa individuals with good LE becomes of pivotal importance in the context of valid medical decision.

To the best of our knowledge, only one previous study examined long-term survival rates after RP in octogenarian or older patients.[7] Additionally, such study is limited by the extremely small sample size (n = 19). In consequence, we evaluated long-term survival rates after RP in a large cohort of patients aged 80 years or older who were treated with RP within a large population database, such as the Surveillance, Epidemiology, and End Results (SEER)-Medicare. Our hypothesis stated that a subset of such individuals achieves LE of 10 years or more and, in consequence, represent valid candidates for surgical management.

Materials and methods

The present retrospective study was approved by the local Institutional Review Board and is in compliance with the Declaration of Helsinki.

Data source

The current study relied on the SEER-Medicare insurance program-linked database. The SEER registries cover approximately 28% of all cancer cases in the United States. The Medicare-linked database is 98% complete for case ascertainment. It encompasses approximately 97% of Americans ≥65 years or older in the United States. Linkage to the SEER database is complete for approximately 93% of the patients.[8]

Study population

Between 1991 and 2009, patients with histologically confirmed PCa (International Classification of Disease for Oncology [ICD-O] site code 61.9, histologic code 8140), aged 80 years or older, who had both Medicare Part A and Part B claims available, and who were not enrolled in a health maintenance organization throughout the duration of the study were abstracted.

Patients were excluded from evaluation, if PCa was diagnosed at autopsy or on death certificate only or if PCa was not their first malignant disease. Additional exclusions consisted of clinical stage T4 tumors and/or distant metastases.

We focused exclusively on patients treated with RP within the first six months from diagnosis. Patients who received androgen deprivation therapy (ADT), radiotherapy (RT) and brachytherapy (BT) as first treatment within six months from PCa diagnosis, were excluded. Receipt of treatment was determined using Common Procedural Terminology, fourth edition (CPT-4), Healthcare Common Procedure Coding System (HCPCS) and International Classification of Disease-Ninth Revision (ICD-9) codes for RP, ADT, RT and BT (Supplementary Table). The final study cohort comprised 234 octo- or nonagenarians with clinical T1, T2 or T3 PCa who were treated with RP.

Variable definition

For each patient, age at diagnosis, year of diagnosis, race (white, black, other), marital status (single, married, separated/divorced and widowed), United States (US) region of residence (Midwest, Northeast, South and West − according to the US Census Bureau) and population density status (urban and rural), were recorded. Socioeconomic status (SES) was defined according to three county-attribute variables (income, education, poverty levels) based on previous methodology.[9,10] The Charlson Comorbidity Index (CCI) was derived from the Medicare claims one year before PCa diagnosis using a previously validated algorithm,[11] and categorized as 0 vs. ≥1. Tumor characteristics included clinical stage (T1, T2, T1/T2 and T3) and Gleason grade. Before 2003, Gleason grades of 2−4, 5−7 and 8−10 corresponded to well-differentiated, moderately differentiated, and poorly differentiated disease, respectively. Thereafter, a Gleason grade of 2−4, 5−6 and 7−10 to well-differentiated, moderately differentiated, and poorly differentiated disease, respectively.

Outcomes

The cause of death was defined using the SEER cause of death code. Patients who died from PCa (ICD-9185.9 or ICD-10 C619) were classified as expired due to cancer specific mortality (CSM), while patients who died of other causes were classified as having succumbed to other cause mortality (OCM).[12] Overall survival (OS) was defined as the interval from the date of diagnosis to the date of death.

Statistical analyses

Our analyses consisted of four steps. First, we estimated 10-year OS, CSM-free and OCM-free survival rates, in the overall population using Kaplan−Meier method. Second, we repeated the analyses after stratification according to the median age and CCI (0 vs. ≥1). Third, in order to better explore the survival differences according to age and comorbidities, we also created two groups − younger